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(Abidjan, 1996)

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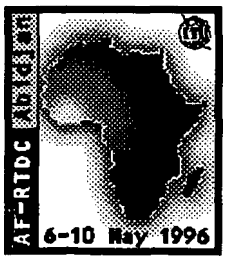
TELECOMMUNICATION DEVELOPMENT BUREAU



AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 1-E
1 March 1996
Original: English

For Information/Support

PLENARY MEETING

SOURCE: SECRETARY-GENERAL, ITU

TITLE: AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE (ABIDJAN, CÔTE D'IVOIRE, 6-10 MAY 1996)
DRAFT AGENDA

Introduction:

0.1 Evaluation of the follow-up and implementation of decisions from AF-RTDC/90, WTDC/94 and PP/94:

- Actions taken by ITU-D
- Actions taken by participating countries and regional organizations
- Lessons learned
- Bottlenecks found

0.2 Analysis of changes in the telecommunication sector in Africa since AF-RTDC/90

- Policy and regulatory development
- Services introduced
- Infrastructure initiatives

I. Policies and Strategies

1.1 Restructuring to further development

- Examination and approval of African Green Paper
- Reform and regulatory issues
- Information infrastructure

- Trade-in-Services
- Importance of licensing

1.2 Role of regional and sub-regional organizations in Africa

- Ways and means to strengthen their role

1.3 Industrialization and manufacturing (including technology transfer)

II. Development of Networks

2.1 Priorities for LDCs

- Development of national telecommunication infrastructure, in particular in rural areas
- Management
- HRD/HRM
- Maintenance
- Planning

2.2 Importance of Management Information System (MIS) to enhance know-how in network management, traffic routing and performance indicators

2.3 Regional networks (RASCOM, PANAFTEL and others)

2.4 Regional projects

- On-going projects (e.g. sub-marine project AFRICA-One)
- Revitalization of previous projects (PANAFTEL)
- New initiatives (e.g. SPACECOM)

III. Financing

3.1 Mechanisms for financing telecommunication development

- Using national/international resources
- Regional and sub-regional cooperation
- Role of the private sector

Actions for the future

- Creation of a mechanism for the follow-up of Conference decisions
- Miscellaneous

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 2-E
2 April 1996
Original: English/ French
For Action

Agenda item: 1.1

PLENARY MEETING

SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU

TITLE: THE AFRICAN GREEN PAPER
TELECOMMUNICATION POLICIES FOR AFRICA

PRESENTATION OF THE AFRICAN GREEN PAPER

Introduction

1. The increasingly widespread awareness of the fundamental role of telecommunications in overall economic development makes it all the more unacceptable that African countries should be so far behind in this respect. The Lagos Plan of Action, which was approved by the Heads of Member States of the OAU, recognised this as far back as 1980 and resolved that the telecommunication sector should be given the necessary backing it deserves in the overall development of our continent. It was in the full knowledge of this that the African Telecommunication Development Conference (ATDC) (Harare, Zimbabwe, 1990) created within the framework of the International Telecommunication Union's Telecommunication Development Bureau (ITU/BDT) a standing African Information and Telecommunication Policy Study Group (AITPSG), entrusting to it as a matter of the utmost urgency the task of elaborating a first draft of the regional telecommunication policy document to be known as the African Green Paper (ATDC-90/RES1) (see **Annex 2**).

2. The inspiration for the Green Paper was drawn from the similar measures taken by the European Commission which in 1987 issued guidelines to the governments of its member countries with a view to harmonising national telecommunication sector policies within the framework of European economic integration.

3. In assuming this task, the AITPSG entrusted the preparation of the document to an *ad hoc* team of four experts from African telecommunication administrations, under the coordination of a consultant. The team met on three occasions (Geneva, 9-12 November 1992; Addis Ababa, 15-19 March 1993; Geneva, 6-7 July 1993), carrying out the tasks assigned to it in close collaboration with the African administrations and the regional and international organisations concerned.

4. The AITPSG met three times in Nairobi, Kenya (from 27 to 29 July 1992), in Cotonou, Benin (from 13 to 17 December 1993) and in Praïa, Cape Verde (from 21 to 25 November 1994) to amend and approve the African Green Paper.

5. The Praïa meeting which approved the African Green Paper requested:

- the ITU/BDT to take all measures to convene as early as possible in 1995 a Conference of Ministers responsible for telecommunications in order:
  - to formally adopt the African Green Paper;
  - to consider the recommendations relating to the African Green Paper that have been formulated by the AITPSG;
  - to take the necessary accompanying measures for implementation of the African Green Paper, in particular the creation of a Follow-up Committee;
  - to define the future activities of the AITPSG;
  - to reaffirm the political will of African governments to give foremost priority to telecommunications development;
  - that the AITPSG Bureau, in collaboration with telecommunication administrations, proceed in popularising the African Green Paper in order to sensitise all partners to the guidelines and the programme of action before the Conference of Ministers planned for 1995;

- that the Telecommunication Development Bureau provide the necessary resources to accomplish this task.

6. Further to these recommendations, the BDT sent the version of the African Green Paper adopted in Praïa to the administrations. At this time, the BDT was willing, due to budgetary constraints, and to avoid convening a conference of Ministers as a separate event, to organise an African Policy meeting in September 1995. A hole day should have been dedicated during this meeting, for a Council of Minister to adopt the African Green Paper.

7. Unfortunately, the Policy meeting could not be held, for reasons beyond the control of the BDT.

8. Finally, the BDT was able to organise the preparatory meeting of the African Regional Telecommunication Development Conference in Tunis, Tunisia (from 22 to 24 November 1995) with the African Green Paper in its agenda.

9. The Tunis meeting recommended that the administrations/organisations provide any changes they would like to introduce before finalising the African Green Paper, and submitting it to the African Regional Telecommunication Development Conference for its adoption at a ministerial level.

10. Although no amendment was received, the African Green Paper was nevertheless revised to take account of ongoing restructuration activities on the continent, the changes occurred in telecommunications, the organisation, etc. Efforts were made to avoid modification of fundamental issues.

The African Green Paper

11. The African Green paper is organised as follows:

Chapter I is an introduction of the paper. **Chapter II** gives an overview of the **existing situation** - in the world in general and in Africa in particular - concerning the telecommunication sector and related areas. **Chapter III** provides the history and current pattern of **legal concepts, instruments** and **institutional options that could be relevant to the telecommunication sector** with focus on both regional and country level requirements. **Chapter IV** sets forth the basic principles governing the establishment of the regulatory framework for opening up the telecommunications market to competition, and offers guidelines for gearing that framework to conditions in Africa. **Annexes 3 to 7** contain background material for the design of such a regulatory framework. **Chapter V** tackles the question of the **operational restructuring**, on the assumption that there still exists a monopoly for the basic telephone service. However the question of whether it is a good or not good thing to maintain a monopoly is not addressed. All that matters is for the government to ensure that the monopoly achieves the required long-term objectives. **Chapter VI** deals with the critical **economic, financial and tariff issues**. The ultimate aim of the endeavour is to satisfy the needs of the African people at the lowest cost, on the basis of an efficient, integrated network, which will enable and facilitate the integration of African economies. **Chapter VII** outlines the direction and main characteristics of **future network developments**, from a technical point of view. As a result of the way in which it is being elaborated, the African Green Paper can provide an opportunity for regional co-operation, for a fresh start and for tangible action. **Chapter VIII** offers suggestions for improving **regional and international co-operation** and making it more effective.

Finally, the African Green Paper suggests **a series of recommendations summarised in the Executive Summary** and indicated at the end of each concerned chapter.

Two new recommendations are proposed to you as follows:

- *That the African administrations should work together and consider an action plan with a timetable for the implementation of these recommendations. This action plan should be drawn up before 31 December 1996.*

- *In view of the rapid and continuous development of the telecommunication environment and the convergence of telecommunications, computer and broadcasting technologies, it is recommended that studies should be pursued with a view to regularly updating the African Green Paper and adapting it to the new international telecommunication environment of the 21st century.*

12. In operational terms, the African Green Paper seeks to:

1) **initiate a dialogue among all the actors involved** in designing and creating a **legal and regulatory framework** that maximises the sector's contribution to economic, socio-cultural and technical development and allows the African countries to improve their global competitiveness in the world economy;

2) **improve the operational efficiency and productivity** of Public Telecommunication Organisations (PTOs) to enable them to face competition whilst better responding to customer demands and social needs;

3) **promote the gradual introduction of competition** initially in the provision of value-added services and terminal equipment) in response to consumers' requirements for a greater choice in the provision of telecommunication services;

4) work towards **common procurement arrangements and common technical standards** for African PTOs, and towards building up manufacturing capacity for telecommunication equipment;

5) **create momentum towards establishing a regional market** for telecommunication equipment and services;

6) **foster the implementation of an African telecommunications network** to facilitate the creation of the African Economic Community.

13. This version of the African Green Paper is submitted to the Conference for approval; the new texts appear underlined and the deletions are crossed out.

Acknowledgements

14. The African Green Paper is the result of collaboration among African experts. We would particularly like to name Mr. DE CRECCHIO, ITU Consultant, the African experts Messrs. FELICIAN Novatus (Tanzania), MAGA Richard (Cameroon), OCHIENG-NYAMOGO (Kenya) and VIGNON Honoré (Benin), who laid the foundation stones of this Paper. We extend our thanks to AITPSG meetings' participants, all members of the AITPSG Bureaux, all the bureaux of the various ad hoc Committees which were created and which meticulously examined the African Green Paper and made the necessary modifications and recommendations. We would not wish to forget the OAU, the ECA, PATU, the COMESA (former PTA), ECOWAS, etc. who contributed to enrich this Paper.

To all we extend our thanks.

Conclusion

15. The African Green Paper will, we hope, become an official tool for all countries concerned, through the adoption of an AF-RTDC Resolution by this competent Conference. Our wish is that this work, into which you have put so much heart and effort, will provide the telecommunication community on the African continent with a framework for reflection on future policies for African telecommunications, and at the same time will serve to stimulate their harmonious development.

All we need in order to meet this challenge is our invincible willpower, unshakeable solidarity and unfailing openness to the outside world.

The BDT - your BDT - is at your service and will spare no effort, within the limits of its budget, to support your efforts to modernise the pan-African telecommunication network and open the telecommunication market up to competition.

INTERNATIONAL
TELECOMMUNICATION
UNION

THE AFRICAN GREEN PAPER

TELECOMMUNICATION POLICIES FOR AFRICA

TELECOMMUNICATION DEVELOPMENT BUREAU (BDT)
April 1996

THE AFRICAN GREEN PAPER

Telecommunication policies for Africa

APRIL 1996

THE AFRICAN GREEN PAPER

Telecommunication policies for Africa

April 1996

TABLE OF CONTENTS

	Paragraphs
FOREWORD	**001-007**
EXECUTIVE SUMMARY	**001-011**
SUMMARY OF RECOMMENDATIONS - *Recommendations*	
CHAPTER I. - INTRODUCTION	**001-027**
Telecommunications evolution	001-004
The telecommunication sector in Africa	005-008
The need for a policy framework	009-015
The policy formulation process	016-019
Content of the policy framework	020-022
Organization of the Green Paper	023-027
Recommendations	
CHAPTER II. - EXISTING SITUATION	**028-077**
(a) *Global trends*	028-041
Search for an appropriate institutional framework	032
Information and communication technologies	033-035
The need for restructuring	036-041
(b) *The situation in Africa*	042-077
The economy	043-047
The democratic transition	048
Demography	049-052
Telecommunication networks and services	053-058
Financing of telecommunication projects	059
Bill collection	060
Network maintenance	061-062
Human resources	063
Regional and subregional cooperation	064-066
Existing operating structures	067-070
Rural telecommunications	071-074
A platform for action	075-077
Recommendations	

CHAPTER III. - LEGAL CONSIDERATIONS **078-108**

Introduction 078-082
The regional/subregional scenario 083
The national scenario - The National Regulatory Authority (NRA) 084-090
The alternatives to NRA 091-096
The PTO's new legal structure 097-098
Further legal issues 099-100
Procedures for the resolution of disputes 101-108

Recommendations

CHAPTER IV. - THE REGULATORY FRAMEWORK **109-138**

Actions to be taken at regional/subregional level 110-116
Reserved and competitive telecommunication services 117-121
Integrity of basic network infrastructure 122-124
Access to network infrastructures 125
The ONP concept 126-127
The Open Networking ~~ONA~~ concept 128-129
Liberalization-cum-regulation 130-132
Other action to be taken at the regional/subregional/and national levels 133-136
Functions to be performed by the NRA 137-138

Recommendations

CHAPTER V. - OPERATIONAL RESTRUCTURING ~~OF NETWORK OPERATIONS AND SERVICES~~ **139-160**

Introduction 139-140
Autonomy versus State control 141-144
Separation of postal and telecommunication services 145-148
Management problems 149-151
Importance of strategic planning 152-154
Detailed diagnosis of agency management 155-156
The special case of human resources management 157-160

Recommendations

CHAPTER VI. - ECONOMIC, FINANCIAL AND TARIFF ISSUES **161-214**

Investment necessary to develop the basic network 161
Profitability of telecommunication investments 162-164
Investment required to develop the basic network 165-167
Sources of funding 168-169
Telecommunication investments and other national priorities 170-174
Recommended action 175
Action required at the national level 176-182
Action required at the subregional level 183
Action required at the regional level 184-186
Tariff issues 187-189
Tariff principles 190-193
Viewpoints on tariff principles 194-198

Utilization of the PANAFTEL network 199-201
Settlement of accounts 202-203
Sender Keeps All Accounting (SKA) 204
The ~~PTA~~ COMESA multilateral clearing facility 205
Action required at the national level 206-210
Action required at the subregional and regional levels 211-214

Recommendations

CHAPTER VII. - TELECOMMUNICATION NETWORK DEVELOPMENT 215-269

Development policy 215-218
The need for balanced development of the national telecommunication network 219-221
Introduction of new technologies and associated services 222-227
Interconnection of public and private networks 228-231
Rural telephony 232-235
Technical options 236-237
Installations maintenance 238-239
Communications charging 240
Accompanying measures 241
Network operation 242
Charging for products 243-245
Network development structure and management 246
Integration of development policies 247-249
Interconnection of national network with a particular type of global network 250-252
The regional level 253-258
Setting up a common infrastructure/common support system 259
Service interconnectivity 260-263
Harmonization of network development norms/standards 264-266
Industrialization policy 267-269

Recommendations

CHAPTER VIII. - REGIONAL AND INTERNATIONAL COOPERATION 270-279

Organizing regional cooperation in a simpler and more efficient manner 271-273
Issues to be tackled within the framework of regional cooperation 274-275
International cooperation 276-277
Least developed countries in the region 278-279

Recommendations

ANNEXES

Annex I List of reference documents

Annex 2 African Telecommunication Development Conference (Harare, 1990), Resolution ATDC/90-No. 1

Annex 3 African Economic Community: Draft OAU Protocol on transport and communications (Article 10 - Telecommunications)

Annex 4 Model organizational structure and staffing of a National Regulatory Authority (NRA)

Annex 5 ~~Example of a draft law determining a regulatory framework for the telecommunication sector~~ Outline of a law determing a regulatory framework for the telecommunication sector

Annex 6 Open Network Provision (ONP) - the European concept

Annex 7 ~~Open Network Architecture (ONA) - the United States concept~~ Model checklist for a detailed diagnosis of agency management

Annex 8 Methods of granting licences - Renewal (Excerpt from the ~~December 1993~~ March 1996 draft of The Blue Book - Telecommunication policies for the Americas)

Annex 9 Financial sources, instruments and strategies

Annex 10 The Buenos Aires Action Plan

Annex 11 Terms of reference of the ITU-D Study Groups

Annex 12 Master plans carried out in Africa with ITU assistance

Annex 13 Basic indicators

Annex 14 Glossary

FOREWORD

1. The increasingly widespread awareness of the fundamental role of telecommunications in overall economic development makes it all the more unacceptable that African countries should be so far behind in this respect. The Lagos Plan of Action, which was approved by the Heads of Member States of the OAU, recognized this as far back as 1980 and resolved that the telecommunication sector should be given the necessary backing it deserves in the overall development of our continent. It was in the full knowledge of this that the African Telecommunication Development Conference (ATDC) (Harare, Zimbabwe, 1990) created within the framework of the International Telecommunication Union's Telecommunication Development Bureau (ITU/BDT) a standing African Information and Telecommunication Policy Study Group (AITPSG), entrusting to it as a matter of the utmost urgency the task of elaborating a first draft of the regional telecommunication policy document to be known as the African Green Paper (ATDC-90/RES1) (see **Annex 2**).

2. In assuming this task, the AITPSG entrusted the preparation of the document to an *ad hoc* team of four experts from African telecommunication administrations, under the coordination of a consultant. The team met on three occasions (Geneva, 9-12 November 1992; Addis Ababa, 15-19 March 1993; Geneva, 6-7 July 1993), carrying out the tasks assigned to it in close collaboration with the African administrations and the regional and international organizations concerned.

3. The inspiration for the Green Paper was drawn from the similar measures taken by the European Commission which in 1987 issued guidelines to the governments of its member countries with a view to harmonizing national telecommunication sector policies within the framework of European economic integration.

4. It should, however, be emphasized that since the African continent does not yet have a political framework as firm as the European Union, the African Green Paper should be viewed more as a thought-provoking document suggesting an appropriate approach and offering a number of potential options for defining and bringing about, as harmoniously as possible, restructuring of the telecommunication sector in Africa.

5. In line with Resolution No 1 of the ATDC, it is suggested that following the adoption of the Green Paper by the AITPSG, studies continue within the four African economic subgroupings or even within a smaller group of countries, as well as within each individual country. Meetings, seminars and workshops could also be organized in a more goal-oriented way than is possible at the continental level, with a view to defining a tighter and more specific policy and regulatory framework, both at the subregional and national levels, based on the Green Paper and other relevant working documents.

6. In these different forums, appropriate measures in terms of human, material and financial resources should be decided upon prior to implementation of the policy adopted by common consent.

7. For their part, the ITU/BDT, the regional and subregional organizations such as the ECA, ECOWAS, ECCAS, OAU, UMA, PATU, SADC~~, PTA,~~ and COMESA (Common Market for Eastern and Southern Africa) should collaborate in evaluating their entire process with a view to reporting on it to future African regional telecommunication development conferences and thereby facilitating the adoption of appropriate measures.

EXECUTIVE SUMMARY

1. Throughout the world, and in particular since the early 1980s, far-reaching changes have taken place in telecommunications as a sector of economic activity. These changes mark the end of a period of several decades characterized by the existence of national, generally State-run monopolies.

2. At the moment, Africa is somewhat removed from these changes. The continent's acknowledged lack of equipment in telecommunications and the poor performance of its public network operators call for very close scrutiny of the approaches adopted since the 1960s, in particular with regard to investment and technical assistance policies. Do the changes which have taken place elsewhere in the world have any relevance for improving the performance of the African telecommunication sector?

3. One of the basic assumptions of the Green Paper is that the African countries would benefit considerably if they were to join forces in approaching the subject at the continental and subregional levels so as to promote to the greatest extent possible the integration of their telecommunication networks and services and, hence, of their economies.

4. Breaking away from resorting to short-term plans to bring about improvements, such as in investment or technical assistance, the Green Paper is a tool for pursuing at the highest level of the States, bringing together as they do the various players in the telecommunication sector, the formulation of explicit policies. These might follow the example of what has been done elsewhere to:

- shift government responsibility away from the ownership and management of public companies towards the establishment of a policy, legal and regulatory framework;
- restructure the telecommunication network operators as fully autonomous corporations and make them more market oriented;
- involve the private sector in the management and implementation of the national telecommunication network;
- and introduce some form of competition.

5. Policies should be subject to periodic review by assessing the effects of measures already taken. The Green Paper proposes to focus on:

- determination of the legal and regulatory framework governing telecommunications;
- restructuring of operations and redefinition of the type of control by the government;
- future development of African telecommunication networks and services; and
- regional cooperation.

6. The "regulatory framework" covers the various legal instruments establishing the regulatory body and prescribing its powers, rights and obligations, the rights and obligations of public operators and other entities subject to regulation, and the relations between the regulatory body and other ministerial departments, the legislative authority and the judiciary.

7. No perfect model emerges from the experience acquired by countries which have already initiated such changes. But a methodical approach can be suggested. Prior to actually defining the regulatory framework, it would seek to identify the objectives, scope and modes of application of the regulations, as each of these three elements offers various options with advantages and disadvantages.

8. As telecommunications ~~are largely~~ have historically been State-dominated, any restructuring attempt will inevitably entail close scrutiny of the State's role and, consequently, of the merits of private participation in ownership and management and of the diversification of operators. The African countries should approach the issue with equanimity. The principal challenge is to adapt the sector in a coherent and systematic manner to market forces and to the requirements of the State institutions. Privatization may be a useful tool among others in this process to succeed with reform.

9. At the same time, the attention of senior executives in telecommunication administrations is drawn to the fact that it is their duty to remove all obstacles to the efficient management of their units. Such obstacles are often the result of cultural inadequacies in administrative bodies which are not run as businesses. Hence the importance of proper human resources management in implementing the necessary changes, which are more closely bound up with staff members' values, attitudes and behaviour than with their technical skills. High priority should also be given in the future to strategic planning, which makes it easier not only to identify objectives and obtain the resources required to achieve them, but also to clarify the organization's relationship with the public authorities and the socio-economic environment in general.

10. Moreover, the Green Paper points to the need to devise ways and means of making regional cooperation simpler and more efficient. The common objective should be to meet the African population's needs through the best possible use of human, material and financial resources. The new approach should lead to the identification and completion of projects in the regulatory, technical and managerial fields. This is the way for achieving integration of more efficient national telecommunication networks which would herald the economic and political integration to which the peoples of Africa aspire.

11. In operational terms, the African Green Paper seeks to:

(1) initiate a dialogue among all the actors concerned in designing and creating legal and regulatory frameworks that strengthen the sector's economic, socio-cultural and technical contribution;

(~~3~~ 2)improve the operational efficiency and productivity of Public Telecommunication Organizations (PTOs) to enable them to face competition whilst better responding to customer demands and social needs;

(~~2~~3)promote the gradual introduction of competition (as a first step in the provision of ~~advanced~~ value added services and terminal equipment) in response to business and individual requirements;

(4) create momentum towards establishing a regional market for telecommunication equipment and services;

(5) work towards common procurement arrangements and common technical standards for African PTOs, and towards building up manufacturing capacity for telecommunication equipment;

(6) foster the implementation of an African telecommunications network to facilitate the creation of the African Economic Community.

SUMMARY OF RECOMMENDATIONS

RECOMMENDATION 1

Creation of a national committee for the coordination of national information and telecommunication policies

The Green Paper incorporates the relevant provisions of Resolution ATDC-90/RES1 of the African Telecommunication Development Conference (Harare, 1990) which calls for the creation in each country of a national inter-ministerial coordination committee to study and propose to the government appropriate national information and telecommunication policies. These policies, while forming part of the country's socio-economic development policy option, would take into consideration the realities of the international telecommunication ennvironment and the pressing need for African economic integration.

RECOMMENDATION 2

Role of the State in telecommunication development

While recognizing the State's continuing role in the development of telecommunication networks and services in Africa, the Green Paper recommends a thorough re-examination of that role, which should be concerned, inter alia, with defining sectoral policy.

RECOMMENDATION 3

The regulatory framework for telecommunications

As the existence of an appropriate regulatory framework is a prerequisite, in the current world context, for any telecommunication development strategy, the Green Paper recommends:

(i) the creation of a separate national body for the regulation of telecommunications. Although the structure and procedures of such a body would depend on a number of factors including some specific to each country, it is important, in this connection, to take the following elements into account:

- *the purpose of the regulatory body must be clearly defined, inter alia by answering certain questions, such as how and why regulation should take place and what should be regulated;*
- *data derived from the international environment, among other sources of information, should make it possible for the regulatory body to anticipate change;*
- *in examining and seeking solutions to the problems which have been submitted to it, the regulatory body must be guided by a spirit of transparency without which it would lack credibility and would not be in a position to carry out its crucial arbitrational role with respect to all interested parties, including the State authorities;*
- *the position of the regulatory body ~~in the overall government sttructure~~ within the State institutions, its organic relations with the other parties and the way in which it is financed will ~~determine~~ depend on the degree of autonomy granted to it by the public authorities;*

(ii) the harmonization, at the subregional and regional levels, of the different national regulatory structures will have the dual effect of creating a homogenous and viable market for telecommunication services responding to a variety of both household and professional needs on a competitive quality and cost basis, and of fostering the integration of the economies of the region as well as the settlement of eventual disputes among States.

RECOMMENDATION 4

Reform of the telecommunication sector

The Green Paper recommends that a bold institutional reform of the telecommunication sector, comprising both organizational and operational measures, should be carried out where this has not already been done. These measures should highlight the commercial nature of telecommunication services, even if they ~~do retain~~ will always have a "public service" dimension which should not be disregarded.

RECOMMENDATION 5

Competition

The Green Paper recommends the initial opening to regulated competition of market segments ~~for which State operator(s) either offer no services or fail to provide the customer with the most cost effective solution~~ for which demand remains to be satisfied, either because the State operator lacks the means of satisfying them within a reasonable period of time and at reasonable cost, or because the demand is for services that do not form part of its primary "public service" mission.

RECOMMENDATION 6

Concerted action

The Green Paper recommends that all of the social and economic partners concerned should be actively involved in the restructuring and development of telecommunications in an atmosphere of complete transparency; indeed, consultation among partners must precede any reforms in this sector.

RECOMMENDATION 7

The financing of telecommunications

Though the results have been relatively poor, considerable efforts have been made, particularly since the 1980s, to increase the financial resources allocated to the development of telecommunications in Africa. However, financing needs remain disproportionate to the financial resources which can be mobilized under the present circumstances. For example, in order to achieve a penetration of two main lines per 100 inhabitants as a regional average by the year 2000, an annual investment of around two billion US dollars is required, an amount considerably exceeding the investments made during the period of strong economic growth. Consequently, the Green Paper recommends:

at the national level

(i) that an institutional reform be carried out in the telecommunication sector in a legal and regulatory environment which would provide sufficient incentive to attract capital from various sources, including the domestic and foreign private sectors;

(ii) that due emphasis be placed on ongoing or planned reforms in the telecommunication sector, on structural and operational measures which would make it possible to increase the self-financing component of the various projects while at the same time facilitating access to sources of financing on favourable terms;

(iii) that an innovative approach be adopted with respect to the search for fresh sources of financing. This could include, for example, the issuing of national bonds, co-financing, joint ventures and agreements of the Build, Operate and Transfer (BOT) type.

at the subregional and regional levels

(i) that the incentive measures taken in each country of a given subregion be harmonized in order to ensure that the disparity in conditions for access to loans does not constitute a further impediment to the financing of subregional and/or regional projects;

(ii) that an ad hoc group be created to follow up the implementation of joint projects. The main activity of the group would consist in mobilizing the necessary financial resources.

RECOMMENDATION 8

Telecommunication network development

Generally speaking, the existing telecommunication network is underdeveloped in relation to demand. Furthermore, owing to the poor quality and high cost of services offered, most networks are exposed to the risk of "bypassing" of international traffic, which often accounts for the bulk of their operating income. Moreover, the interconnection of networks is weak, especially in the Central African subregion. In order to remedy these different shortcomings, the Green Paper recommends:

(i) that a coherent policy be formulated for the development of public and private telecommunications, taking into account the urgent need to ensure the interconnection of networks and services at the subregional and regional levels;

(ii) that the integrity of the national telecommunication network be safeguarded through the development of precise standards for interconnection with the public network of private networks introduced on the basis of concessions;

(iii) that, other than in exceptional situations where there is economic justification, countries stop buying new analogue switching or transmission equipment for the extension of the existing network. Network digitization must be carried out within the framework of a plan and not on a piecemeal basis, each country adopting the most economical digitization scenario with respect to its particular situation;

(iv) that the efforts undertaken with a view to providing rural areas with a minimum high-quality service at non-discriminatory cost be pursued. To this end, radio systems may, in certain cases, provide the best technical solution for serving rural areas~~, along with~~ (e.g. satellite systems and/or cellular telephony);

(v) that the problems of maintenance and repair of existing installations be taken into account in programmes for the renewal and extension of the network.

RECOMMENDATION 9

Human resources

Human resources are the principal resource necessary to the development and rational operation of telecommunication networks, particularly in an environment such as Africa where the latest technology has to be used in particularly difficult conditions. Regardless of the legal status of the entity responsible for the development and management of telecommunications, the Green Paper recommends that sufficient investments be made in the development and management of human resources and that measures be taken to ensure that procedures and rules relating to personnel management are compatible with the commercial nature of the telecommunication services which must be provided in a dynamic and highly competitive environment.

RECOMMENDATION 10

Cooperation

The Green Paper takes up the declaration made by the representative of the Economic Commission for Africa (ECA) at the World Telecommunication Development Conference (Arusha, Tanzania, 1985), according to which "... it is essential for the countries of the African Region to realize the similarity of their objectives and the complementarity of their needs, to combine their resources in order to obtain better results and, collectively, to take maximum advantage of the region's resources". To this end, the Green Paper recommends:

(i) a thorough examination of the mandates and operating structures of the subregional and regional organizations responsible for cooperation in the telecommunication sector in order to increase their efficiency and eliminate any duplication of work and, if necessary, a reduction in the number of such organizations;

(ii) the drawing up of a strategy for cooperation with the other international organizations involved in the development of telecommunications in Africa, ensuring that all actions undertaken are directed towards the same objective and are carried out at optimum cost;

(iii) more active cooperation between developing countries at the subregional and regional levels and a periodic evaluation of such cooperation with a view to constantly improving its cost-effectiveness.

RECOMMENDATION 11

Tariffs

The setting of tariffs for telecommunication products in Africa has already given rise to a number of important technical contributions, particularly by the TAF Group.

The fact is, however, that no adequate solution has yet been found for the determination of accounting rates for intraregional communications and the settlement of the related accounts, either at the subregional or the regional level.

One of the reasons for this difficulty is that tariff structures and levels in most of the countries are determined without any reference to the actual cost of the services offered. As tariffs are the "ultimate competitive weapon", the Green Paper recommends:

(i) that studies be undertaken to determine the actual cost price of the services and benefits supplied, data which is essential for the fixing of equitable tariffs and quotas;

(ii) that updated statistics be regularly kept on the different intraregional traffic flows, whether routed directly or through transit centres located within or outside the region;

(iii) that until objective elements are available for determining accounting rates for intraregional communications and choosing the optimum solution for the settlement of accounts, a provisional solution be adopted. This solution should encourage the routing of intraregional traffic through transit centres available in the region, while at the same time creating direct links between the States of the region as soon as this is justified by the volume of terminal traffic;

(iv) that a study group should be set up at the national level to examine the question of tariffs for telecommunication products and to provide all the technical elements required to determine tariff structures and levels.

RECOMMENDATION 12

Industrialization

While practically all of the telecommunication equipment installed in Africa is produced outside the region, the African equipment market is not large enough to alter the production policy of suppliers, who are more concerned with satisfying the needs of their main customers, the big network operators. Moreover, the market for the productioon of telecommunication equipment is currently in the process of being restructured in response to the drastic changes in production technology and the new situation with respect to the competitive supply of telecommunication services. In this context, the Green Paper recommends:

(i) that the problem of industrialization in the field of telecommunications be made a priority objective, it being understood that to this end the States must create, on a subregional or regional basis, a favourable legal and regulatory environment providing sufficient incentive to attract private sector investments in the manufacture of telecommunication equipment in Africa;

(ii) that the necessary technical and regulatory measures be taken at the appropriate level to harmonize standards for the equipment used. The technical information relating to such equipment and to new purchases would be organized into a database, constantly updated and made available to potential developers of a local industry for the manufacture of telecommuication equipment. Studies would have to be made in this connection in order to determine the conditions in which such a project could be viable from the financial point of view.

RECOMMENDATION 13

Separation of postal and telecommunication services

In certain African Administrations, posts and telecommunications are subject to the same management regulations, in spite of their specificity. Postal services are generally considered to be structural loss-makers. However, there are examples which prove that postal and financial services, if well managed, can generate profits. The Green Paper recommends that, where possible, postal and financial services should be managed separately from telecommunication services. In this connection, a certain amount of clarification and diagnosis is essential before the evaluation, distribution and devolution of initial joint assets can take place. Wherever possible, balance sheets should be drawn up prior to the actual start-up of the new entities.

RECOMMENDATION 14

Infrastructures and basic services

A number of factors specific to Africa, such as the size of the telecommunication market, the imbalance in the level of development between rural and urban areas, and the legal and regulatory framework in force in most of the countries of the region militate in favour of a prudent approach to liberalization. ~~a monopoly be maintained over basic infrastructures and services.~~ However, the survival of such monopolies will depend on their ability to adatp to the new international telecommunication environment. In this ~~connection~~ context, the Geen Paper recommends that each country should study all of the advantages and disadvantages of maintaining a monopoly on basic infrastructures and services and then decide freely on the scope and duration of the monopoly in accordance with its real needs, with due regard for its own particular economic, social and political constraints.

RECOMMENDATION 15

The Green Paper recommends that the African administrations should work together and consider an action plan with a timetable for the implementation of these recommendations. This action plan should be drawn up before 31 December 1996.

RECOMMENDATION 16

In view of the rapid and continuous development of the telecommunication environment and the convergence of telecommunications, computer and broadcasting technologies, it is recommended that studies should be pursued with a view to regularly updating the African Green Paper and adapting it to the new international telecommunication environment of the 21st century.

CHAPTER I. - INTRODUCTION

Telecommunications evolution

1. Since the beginning of this century, telecommunication services throughout the world have been supplied on a monopolistic basis. In most of the developed countries, moreover, the monopoly was traditionally run by an administration or a State-owned enterprise, while a few countries opted for the system of issuing licenses to private sector monopolies on a territorial or functional basis.

2. As a result, by the end of the Second World War, the majority of the developed countries had set up national networks providing a practically universal service, which satisfied the needs of both households and the economy.

3. In the 1980s, under the pressure of technological progress and expanding business requirements, some changes began to occur in the traditional way telecommunications were organized. The process started in the United States when competition was fostered in the supply of long-distance telecommunication services~~,~~ following the divestiture of AT&T ~~break-up of the Bell system. After that,~~ the United Kingdom, Japan, Australia, New Zealand and an increasing number of developing countries have since introduced competition in the supply of services. At present, many countries are at some stage or another of restructuring their telecommunication sectors.

4. The form this restructuring takes varies from one country to another, but, in general, it has resulted in more attention being paid to the needs of customers and to tariff structures and levels more in line with production costs and market demand.

The telecommunication sector in Africa

5. In African countries, as in most of the developing countries, telecommunication network operators, which were originally either private companies or colonial administrations, were mostly nationalized at the time of independence in the 1960s and transferred to the public sector. It is not easy to arrive at any accurate and quantified evaluation of the performances of public network operators in Africa on account of inadequate statistics which reflect shortcomings of existing management methods, since these are not explicitly founded on operating statistics and performance indicators. One has to recognize that the results obtained by nationalized enterprises could on the whole be said to be unsatisfactory despite the elaboration of a host of master plans as shown in ~~Table 1~~ **Annexe 12**.

6. According to data compiled in the indicator series of the ITU (see ~~Table 2~~ **Annex 13** and item 1 of **Annex 1**), Africa is very unfavourably placed compared with other even little developed regions of the world, such as the low-income countries of Latin America and the Caribbean or Asia and the Pacific. For instance, the telephone density of sub-Saharan countries in 1994, which was 0.5 lines per 100 inhabitants, is only 1/10th of that of Asian countries and 1/15th compared with countries in Latin America. The efficiency rate of calls is less than 30%, compared with 70% in many developed countries.

TABLE 1

MASTER PLANS CARRIED OUT IN AFRICA WITH ITU ASSISTANCE*

COUNTRY	PUBLICATION YEAR**
SUB-SAHARAN	
ANGOLA	1984
BENIN	1985
BOTSWANA	1984
BURKINA FASO	1989
BURUNDI	1992
CAMEROON	1989
CAP VERDE	1989
CENTRAL AFRICAN	1984
CHAD	1993
CONGO	1983
COTE D'IVOIRE	1985
GUINEA	1991
GUINEA BISSAU	1976
MADAGASCAR	1989
MALAWI	1987
MALI	1989
MAURITANIA	1992
MAURITIUS	1987
MOZAMBIQUE	1992
NIGER	1993
NIGERIA	1973
RWANDA	1982
SAO TOME AND PRINCIPE	1989
SENEGAL	1980
SOMALIA	1983
SUDAN	1993
TOGO	1986
ZAIRE	1982
ZIMBABWE	1986

* No master plans were carried out in North Africa except Libya (not completed).

** All master plans cover a period of about 20 years.

TABLE 2

Basic indicators / Indicateurs de base

		Population		GDP		Main telephone lines	
		Total (M) 1994	Density (per km²) 1994	Total (B US$) 1993	per capita (US$) 1993	Total (k) 1994	per 100 inhabitants 1994
1	Algeria	27.33	11	46.8	1'742	1'122.4	4.11
2	Egypt	57.56	58	35.5	638	2'456.2	4.27
3	Libya	5.22	3	21.9 [89]	4'975	240.0 [93]	4.76
4	Morocco	26.49	40	27.4	1'027	992.8	3.75
5	Tunisia	8.82	54	13.1	1'526	474.3	5.38
	North	125.41	21	144.8	1'183	5'285.6	4.22
6	South Africa	40.56	34	111.9	2'751	3'844.5	9.48
	South Africa	40.56	34	111.9	2'751	3'844.5	9.48
7	Angola	10.67	9	9.2 [90]	997	53.3 [93]	0.53
8	Benin	5.25	47	2.2	416	23.9	0.46
9	Botswana	1.44	3	3.7	2'636	43.5 [93]	3.10
10	Burkina Faso	10.05	37	2.8	286	26.3	0.26
11	Burundi	6.21	223	1.0	164	15.8	0.25
12	Cameroon	12.87	27	9.4	746	57.2 [93]	0.45
13	Cape Verde	0.38	94	0.3	815	18.6	4.87
14	Central African Rep.	3.24	5	1.2	380	7.4	0.23
15	Chad	6.18	5	1.2	195	4.7	0.08
16	Comoros	0.49	260	0.2	470	4.3	0.88
17	Congo	2.52	7	2.4	951	20.6	0.82
18	Côte d'Ivoire	13.78	43	9.3	696	108.4	0.79
19	Djibouti	0.57	26	0.4 [91]	855	7.5	1.33
20	Equatorial Guinea	0.39	14	0.2	350	2.5	0.65
21	Eritrea	3.44	37	...	...	15.2	0.44
22	Ethiopia	53.44	44	3.5	66	137.7	0.26
23	Gabon	1.04	4	5.5	4'422	31.4	3.03
24	Gambia	1.08	101	0.4	350	18.3	1.69
25	Ghana	16.94	71	6.2	378	50.0	0.30
26	Guinea	6.50	26	3.1	494	9.3	0.14
27	Guinea-Bissau	1.05	29	0.2	228	8.6 [93]	0.82
28	Kenya	26.02	45	5.5	218	228.5	0.88
29	Lesotho	2.00	66	0.8	399	12.2 [93]	0.64
30	Liberia	2.94	26	1.2 [89]	509	4.5 [93]	0.19
31	Madagascar	14.30	24	3.4	265	34.8 [93]	0.27
32	Malawi	10.84	115	2.0	218	33.1	0.31
33	Mali	10.46	8	2.7	288	13.8 [93]	0.15
34	Mauritania	2.22	2	1.0	452	8.4	0.38
35	Mauritius	1.10	592	3.1	2'799	129.4	11.72
36	Mayotte	0.10	278	...	...	4.0 [93]	4.02
37	Mozambique	15.53	20	1.5	87	57.2	0.37
38	Namibia	1.50	2	2.5	1'621	69.8 [93]	4.46
39	Niger	8.85	7	2.2	263	10.5 [93]	0.12
40	Nigeria	108.47	117	34.9	333	368.7	0.34
41	Réunion	0.64	256	4.0 [88]	6'878	198.5 [93]	31.98
42	Rwanda	7.75	294	1.6 [92]	212	15.0	0.19
43	S. Tomé & Principe	0.13	130	-	318	2.5	1.97
44	Senegal	8.10	41	5.8	717	72.0	0.89
45	Seychelles	0.07	181	0.4	6'366	12.5	17.08
46	Sierra Leone	4.59	63	0.7	164	14.5 [93]	0.32
47	Somalia	9.08	14	0.9 [90]	113	15.0 [93]	0.18
48	Sudan	27.36	11	4.3 [92]	161	64.0	0.23
49	Swaziland	0.91	52	0.9	1'013	18.6	2.05
50	Tanzania	28.85	31	2.7 [92]	106	88.3	0.31
51	Togo	4.01	71	1.3	314	21.4	0.53
52	Uganda	18.59	79	4.0	223	34.9	0.19
53	Zaire	42.55	18	7.5 [90]	202	36.0 [93]	0.09
54	Zambia	9.20	12	3.3	389	79.7	0.87
55	Zimbabwe	11.00	28	4.9	463	134.8	1.23
	Sub-Saharan	534.66	23	165.5	327	2'447.2	0.46
	AFRICA	700.62	23	422.2	630	11'577.3	1.67

Note: For data comparability and coverage, see the technical notes.
Source: ITU, UN, IMF, World Bank, OECD.

7. Network growth is between 5 and 7%, well below the theoretical rate of 12% required to sustain satisfactory growth of the sub-Saharan African economies. In 1991, these countries invested 3.7% of their Gross Fixed Capital Formation (GFCF) in telecommunications, a percentage higher than those obtained in other regions of the world (see item 1 of **Annex 1** (see ~~also~~ the ITU African Telecommunication Indicators, ~~June 1993, table 22~~ 1994).

8. What these figures do not reflect is the abnormally high number of staff per 1000 main telephone lines, of pending applications, inadequate coverage of the national territories, to the exclusion particularly of rural areas, poor service quality, the absence or scarcity of new services required by business and the growing pressure on the part of companies to have their own networks.

The need for a policy framework

9. The question thus facing African countries, which like all other countries ~~are~~ exposed to the pressures of technological progress and demand, is how to cope with this unsatisfactory situation, which is all the more frustrating since a considerable amount of investment and technical assistance has been committed over the last 30 years, as a result of bilateral and multilateral contributions from outside.

10. It will not be sufficient to do more of the same, that is, to design new investment programmes or to improve individual aspects of telecommunication network management. Not only are the countries unable to mobilize the enormous amounts of capital required to catch up with demand within a reasonable period, but some operating agencies do not even have the capacity to deploy efficiently the financial resources they would otherwise need.

11. This traditional approach based on State-owned enterprises has shown its limitations and is no longer really in line with the new economic strategies introduced in many countries in the form of successive programmes of structural adjustment, under the auspices of the World Bank and the International Monetary Fund.

12. A new approach is needed which explicitly formulates a policy framework setting out the development objectives of the telecommunication sector. Future actions can then fit within a coherent vision, offering greater appeal to ~~traditional financial institutions and to~~ new financial partners, for instance potential contributors from the private sector, while at the same time adjusting to the new financing policies of the national institutions. Moreover, as such actions are introduced, they can be better assessed and adjusted in order to achieve the desired objectives.

13. The establishment of sectoral telecommunication policies in Africa is facilitated by four main factors. Firstly, compared with other sectors such as public works or transport, the number of players (operators, technology suppliers) at national and international level is more limited, which may be considered as a point in favour of the preparation, recognition and implementation of general policies for the sector. Secondly, most African countries with their structural adjustment programmes have agreed to adopt new economic strategies, including measures to liberalize trade, promote competition, reduce restrictions on incoming foreign capital and restructure State enterprises. These measures tend to give pride of place to the telecommunication sector, both as an infrastructure which is essential to implement the new economic fabric and as a typical public enterprise in need of restructuring. Thirdly, the changes occurring in the telecommunication sector

in developed countries, which were mentioned above, have highlighted, in international terms, a broad range of new concepts and actions, while demonstrating the feasibility and value of moving away from the traditional state monopoly approach in the sector. Fourthly, and lastly, as a result of the globalization of telecommunication service supply, which has followed domestic changes in the telecommunication sector in individual countries, the telecommunication network operators of the developed countries are at present actively searching for new opportunities abroad, and especially in the developing countries (see item 2 of **Annex 1**).

14. In confirmation of the above analysis, which applies across the regions of the world, reforms have been undertaken and are being implemented in a host of the countries. Individual examples vary from one country to another with three main features in common:

(1) A shift of government responsibilities away from the actual ownership and management of public companies towards the establishment of a policy, legal and regulatory framework;

(2) Restructuring telecommunication network operators as independent corporations, making them more market oriented;

(3) Participation of the private sector in the management and implementation of the national telecommunication network;

(4) and the introduction of some form of competition.

Reforms have been most marked in Latin America, Asia and ~~most~~ more recently in Central and Eastern Europe, with the privatization of State enterprises, the creation of joint venture companies with foreign operators and the granting of licenses to private companies for ~~enhanced~~ improved services (see item 3 of **Annex 1**).

15. In Africa, a significant number of countries have separated the postal sector from telecommunications and have altered the status of the telecommunication administration to make it more market-oriented ~~(Senegal, Mali, Côte d'Ivoire, Burkina Faso, Nigeria, Gambia, Central Africa, etc.). Côte d'Ivoire is seriously considering privatizing its national network operator CITELCOM. Ghana has left the implementation and management of its cellular network in private hands.~~; other have introduced regulated competition for a new or value-added services, while others still have allowed private investors to acquire a stake in State operators and created partenership with international operators. Steady pressure has been brought to bear in many ways by the private sector for governments to liberalize participation in the supply of telecommunication services.

The policy formulation process

16. The main responsibility for establishing a policy framework for the sector must lie with the government and more specifically with the ministry ~~concerned~~ responsible for telecommunications. ~~It has to be recognized, however, that this fundamental action is still not being routinely or efficiently undertaken by governments in the continent, even for other sectors of activity. It is therefore important that the formulation of policies should be properly mastered as a specific process, using appropriately established guidelines.~~ The way forward to such policy making is by linking in a logical and systematic manner the main stages, which are: identifying the problems to solve analysing and selecting solutions, specifying actions, mobilizing the human and other resources, and periodically reviewing and assessing results.

17. A further significant point to consider is that within the domestic context ~~these~~ a sectorial policy~~ies~~ concerns a number of players who represent different interests, either convergent or divergent, such as agencies involved in national planning, ministries, local authorities, user groups, the suppliers of goods and services in the sector, trade unions, etc. Clearly defined procedures must be laid down to ensure that ~~they~~ all players are ~~all~~ duly involved in the policy making process from the beginning. It is also worth considering the judicious use of group dynamics, in the form of seminars, roundtables or workshops, as well as the establishment of steering committees and special task forces. It has to be recognized, however, that these fundamental action are still not being routinely or efficiently undertaken by governments in the continent, even for other sectors of activity. It is therefore important that the formulation of policies should be properly mastered as a specific process, using appropriately established guidelines.

18. One of the main ideas underlying the Green Paper is that the African countries stand to gain a great deal by adopting this approach, which is new for most of them. For example, by coordinating their efforts at a continental and subregional level, not only for the obvious reasons of resource savings and efficiency, but also because it would inevitably facilitate the introduction of homogeneous and compatible national policies, and hence the economic integration of the African continent, which is an essential pre-condition of a genuine economic take-off.

19. On the other hand, isolated reforms here and there may not only prove ineffective, but can lead to the development of antagonistic national characteristics, which will be harmful to the future integration of African telecommunications. Although, one must remain alert to past experiments and draw the appropriate lessons for them.

Content of the policy framework

20. The establishment and maintenance of a policy framework must be considered by governments as one of their permanent, normal activities leading to the systematic implementation of the general scheme referred to earlier. On the other hand, the content of such a policy framework will depend on the particular situation prevailing in each country and will vary over time, yet may be expected to be stable for a few years as the subject matter is government policies.

21. In view of the similarity of the situations prevailing throughout the African continent, this Green Paper may be considered as a first attempt to build a general policy framework for the telecommunication sector in the following specific areas:

- a new legal and regulatory framework governing telecommunications;
- the restructuring of operations and the redefinition of State control;
- the future development of telecommunication networks and services;
- regional cooperation.

~~22. Without wishing to anticipate any conclusions that may be reached by more detailed studies than this Paper, it may be doubted, where African countries are concerned, whether dismantling the telecommunications monopoly altogether can in the medium term constitute an effective solution, especially in view of the small size of the markets involved. The real issue seems to be more efficient management of the monopoly, especially in the case of the basic telephone network, while allowing the specific services required by business to be suitably supplied.~~

22. However, all the advantages and disadvantages of moving away from monopolies toward more liberal solutions in the short, medium and long term should be examined with a view to deciding freely and advisedly on the scope and duration of the exclusive rights to be preserved; these should be based on the genuine economic, social and political requirements of the differents States and must nót hold up countries' economic development.

Organization of the Green Paper

23. **Chapter II** gives an overview of the **existing situation** - in the world in general and in Africa in particular - concerning the telecommunication sector and related areas.

24. **Chapter III** provides the history and current pattern of **legal concepts, instruments** and **institutional options** that could be relevant to the telecommunication sector with focus on both regional and country level requirements. ~~Chapter IV discusses the basic principles of a regulatory framework and offers guidelines for its implementation~~ Chapter IV sets forth the basic principles governing the establishment of the regulatory framework for opening up the telecommunications market to competition, and offers guidelines for gearing that framework to conditions in Africa. **Annexes 3 to 7** contain background material for the design of such a regulatory framework.

25. **Chapter V** tackles the question of the ~~restructuring of operations~~ **operational restructuring**, on the assumption that there still exists a monopoly for the basic telephone service ~~would remain a monopoly. Whether the monopoly is public, private or a mixture of both is irrelevant~~. However the question of whether it is a good or not good thing to maintain a monopoly is not addressed. All that matters is for the government to ensure that the monopoly achieves the required long-term objectives.

26. **Chapter VI** deals with the critical **economic, financial and tariff issues**. The ultimate aim of the endeavour is to satisfy the needs of the African people at the lowest cost, on the basis of an efficient, integrated network, which will enable and facilitate the integration of African economies. **Chapter VII** outlines the direction and main characteristics of **future network developments**, from a technical point of view.

27. As a result of the way in which it is being elaborated, the African Green Paper can provide an opportunity for regional cooperation, for a fresh start and for tangible action. **Chapter VIII** offers suggestions for improving **regional and international cooperation** and making it more effective.

RECOMMENDATION 1.1 - Development of a policy framework

In connection with the analysis of the efforts made and results obtained in respect ~~of~~ to the development of telecommunication networks and services in Africa, and bearing in mind the international telecommunication environment, the Green Paper recommends:

(i) that priority be given to the development of a sectoral policy framework explicitly setting out coherent objectives for the development of telecommunications. All parties concerned must be associated with ~~this effort~~ its formulation;

(ii) that the government assume ~~principal~~ ultimate responsibility for the formulation and adoption of this sectoral policy, and that in spite of the particularities of each country, due account be taken in this respect of the world trend, that is, of the fact that:

- *the State's responsibility consists more and more in solving legal and regulatory problems rather than network management problems;*
- *the objective efforts to restructure network operators is the recognition, in practice, of the commercial nature of telecommunication services;*
- *the private sector is becoming a partner in the management and development of telecommunications, and the merits of introducing a certain degree of competition, under appropriate forms and in the appropriate market segments, have been recognized.*

RECOMMENDATION 1.2 - Implementation of the Green Paper

It is recommended that the Green Paper be used as an efficient tool in the development of regional cooperation and that, to this end, pragmatism and clarity should form the basis for any implementation strategy.

CHAPTER II. - EXISTING SITUATION

(a) Global trends

28. A new "architecture of civilization", possessing new scales of values and appropriate economic, technical and legal structures, is coming into being. This new situation is affecting the various regions of the world in different ways, depending on their levels of development and their perception of the future; but we are all faced with similar challenges in trying to meet the long-term objective of creating the "global village" which, as a result of the new technologies, particularly communication techniques, will become a reality in the near future.

29. In the gross national product (GNP) of both developed and developing countries, cross-border flows (data, economic, financial, etc.), have been playing an increasingly important part. Annual direct investment flows rose fourfold over a recent period of five years, according to the IMF. These tendencies reflect the globalization of economic activities, and affect both the production and the distribution of products and services, while making countries increasingly interdependent in all sectors of activity.

30. There has been a widespread move towards liberalization of economic activities, opening avenues for private initiatives and enhanced competition. Some areas traditionally reserved for state operations have attracted private risk capital, even in the social sphere in some special cases, with the aim of making companies more productive and more competitive. This implies reconsidering the role of the State, which henceforth should centre on good governance and basic regulatory functions.

31. As a corollary to the globalization and competitive dynamics of the economy, any country wishing to thrive in this new environment must organize itself properly or else take the risk of plunging the majority of its population into poverty. The major regional groupings, which have become models and sources of inspiration for other countries, have concentrated or been restructured around the United States, Europe and Japan. Some commercial rivalry remains within each economic group, but rather in the form of cooperative competitiveness aimed at achieving a more advantageous position in relation to other groups; the scope and the weapons of world competition have become such that no national company on its own can last out in this new environment.

Search for an appropriate institutional framework

32. There are major international institutions (such as the IBRD, IMF, ILO, UNIDO, FAO, GATT-now the World Trade Organisation (WTO) or ITU) which attempt to solve the problems that fall within their scope. Mankind's resources, both physical and non-physical, renewable and non-renewable, and the whole of the biosphere are increasingly affected by international factors. This encourages countries either to restructure existing frameworks or to find new frameworks to facilitate the passage of world flows for the greater good of all. One example of adaptation is that provided by the General Agreement on Tariffs and Trade (~~GATT~~ WTO) which has been increasingly extending its scope by including new services in sectoral annexes to the general framework agreement. In this respect, the annex on telecommunication services, though only recently drafted, is one of the most detailed and provides a good illustration of the role unanimously attributed to telecommunications in this global process (see item 4 of **Annex 1**).

Information and communication technologies

33. New information and communication technologies and related services have been actively determining the form and extent of the globalization process. Information has become a kind of "raw material", whose added value, in all transactions, has been increasingly rivaling that of conventional physical raw materials. By making available information in all its forms, without specific time or place constraints, information and communication technologies in fact determine the policies adopted for the production, storage and distribution of products, and even the location of industrial plant. In addition, by the nature of the services that are offered, information users are affected in their way of living and even in their way of thinking. Information is therefore an extremely strategic commodity, and the extent to which it is used and/or controlled will decide each country's or group of countries' place in the world, which it is also tending to render increasingly "interconnected".

34. In response to this challenge, the developed countries, individually, but even more collectively, have been introducing a global strategy for the development and use of information and communication technologies. On a domestic level, laws have been drafted to protect the private lives of individuals against any possible misuse of these technologies, which are disseminated by telecommunications.

35. Many developing countries have not yet achieved a fully global appreciation of information technologies, and in particular of their strategic impact on the international community's future activities. Quite a few are making considerable individual efforts based on their respective situations, to find the best way to meet the enormous challenge of developing their telecommunication networks in the new international environment.

The need for restructuring

36. The rapid technological changes which have been occurring in the last 20 years have had the most noticeable effects in the area of telecommunications. The combination of telecommunications, computing and recently audiovisual techniques has given rise to a new range of services, which have now turned telecommunications into a driving force of the world economy. By facilitating the exchange of products and services for other sectors of activity on a national and an international level, while creating its own products and services, some of which are strategic, telecommunications has now become a hub of human activities. Any telecommunications development and management policy must take the following factors into consideration:

(1) Restructuring of the production sector

With the arrival of new players in the telecommunications sector, and the increasingly high cost of research and development (the key to present and future success), production units are being constituted (through mergers, buyouts, transfers, etc.) of a critical size large enough to face international competition, which leaves the "small fry" no chance of surviving.

(2) Emergence of private networks

Both nationally and internationally, there has been a proliferation of private telecommunication networks, set up by and for companies, particularly in the service industries, whose diverse and urgent requirements cannot be economically met by traditional suppliers. Some of these networks have an international bearing, often belonging to groups of companies in different sectors but with strategic interests in common.

37. Until recently, the International Telecommunication Union (ITU) was the only international forum where countries met to prepare the **technical and operating standards** on which the interconnection of national networks depended through their observance by the parties involved. They even had to be applied by outsiders, which otherwise were unable to market their products. As things stand at present, the ITU has not lost its leading role in this respect, though it must be recognised that the role of **regional standardization structures** has been strengthened by the increasingly rapid introduction of new services, the fading distinction between the latter and existing services, and the need to create or reinforce homogeneous economic areas while protecting them from external competition. Standardization constitutes one of the strategic goals in the process of economic globalization, to the extent that, quite apart from the technical aspects, standards reflect unavowed political objectives.

38. The **regulatory evolution** is a complex matter. The effects on the users of the first waves of deregulation of the 1980s have necessitated a policy review in this respect. It is becoming increasingly difficult to distinguish between the sectors that need regulating, as new technologies are mastered and introduced. Within any given sector, the diversity of services and the complexity of implementation attract new players, whose basic activity is not always directly related to telecommunications. For instance, the appearance of cable networks and new generations of satellites have given rise to new possibilities of interaction, so that these areas can be considered as belonging just as well to the media as to telecommunications.

39. There is a universally recognized need to separate the technical and commercial operation of a network from its regulation. Once the regulation system has been understood to represent legal means of introducing competition, dynamism and efficiency, each country tends to apply it with a view to safeguarding its own interests while trying to acquire the means of competing with others on their own markets. There has been a worldwide tendency to liberalize the supply of terminals. The process of liberalization in the telecommunication sector has in most countries affected only certain services to the exclusion of networks (infrastructure), which remain a public asset. Governments can then offer such service segments to private and/or public suppliers, or enter into joint ventures with them, e.g. via their national operator. Countries' economic, social and political choices will determine the market structure adopted and hence regulatory arrangements ~~The regulatory arrangements will determine the resulting market structure for the services concerned, e.g. territorial or functional monopoly, duopoly, restricted or free competition.~~ It is however interesting to note the school of thought which has emerged in Europe, recommending liberalisation of the infrastructure without altering the monopoly on basic services.

40. The supply of equipment and its subsequent installation is carried out by private companies. The operation of the networks and provision of associated services is carried out mostly by public monopolies. The procurement process generally involves several suppliers, the extent of which depends on the source of financing. Several sources of financing are available, notably bilateral, multilateral and private financing arrangements. All of these have their inherent advantages and disadvantages.

41. With the expansive development of new information and communication technology, which are based chiefly on know-how and brain power, **human resources** are becoming a critical factor. In a general climate of rising unemployment, the telecommunications sector stands out as an exception though at the cost of a continuous effort of retraining both employees and managers. The latter have become entrepreneurs, even when they operate within a public telecommunication network and services context. As a result of the multiple disciplines involved and the management tasks and tools, widely determined by technology, all the players concerned are obliged to rethink their human resources policies, including staff motivation.

(b) The situation in Africa

42. At least some of the aspects of the situation described above apply to Africa. A number of specific characteristics, however, have to be taken into account to take advantage of this new global situation.

The economy

43. Most of the African countries are experiencing sluggish economic performance. Some of the main reasons for poor performance are:

- drought and other unfavourable climatic conditions;
- massive debt service charges;
- declining or volatile demand for traditional exports;
- slump in the oil market (for oil exporters);
- political problems (i.e. civil strife and armed conflict).

During the 1980s, real GDP for African countries grew at an average of 2.6% per year, marginally above the rate of population growth of 2.4% per annum during the same period. Over the previous decade, GDP had grown at 3.8% per year. Economic growth is projected to strengthen during the 1990s, but very little improvement is expected in per Capita GDP due to high population growth.

44. The average rate of inflation for African countries was about 17% during the 1980s compared to 14% during the 1970s. However, the rate of inflation is declining in most of the African countries which are implementing structural adjustment programmes and the trend is expected to continue during the 1990s.

45. The debt problem for African countries is indicated by the rising ratio of debt service to exports during the 1980s. The debt ratio of African countries, especially low-income sub-Saharan Africa, is projected to continue rising during the 1990s. During the 1980s the debt volume almost doubled compared to the 1970s to US$ 257 billion by 1989, more than three times African annual export earnings.

46. Although there are some positive indicators in terms of economic growth and declining rates of inflation during the 1990s, a large portion of the national income of the majority of African countries will be utilized for debt servicing during the same period. In addition to the declining terms of trade for exports of less developed countries, which are mainly primary commodities, compared to manufactured goods such as telecommunications equipment, limited funds will be available for the required massive investments in telecommunications.

47. In most countries the **institutional framework** is often a pale reflection of what existed earlier in the colonizing or controlling countries, in other words poorly adapted to the local socio-economic context. Under the direction of the IMF/IBRD, some countries are building a new institutional environment complying with the conditions set out by the two institutions, within the framework of structural adjustment programmes. Even if the interested parties agree to introduce a social dimension in the programmes, it must be admitted that in the light of all the outstanding problems the measures amount to no more than a palliative, however indispensable they may seem when introduced.

The democratic transition

48. In varying degrees, certain African countries are in the process of democratic transition to encourage the enhancement of individual freedoms and the respect of human rights. The voluntarist approaches of the countries in question are in line with the new international ethic which seeks to enhance man's condition everywhere.

Demography

49. Current forecasts indicate overpopulation of the Third World alongside a depopulation of industrialized countries. From 1965 to 1985, the tendency towards lower birth rates spread throughout the world, with the exception of inter-tropical Africa. Elsewhere a definite decrease is noted, even in South America where the rate was already moderate to begin with.

50. The population of Africa, which stood at 460 million in 1985, is due to reach 730 million around 2000, and over 900 million by 2010; these are very modest forecasts, based on the assumption that birth rates will decrease considerably. With a few rare exceptions (Rwanda and Burundi), we are still nowhere near some of the high population densities found in Asia, but a high population growth rate is nevertheless a considerable threat to the region's socio-economic development. Not only could it raise problems with regard to food supplies, it could cancel out most efforts undertaken in the region to improve education, health, and living standards.

In addition, the low population densities of some countries considerably undermine the financial profitability of properly developing those countries' telecommunication networks.

51. The Mexico City Declaration on Population and Development (**see item 17 of Annex 1**) deliberately states that in order to be realistic, development policies, plans and programmes should take into account the inextricable links uniting population, resources, the environment and development. For several years now in Africa, considerable efforts have been made to increase public awareness of the problem (some countries have even introduced birth control programmes).

52. In spite of the considerable contribution made by the United Nations Fund for Population Activities, only the countries concerned can find solutions suited to their physical and cultural environment, while it is hoped that the requisite population control will not come about in a negative or involuntary manner, as a result of famine, war or sickness.

Telecommunication networks and services

53. Generally speaking, transport and communication infrastructures are recognized by all political decision-makers as decisive factors for the development and integration of Africa. In that spirit, the United Nations Decade for Transport and Communications in Africa was launched in 1977 and a second decade proclaimed for the period 1991-2000. Telecommunications occupy a significant place in the resulting programmes, offering a better return on cost in comparison to the other communication infrastructures.

54. Yet, Africa has the least developed telecommunication network in the world, even though a major effort has been made in this area, compared with other sectors. The infrastructure capacity is insufficient and most **infrastructure equipment** comes from suppliers outside the region. Moreover, the equipment is produced according to standards and at a rate which takes no account of Africa's specific needs and environment. Most of the time, there is a great diversity of equipment within networks, which are themselves concentrated in urban areas. The rural areas, where the majority of the population lives, are rarely provided with telecommunications. New services are being half-heartedly introduced, even though here and there one might find some low-speed data transmission networks. Network and service quality are far behind prevailing standards and network operation is conducted by over-abundant and generally little motivated staff.

55. For their **financing needs** most countries have to resort to scarce hard currencies, while the income derived from network operation comes in local currencies. In some cases, the government arbitrarily transfers income away to other sectors of activity. This reflects the dominant role which governments still play in telecommunication network management. Even when management has some freedom to act, this freedom does not extend to all the decision-making areas required to introduce and rationally manage a telecommunication network. In countries where the authorities have granted telecommunications some autonomy, the operating results of networks have been more satisfactory.

56. Intra-African telecommunication traffic generally passes through transit centres situated outside the region. The PANAFTEL project itself has made only limited progress as far as the objective of interconnecting national networks is concerned. These still consist of equipment derived from technologies which are increasingly being abandoned by suppliers, who are turning their attention to digital equipment, looking ahead to the introduction of integrated services digital networks (ISDN), which are the only solution to providing the kind of services that the economies and users of developed countries require.

57. All of this points to the fact that Africa still does not have sufficient assets to find a suitable place in the new world configuration, as it is appearing on the horizon. And yet, this is not for lack of initiatives. For instance:

- Every subregion has its own economic integration structure, such as ECOWAS in West Africa, the ECCAS of Central Africa, the SADC in Southern Africa or the Preferential Trade Area (PTA) ~~in~~, now the Common Market for Eastern and Southern Africa (COMESA). The Council for the Development of Economic and Social Research in Africa (CODESRIA) has been operating since 1975. This regional association has recently listed over 630 institutes in the region active in the areas of development training or research. Similarly, the decision gradually to integrate African economies with a view to setting up the African Economic Community by the year 2000 reflects the constant concern of African States to unite their efforts for the development of the continent (see **Annex 3**).

- The development and integration of telecommunication networks have been given special attention. This has been shown and is still being shown both on an international level, with the ITU, and on a regional level, with the "Missing Link" report, the Arusha Declaration, the setting up of the Telecommunication Development Bureau (BDT), African telecommunication development conferences, Buenos Aires Action Plan (**Annex 10**), the recent establishment of the RASCOM organization, a number of subregional organizations involved in telecommunications as their main or

secondary activity, etc. At the regional level and through the initiative of African governments, the OAU, ITU and ECA, the Pan-African Telecommunication Union (PATU) was established in December 1977 to coordinate the development and operation of the regional telecommunications networks and services in a concerted and harmonious manner.

58. With the advent of the information era, challenges of another kind are appearing in the world of telecommunications which has now become the driving force of any change in society. Even though it still has not met the challenges of the century which is closing, Africa is now faced with a Cornelian type of dilemma: whether or not to belong to the emerging global economy. A lot will depend on the response to the challenges of telecommunication network development.

Financing of telecommunication projects

59. Despite considerable efforts, countries spend less than 0.4% of their GDP on developing and extending their telecommunication networks - a paltry amount compared with other countries which have already satisfied their basic services requirements (telephone and telex). The sources of financing are varied but mainly comprise internal funds and bilateral and multilateral assistance, in different forms and under varying terms. Financing requirements are enormous. As telecommunications are potentially highly profitable, they have inherent advantages which should attract floating capital. Yet, the scale of projects, their presentation in forms which do not meet leaders' or investors' requirements and the fact that the institutional framework of telecommunication services management does not favour the optimum generation and use of resources are some of the factors preventing access to sources of financing which might otherwise be available.

Bill collection

60. Bill collection for services rendered provides a test of the performance level of telecommunication administrations. A joint UNDP/ITU study carried out in December 1991 in ten sub-Saharan African countries revealed an average telecommunication bill recovery rate of 60% with, in most cases, the State as the main debtor of the public telecommunication operator/administration. The same report showed a recovery rate of over 80% for relatively autonomous telecommunication administrations. In contrast, those telecommunication administrations still under heavy State supervision have the lowest recovery rates (under 60%). In some cases, unrecovered amounts over a three-year period represent 1.15 times the organization's turnover for a given financial year. The problem of telecommunication bill recovery is in fact closely linked to the more general problem of the institutional framework covering telecommunication network operations in individual countries.

Network maintenance

61. Telecommunication network maintenance is of increasing concern to network managers, while the resources allocated for the purpose still fall short of actual requirements. Ten years ago, maintenance services hardly appeared in most telecommunication administrations' organization charts. Users were more concerned with service access regardless of service quality, whereas now they want both access to and quality of service in an environment which is technically more complex, where different technologies coexist in a single network and where new services are introduced to satisfy new demands.

62. One case study shows that owing to bad maintenance, a sub-Saharan African telecommunication administration was losing a yearly average of the equivalent of 51% of its turnover. This may be an extreme example, but it is symptomatic of the undesirable consequences of rough, inadequate maintenance, often underlying the broader problem of network operations.

The widespread implementation of the national plan for the improvement of maintenance (NPIM) launched by the ITU and its concomitant development (where it does not already exist) along with the master plan for network development, will greatly improve the existing situation. The Declaration of Bangui was made in just this spirit, following the symposium organized in February/March 1990 at Bangui in the Central African Republic, within the framework of the PANAFTEL project "Rehabilitation and maintenance".

Human resources

63. Of all the resources required to develop and operate networks, lack of highly qualified staff constitutes a great setback to telecommunication administrations. In addition to the frequent problem of over-staffing in most existing management structures (an average of 60 employees per 1000 main lines), the human resources problem comes down to staff management in the strict sense of the term. The overall mediocrity of telecommunication administrations' financial, economic and technical indicators reflects the quality of their human resources. If the organization responsible for developing and operating the network is relatively autonomous, it has more chances to improve the situation via selective recruitment management and skill training, etc. It would also be advisable to strengthen and expand regional efforts to provide human resource development centres such as the African Regional Advanced Telecommunications Institute (AFRALTI) in Nairobi and the Ecole Supérieure Multinationale des Télécommunications (ESMT) in Dakar. Such regional centres should provide both technical and management training.

Regional and subregional cooperation

64. Regional, subregional and even international cooperation structures exist, and all have the same objective, namely the development and economical operation of the African telecommunication networks. All subregional economic organizations include a body responsible for coordinating telecommunications development in the subregions concerned.

65. The real problem with regard to cooperation is due to a lack of coordination of the activities undertaken by existing cooperation organizations, which results in a dissipation of resources in the beneficiary States. With the exception of those countries belonging to the SADC, subregional cooperation policy decisions are rarely implemented at the national level. Even the RASCOM project, which for over ten years constituted a practical demonstration of African States' willingness to cooperate and led to the establishment in May 1992 of the organization bearing the same name, had great difficulties entering the operational phase. The lack of financial capacity to implement agreed-upon policies and programmes is the single most important problem.

66. And yet only effective cooperation and coordinated development policies can help the region resolve its current problems, including the development of its telecommunications as a vital means of belonging to the international community of tomorrow.

Existing operating structures

67. With only a few exceptions (two or three countries), telecommunication management structures are still more or less under State administrative and political control, while in some countries the State still issues instructions for everyday network management.

68. Even though all the decision-makers are in favour of restructuring the telecommunication sector, views vary on the legal status and capital structure of the new bodies required to operate the telecommunication network. ~~Among politicians, the~~ The general ~~view~~ trend is ~~that the State's~~ forwards maintaing the monopoly ~~over~~ of the State, which may or may not grant exclusive licenses for the network and basic services ~~should be maintained and~~, giving greater management independence ~~given~~ to one or more public operators; ~~there is also a general tendency in the region towards~~ at the same time, liberalization of terminals and value added services is becoming more widespread in the region. Nevertheless, under the pressure of events - including the structural adjustment programmes under way in most countries - telecommunication reforms depend on increasingly broader liberalisation considerations ~~related to liberalization of~~ in keeping with those adapted for the national economy.

69. ~~The lack of outside finance and the insufficient generation of income to cover operating costs have led some States to consider privatizing their networks without even knowing the current market value of their assets, which are in fact sold off at bargain prices.~~ For a great variety of reasons, such as the improvement of management throught the introduction of confirmed international operators as partners, the possibility of obtaining new sources of financing (thus enabling States to reserve the financing of development agencies for sectors such as health, education, etc.) and the appealing prospect for the State budget of an important source of hard currency revenue, governments are increasingly inclined to transfer a more or less significant share of the capital of State telecommunication enterprises to the private sector. When the network management structure is already fairly autonomous and allows for private-style management, sale of assets to private parties or the participation of new private partners ~~would~~ will pose less problems since the operational indicators ~~would~~ will better reflect performance and facilitate asset valuation.

70. In most cases, the separation of the regulatory body from the network operating body is ~~seldom~~ not always clear. This limits the scope of measures to liberalize specific services and supplies of equipment.

Rural telecommunications

71. In industrial and commercial terms, Africa is mainly rural. Over 70% of its population lives in rural areas which hold most of the region's natural and mineral resources. The United Nations raised the alarm many years ago and urged the international community to take steps to accelerate social and economic progress in rural areas. In Africa, those steps were intended to comprise a wide range of harmonized, multisectoral measures to promote integrated rural development.

72. Despite the continuing high cost of rural telecommunication lines (still five to six times that of built-up areas), African telecommunication administrations have incorporated rural telecommunications in their network development policies. Their task was facilitated in 1981 by the pre-feasibility study on the "Appropriate Modern Telecommunications Technology for Integrated Rural Development", a study paid for by the Federal Republic of Germany as part of the programme of the first United Nations Transport and Communications Decade in Africa (in which programme the project "Survey of Rural Telecommunications Requirements" appeared as a priority activity for the Decade).

73. More recently, at the end of the RASCOM project feasibility study it was clearly stated that the RASCOM project's basic objective was to provide reliable means of communication to remote areas deprived of infrastructures such as transport or electricity. One of the project's objectives is to provide remote rural areas with telecommunication services.

74. The above shows clearly that the need to develop rural telecommunications is well recognized at all levels of decision-making. Furthermore, available technology ~~already~~ now offers numerous options for subscriber access. This technology significatly reduces cost per user. The major problem remains financing as the direct profitability of projects is not immediately apparent however detailed case-by-case study often reveals more profitable solutions.

As to matters relating to structure, legislation, financing and the integrated development of rural telecommunications, the Buenos Aires Action Plan (BAAP) takes these concerns into account in the activities to implement the 12 priority programmes and in the activities of the two Study Groups established for that purpose (see **Annexes 10 and 11**).

A platform for action

75. The new type of human society emerging is moving towards an increasing internationalization of activities. The main base of this society, namely its resources in capital and new technologies, especially information and communications, no longer belongs to any one group of countries and even less to one country alone. In order to access these resources and derive the best advantage from them, each of the interested parties restructures the technology and the regulations of its national telecommunication network, while ensuring, within the framework of international cooperation and competition, that its network can be interconnected to others with a view to setting up the future global telecommunication network. The institutional environment, standardization, the emergence of international networks controlled by companies for strategic purposes are outstanding problems calling for solutions in which all parties should cooperate.

76. In order to construct a reliable telecommunication network in this new environment, Africa should ~~individually and collectively~~ nationally and regionally find a global, optimal solution to a series of independent problems. The objectives should be:

- to increase the user connection capacity of national networks, through a judicious choice of technologies; ~~and~~ equipment and method of financing, in order to meet demand in both urban and rural areas within a reasonable time span;
- to increase network availability and enhance quality of service through proper maintenance;
- to ensure that telecommunication network operation generates sufficient financial resources to increase the self-financing share in telecommunication projects;
- to structure the technology and regulations of national networks to facilitate their insertion in regional and world telecommunication networks, to whose standardization they should contribute actively and proportionately;

- to consider telecommunications not only as a support for the socio-economic development of the country, but also as a commercial activity in its own right, conducted by private and public players within a regulated framework; such a framework must favour competition ~~without detracting from the financial viability of the authority responsible for setting up an infrastructure, which must remain unimpaired~~ and take account of public service requirements. In this context, the technical specifications of public operators must provide for the fulfilment of their public service mission without jeopardising their financial viability;

- to place a special emphasis on the development and management of human resources, in the knowledge that these are the best type of capital, without which it has not been and will not be possible to develop the region, regardless of the quality and nature of other types of resources available.

- to promote regionally the following;
  - coordinated development approaches
  - enhanced network connectivity
  - harmonized tariff and traffic accounting
  - sharing of manpower development facilities
  - maintenance
  - research, development and manufacturing.

77. All these challenges must be met in an economic and social environment which is particularly ill-defined and full of uncertainties of all kinds. This should not constitute an obstacle, but rather an encouragement to act, associating all the interested parties in bringing together their collective capacity to ensure the development of a service, which though public is recognized to be commercial in nature.

RECOMMENDATION 2 - Construction of a reliable telecommunication network

In response to all of the above-mentioned challenges, the Green Paper recommends:

(i) that the network be developed with due regard to its economic viability and using appropriate modern technologies;

(ii) that efforts be made to ensure that the quality of service offered is constantly improved in order to meet customer expectations while at the same time reducing losses in operating income caused by poor quality of service;

(iii) that the telecommunication sector be restructured with due regard for the national and international environment;

(iv) that particular attention be paid to the development and management of human resources, the most valuable asset of public telecommunication operators;

(v) that the spirit and scope of regional and international cooperation be strengthened and extended, taking care to avoid any duplication of work;

(vi) that industrialization in the telecommunication sector be considered as one of the priority projects to be carried out on a subregional basis, and that the private sector be involved in such efforts.

CHAPTER III. - LEGAL CONSIDERATIONS

Introduction

78. For most of this century, the provision of telecommunications has been regarded as a "natural" monopoly regulated by governments. In the 1970s and 1980s, however, policy makers in an increasing number of countries have begun to question this assumption and have attempted to define:

(a) which aspects (if any) of telecommunications should be provided by a monopoly;

(b) what rules should govern those areas in which competition is to be permitted;

(c) how to manage the relationship between the monopolist and competitive players.

79. When examining current trends in telecommunications policy, it is helpful to consider the concept of a "natural" monopoly and the mechanisms which define its boundary. A natural monopoly can be defined as an economic sector where, because of scale economies or critical mass effects, the supply of goods and services by a single organization is the most effective way of meeting customers' needs. The principal factor influencing the review of the natural monopoly in the telecommunication sector would appear to be the radical change in the nature of telecommunications caused by the technology introduced over the last 15 to 20 years.

80. Until the 1970s, telecommunications technology was specific to and developed by that industry. Successive generations of technology improved efficiency and quality, but did not change the functions of the system in any material way. The technology introduced since 1970 has been based on microelectronics and has much in common with the basic technology of computing, consumer electronics and broadcasting. This convergence has the following effects on the telecommunications environment:

(a) there is now a wide range of new services ~~has become possible~~ and new technologies for providing some of these services;

(b) these services embody features more usually associated with computing or broadcasting;

(c) players outside the traditional telecommunications industry are technically capable of providing these new services;

(d) the optimum distribution of function between network and terminals is not clear and will change with time.

81. In addition to these technologically-based reasons, the redefinition of the monopolistic domain was supported by certain criticisms of PTOs, i.e.:

- exploiting their monopolistic position by providing inadequate service at excessive costs, thus ignoring important political, social and economic concerns;
- preventing users to benefit from all the possibilities offered by the technological developments, due to the constraints imposed by monopoly;
- having high productivity costs and low inputs.

82. The legal instruments implementing new regulatory arrangements in the countries where competition has been introduced (e.g. in the United States and Europe) contain quite specific definitions of rights and responsibilities of players and provide mechanisms for controlling their commercial behaviour over and above those which would result from market forces. A new regulatory framework must be adequate to manage the relationship between ~~monopolists~~ operators that still have a monopoly and new competitive players. ~~Under one form of regulation,~~ It is essential to ensure that the regulations adopted do not allow the new players ~~may~~ to exploit anomalies in the former monopolist's price structure and target the more profitable segments of the market in a "cream skimming" operation. ~~A different regulatory regime might~~ Nor should the regulations allow a monopolist to subsidize activities in competitive areas from profits earned in its monopoly business and inhibit the entry of new players. In view of the complexity of such work, it is advisable that it be performed from the regional/subregional level to the national level. The development of a harmonized regulatory environment would contribute to the socio-economic integration of the countries concerned.

The regional/subregional scenario

83. The aim of the regional/subregional approach will be to create an enabling environment in a binding form for the activities foreseen. The legislation in such a case would have to be in the form of treaties. Such treaties may be bilateral or multilateral. The treaties would have to address the following among other things:

(1) The legislation will have to define market borders in a rather liberal sense to cater, for example, to free access for all players both at the borders of and within the market. ~~Whatever restrictions which remain ought to~~ Where certain restrictions remain, they should in all events affect all the players in the same manner - hence a free, transparent and non-discriminatory market.

(2) The market however will not be seen to be harmonized in the sense foreseen in (1) above unless, among other things, there exists a "minimum set of rules" to be observed by all players. Legislation would therefore have to cater for harmonization of such rules and this it could do by establishing an appropriate body. In its work such a body could deal with matters of orderly transfer of technology, for example, and ensure that, where appropriate, within the acceptable context of international intellectual proprietary rights, not only "know how" but also "know why" is transferred. In the process the body could, where relevant, negotiate intellectual property licenses at collectively reasonable terms. It is suggested that this body could possibly exist as an organ of one of the existing regional institutions, at least in its formative stages.

(3) Legislation will have to establish regional/subregional regulatory authorities to handle issues such as licensing, type approval of equipment, frequency management, procurement, and market access at the regional and subregional level. The authority could be staffed more or less in the same manner as is proposed for the National Regulatory Authority (NRA) (see **Annex 4**).

(4) There will have to be established judicial reference points or tribunals to adjudicate over rights and obligation of players in the market. It is conceded, however, that such a function could also be handled as one of the terms of reference of the regional/subregional regulatory authorities.

The Treaties or Regional Agreements would be setting the rules of the game and manner of play within the market.

The national scenario - The National Regulatory Authority (NRA)

84. The case for a fused regulatory-cum-operational entity in most African countries has been that telecommunications is not only a sensitive but also a strategic national matter. This argument does not, however, seem to suggest that if regulatory and operational functions were to be in two separate hands then telecommunications would be any less sensitive and strategic. It is inconceivable in a liberalized competitive market that the ultimate operator could at one and the same time be the ultimate regulator and ~~still retain~~ that the a requisite ~~and sufficient degree of~~ impartiality with respect to the other competitors should be undermined.

85. The delinking of the regulatory functions from the purely operational one therefore becomes a priority at the national level for purposes of liberalization. The delinking could be done by an Act of Parliament or via any other legal act available. However, having effected the delinking by whatever legal means, it is strongly proposed that the new NRA be constituted by an Act of Parliament. This will be the foundation for the stability and autonomy that this entity needs to discharge its function with impartiality.

86. The structure and staffing of the NRA will depend on whether it is to be merely a technical supervisory body or whether it should have a judicial function. The preference should be that it has a judicial role in which case its staffing and structure would cater for engineers, accountants/auditors, tariff analysts and lawyers among others. As already mentioned, a possible model and write up is presented in **Annex 4**.

87. It can be argued that the NRA is a buffer or a *de facto* arbiter on the one hand between the State and the monopolist PTO and on the other hand between the service providers and consumers foreseen in the liberalized market while indeed in the third situation, it could be the mediator or arbiter in any matter involving any number of the four groups (i.e. government, PTO, service providers and consumers). It has for example a role to set standards and ~~approve tariffs~~ develop a tariff framework for dominant or mopolist operators (more specifically with respect to interconnection charges) and in doing this it has an implicit role to ensure quality performance and protect the consumer from exploitation. The ultimate test for its effectiveness will not only be its autonomy but precisely its capability ~~not only~~ to act competently, independently ~~but also~~ and impartially.

88. The legislation incorporating it will ensure this autonomy and independence if it provides, *inter alia*, for the appointment of its chairman and members by a highly placed authority such as the head of State or Parliament or even by the head of State with the ratification by Parliament. Further, its chairman and members ought to have and enjoy security of tenure to the extent that they may only be removed on special and stipulated grounds and/or by a commission/tribunal constituted for that purpose or by Parliament. However, to the extent that it has judicial authority/functions and to restrain it from acting as a law unto itself, its decisions on all other questions other than ~~questions of~~ those based on undisputed fact ought to be made appealable to a higher judicial authority such as a Court of Appeal.

89. Two cardinal issues should not be lost sight of: The road to the establishment of an NRA is, and indeed ought to be, evolutionary in that whereas in the one country it may start with a departmental reorganization to create a regulatory committee, in the other it may be by direct Act of Parliament to incorporate it. Both solutions are fine as long as the ultimate aim is to create an autonomous body as foreseen in the previous paragraph. Also the NRA should have the legal authority, enshrined in the act establishing it, to interact with similar entities outside national borders because it is through it that regional harmonization, indeed liberalization/cooperation, will be effected.

90. Finally the NRA should preferably be self-financing and have its own budget if it is to be truly independent. One option would be to finance it like the judicial system from government the State budget. Or, the statute establishing the NRA would empower it to collect its own revenue for services rendered.

The following could be some of the appropriate sources:

- fees for granting of licenses for installation and operation of telecommunication services;
- fees for carrying out type approval of subscriber terminal equipment in the public network;
- levy charge/fees to all users of the spectrum for its (the NRA's) management of the spectrum;
- inspection fees payable by suppliers of equipment;
- possibly a certain fixed fee (charged annualy or as appropriate) payable by all users of the national network;
- ~~fees on imported equipment;~~
- fees chargeable on opinions given on agreements between various players in the market including the PTO;
- fees on disputes brought before it.

The alternatives to NRA

91. The following alternatives could be available as regulatory structures:

(1) An independent individual supported by a team of experts/technicians

92. In order that he may enjoy the requisite independence devoid of unwelcome pressures and interference from any quarter, this individual ought to have and enjoy security of tenure in that he should be appointed for a certain or ascertainable period during which he may not be removed during good behaviour except for incapacity. Further, the individual ought to have and control his own budget, the financing of which may come from such sources as licensing and renewal of license fees, type approval fees etc. It is assumed here that this individual will be the licensing authority, however, where he is not, he should have the legal power to advise the licensing authority, via opinions, on licensing - such power should have the legal power to review or modify a license already issued where and when appropriate.

93. The one glaring advantage of this model is that it would be less costly than the autonomous NRA. However, an argument is to its disadvantage that far too much power could be concentrated in the hands of a single individual and that such power could be open to abuse. As a counter to such an argument it must be recalled that the individual only holds office during, *inter alia*, good behaviour and, in any case, the legal provisions establishing his office could and indeed should provide checks and balances including a provision for his impeachment where and when appropriate.

(2) A government ministry

94. In this setup, a department or section within the ministry could be charged with the regulatory function. Notable disadvantage here is the risk of having too much government on the backs of the various players probably to the unfair advantage of the dominant or State-owned operator if any. The political advantage, however, is that it gives the government a direct control to the possible delight of the electorate and the political party. Perhaps this is acceptable in a situation where government has completely gone back to governance and has no market interest in the dominant operator. It may also be observed that in this model the government, through the department, directly retains the duty of accountability to the people and to the various players. This solution would pave the way for its transformation into an independent body. The transparency of the decisions taken could then be guaranteed, as is already the case in certain African States which have set up an "advisory board" to which all cases are submitted for an opinion.

(3) An agency under the ministry in charge of telecommunications, with a legal identity and financial autonomy

95. In this alternative, there is an institutional separation betwen the policy-making and regulatory functions. The aim of the agency would be to assist the government in the supervision and regulation of the telecommunication sector, following broad political guidelines laid down by the ministry in charge of the sector. The borderline between the jurisdiction of the ministry and the agency should be clearly defined, as should the limits of the regulatory powers of the agency.

96. The last word on this issue of regulation seems to be that whatever model of regulatory structure is opted for by a country, it would appear prudent that the eventual intention should be to eventually get government back to governance and to expose/open the telecommunication sector to, *inter alia*, fair competition, rural/subregional/regional accessibility and availability and commercial stance.

The PTO's new legal structure

97. Having delinked the regulatory from the operational aspects, the PTO would now be left to handle operational matters and more particularly the establishment, operation and management of the national telecommunication network and its attendant structures. As in the case of the NRA, the cardinal legal aim here should be to establish a corporate entity distinct and separate from the government with the goals of: commercial viability, quality of service and good operational performance. This could be done by an Act of Parliament constituting the PTO into a public corporation. The act itself must provide for autonomy with just a modicum of government intervention for social and political purposes, especially at the initial stages. For the protection of the consumer and private service providers, ~~there will need to be~~ provision ~~in the act~~ will have to be made in a written agreement (for example a programme contract) concluded between the State and the public corporation for matters such as quality performance indicators, compliance with tariffs, equitable terms of access and charges, etc. Other than by an Act of Parliament, the PTO could also be brought into existence through the Companies Act or any other law providing for the incorporation of such a commercial corporate body. It may be prudent that the act or law establishing the PTO has as one of its clauses a provision against takeover by a foreign entity.

98. Regarding ~~privatization~~ liberalisation of the market, the aim being to leave the PTO with only basic or strategic services, there will be a need to look beyond the borders of telecommunication statutes. The actual separation of services from strategic to non-strategic may be done otherwise than by legislation depending on the prevailing legal climate or environment. For example, this could be done by the mere issue of a Ministerial Instrument. However, the actual ownership and operation of the ~~privatized~~ liberalised areas will still have to governed by a series of legal texts. ~~have to undergo some legislative operation~~. There will, for example, be a liberalization of the investment statutes to enable and attract foreign participants; income tax, corporate tax and repatriation of profit laws will have to be equitable both to the foreign investor and to the host participant. In this respect, the drawing up of specifications will, whenever ~~privatisation~~ liberalisation takes place in the field of telecommunications, allow for priority financing rules to be established for the integrated development of rural telecommunications. In telecommunication areas, there will have to be regulation to remove the dominant and monopolistic position of the PTO. Also, there will have to be new rules and regulations to provide for matters such as interconnection and interoperability of the multiplicity of systems and equipment that must of necessity enter the liberalized field.

Further legal issues

99. The legislative scenario will have to take account of a number of constraints, ~~bring forth certain legal positions~~ including liabilities as follows:

(1) At the regional/subregional level the need for interoperability, interconnection/interface of systems/equipment will require harmonized and published standards. This in itself requires access into the "know-how" and possibly even "know-why" of such systems/equipment. The consequence of this is likely to be complex, and at times protracted contractual negotiations with the owners for provision of the "know-how/know-why" with or without license.

(2) The need to comply with specifications will require the regions to negotiate "Agreements for Mutual Recognition of Type Approvals".

(3) At the country level, there will be legal problems with the right of access to the public network. This underscores the need for an objective, transparent and non-discriminatory legislative regime.

(4) With so many providers of goods and services and multiple equipment, there will be, for purposes of consumer protection especially, a need to determine where to place the blame for purposes of liability for failure to perform. Between operators this probably may be taken care of in their contracts. For the customer, however, a statute might well allow him to lay the blame on the 'first contact' provider of service who could then seek indemnity from his (service provider) collaborator.

(5) The scenarios which involve foreign investors may bring with them the risk of undercapitalization where, under the guise of transfer of technology, the foreign investors ~~import~~ include depreciated equipment ~~into the country~~ as part of their capital contribution. The agreements should cater for all the implements of trade including training and training parameters.

(6) There is also the danger ~~of~~ that a multiplicity of agreements might restrict competition. ~~"C ontracts in Restraint of Trade These~~ Such agreements must never be enforced unless it is clearly shown that they do not perpetuate monopoly by being against fair trade and competition in an open market place.

(7) The concept of "fair and equitable access within the market" has implicit in it the concept of "fair and equitable", indeed transparent, procurement laws and regulations. Whereas the national laws may not necessarily be found wanting in this area they will of necessity, however, require updating to meet the new changed procurement climate. The regional/subregional environment will have to develop "common procurement laws and regulations both for goods and services" to take into account the legal barriers which have to be pulled down to give way for a liberalized market place. Such laws/regulations whether at the national or regional level, will have to address matters such as public tendering, tender procedures, submission of tenders, acceptance of tenders, evaluation of tenders, negotiation with suppliers, among others. In its "Draft model law on procurement", the United Nations Commission on International Trade Law (UNCITRAL) has done an appreciable amount of research and work which can be used or even adopted *in toto*.

100. The changes contemplated in the new telecommunication environment are indeed radical both in law and fact, hence the need for legislation. Not only would it lend legislative sanction to the new order, but it would also provide statutory legitimacy to the plethora of contractual arrangements which would be the logical consequence of the changed environment.

An example of a draft model law defining a regulatory framework for the telecommunications sector is presented in **Annex 5**.

Procedures for the resolution of disputes

101. The problem of the resolution of disputes is multifaceted. The issues have to be looked at in the African context, the subregional context, and from the national angle. The interest of the individual role players, namely the subscribers vis-à-vis the services providers, PTOs vis-à-vis service providers, etc., have to be addressed at every level. Finally, examination is required of the principle of national sovereignty and the need for harmonization of the various divergent legal concepts/jurisdiction which will of necessity come into play, especially as regards disputes at regional or subregional level.

102. As the Green Paper seeks to consolidate Africa into one telecommunity, it is envisaged that the African States will ~~'tone down' and~~ be more accommodating of each other in this regard. Disputes should find their resolution in provisions of bilateral and multilateral agreement governing the rights and obligations of the parties. Such agreements should have, *inter alia*, provisions for intra- or trans-territorial access to courts, recognition and enforcement of judicial decisions from outside the national jurisdiction, and recognition and enforcement of decisions resulting from alternative procedures for the resolution of disputes from outside national jurisdiction. The treaty establishing the African Economic Community provides, in its Article 18, for the Court of Justice to deal with the above issues.

103. There are other international treaties on which the various players within the African telecommunity could fall back for purposes of resolution of disputes. The ITU Constitution and Convention, with its associated instruments/regulations, is one such treaty for disputes of a technical nature. Secondly, as most African States are embracing the General Agreement on Trade in Services (GATS) of the ~~GATT~~ World Trade Organisation, the disputes, resolutions and provisions of these treaties could become a useful support.

104. For the purpose of facilitating the resolution of **regional disputes**, certain forums or organs will have to be set up. In this regard it is commendable that there already exists a Centre for Arbitration with a pool of arbitrators in Cairo. This could be augmented by setting up a few others across the continent. The Pan African Telecommunication Union (PATU) may wish to widen its Article 17 (Settlement of disputes) to cover issues other than merely "the interpretation or application of any provision of this Convention or its annexes". It is also gratifying that there already exist subregional organizations such as the ~~Preferential Trade Area (PTA)~~ Common Market for Eastern and Southern Africa (COMESA) and ECOWAS which have, *inter alia*, telecommunications in their mandate. Such entities should now be encouraged to move a step further to set up regulatory-cum- adjudicatory tribunals or boards to handle trans-border questions of a subregional nature.

105. The dispute resolution process at the **national level** will have to deal with the concept of national or equal treatment or non-discrimination, this corresponds to what is called most favoured nation status under the GATS. Equity needs to be secured in matters of procurement, compliance with licensing requirements and indeed treatment under every aspect of applicable law. This will be all the more important once a government has embraced the concept of "market access", both at and within the border. Investors are now likely to be attracted to a legal regime that enables them to conclude operating agreements with local firms in a transparent, non-discriminatory, and equitable market both commercially and legally. Host countries and/or regulators will need to undertake, either in bilateral agreements, or expressly in their national statutes, not to unreasonably invoke the sovereignty protection concept whenever they are involved in disputes with other market actors.

106. With the above principles in place, there would be several options for the resolution of disputes at the national level. One option would be for the parties to take their case to court. This entails, rather formal and stringent, indeed often time- and finance-consuming court procedures. However, as long as these are transparent and non-discriminatory, the interest of the claimants would be served. The independence of courts from executive control/interference must be beyond question.

107. The parties could also opt for the traditional arbitration process which may be stipulated in a national statute or be enshrined in a clause in a particular contractual agreement. In either case, it is important that the law of the country should protect the procedure without, at any stage, interfering with the arbitral process once commenced. For the resolution of disputes by arbitration, the parties should also have the option to resort to arbitration in accordance with the rules of other international bodies such as the International Chamber of Commerce (ICC) and the International Telecommunication Union (ITU).

108. Finally, there are the so-called Alternative Dispute Resolution Procedures (ADRP) now gaining currency especially in the United States and parts of Europe. These include Mediation and Mini Trial. The distinction between Arbitration and these two is that Arbitration is adjudicatory whereas these two are not. In MEDIATION, a neutral person facilitates a process whereby the protagonists themselves are given a chance to come to an understanding. The mediator has to be held in high esteem and confidence by the parties. In a MINI TRIAL, a procedure that commenced some15 years ago, the chief executives or representatives of the protagonists sit together and listen to a presentation of their "best case" by their lawyers at the end of which they retire and attempt to resolve the dispute themselves without lawyers. While the adjudicatory process tends to create an atmosphere of "I am right, you are wrong", the Mediation and Mini Trial procedures do facilitate consultation, enquiry and conciliation, often leading to peaceful coexistence between the protagonists.

RECOMMENDATION 3.1 - Separation of functions

It is recommended that the functions of regulation and operation of the network be separated before the necessary competitive régime is introduced.

RECOMMENDATION 3.2 - Autonomy of the regulatory authority

In order to ensure the autonomy and independence required by the body responsible for regulation, the Green Paper recommends that the body in question should be created under legislation which provides, inter alia, a mechanism for the appointment of its chairman and members. The need for autonomy and independence must be taken into account, even where there exists a structure other than the regulatory authority.

RECOMMENDATION 3.3 - Harmonization of the different regulatory frameworks

The Green Paper recommends the harmonization of the different national regulatory frameworks in order to facilitate the socio-economic integration of Africa, to which end the development of such frameworks should be governed by a minimum number of common principles.

RECOMMENDATION 3.4 - Settlement of disputes

Since the ultimate aim of the Green Paper is to assist in the creation of an African telecommunication community, it is recommended that a suitable framework be found for the settlement of any disputes which may arise among States, drawing inspiration from the provisions of Article 18 of the Treaty establishing the African Economic Community.

CHAPTER IV. - THE REGULATORY FRAMEWORK

109. In this chapter the basic principles of a regulatory framework for telecommunications development in a competitive environment are discussed, and guidelines for the definition of a regulatory framework adequate to the African environment are given. Some decisions in favour of the creation of a harmonized regulatory environment need to be taken by appropriate bodies at regional/subregional levels.These decisions must be made binding for the countries concerned through appropriate legislative instruments/provisions committing the authorities responsible for regulatory aspects in these countries, also in respect of monitoring the correct application of the decisions taken. Prior action by individual countries in line with the proposals can be taken when there is a need for early sector reform.

Actions to be taken at regional/subregional level

110. Besides the separation of regulatory from operational functions, the main issues for consideration by appropriate bodies at regional/subregional levels are:

- the introduction of regulated competition in the telecommunication services domain;
- the development of common principles to access network infrastructures under fair and equitable conditions;
- the provision of terminals in a free market.

111. As already mentioned, telecommunication services are increasingly characterized by two trends:

- technical progress, making a multitude of new services possible, which has led to the blurring of traditional boundary lines between traditional services and to the definition of new ones;
- the network infrastructure can carry more and more services operated independently of network operation. Telecommunication services are, therefore, becoming more and more tradeable.

Both facts have contributed to determine the changes in the regulatory framework in many countries in the world and must be considered in establishing a new regulatory framework adequate to the African environment.

112. A review of the current situation in the area of telecommunication services, performed from a regulatory point of view, is presented below.

Current status of regulation

113. The traditional "basic" telecommunication services are telephony and telex (which is now disappearing). These are supported by worldwide fully interconnected networks which are both widely understood and used.The basic principles of these two services have changed very little over the years, although both have benefited from an increasing level of technical sophistication, in both network equipment and terminal equipment. In most countries in the world these services are reserved for the exclusive provision by PTOs.

114. As technology has evolved, PTOs have introduced new services, some of which ~~have become accepted~~ are recognised as basic services in some countries, but not in others. Examples of these services include: packet switched data services; circuit switched data services; electronic mail; videotex.

As a consequence, *inter alia*, of technological developments, it has been more and more difficult for PTOs to offer these services on an exclusive basis.

115. Taking advantage of the technological advances, it is possible to enhance the "basic services" by providing additional functions, either:

- in the basic network by incorporating additional features, typically in the exchanges, or
- in the customer terminal equipment.

To a large degree both methods can provide equivalent features (for example, for telephony it is possible to provide a feature such as "short code dialling", either from the exchange software or incorporated within the terminal). Similarly, it is possible to incorporate a range of complementary features, some implemented from the network, some from the customer terminal equipment and some partly implemented in each.It becomes more and more difficult for the PTOs to have complete control of the implementation of functions, even within "basic" services.

116. A growing variety of new services, including "value-added" or "enhanced" services offer additional functions beyond the basic conveyance functions. However, it is often difficult to strictly define ~~value-added~~ the services that can appropriately be referred to as value-added services in an era of evolving technology and with a rapidly growing number of services.

~~Therefore, if a definition of value-added services is used in order to maintain boundary lines between those (basic) services that can be provided as an exclusive function of the PTOs and the (value-added) services which could be provided by any other operator then:~~

- ~~firstly, there would appear to be fundamental difficulties in classifying existing services since VASs services range from services where the "transport component" is low (e.g. 5 - 15%), such as for computer bureau service offerings, to services where this component is high (e.g. 90%), such as for services concerned with the transmission of texts and graphics;~~
- ~~secondly, the regulatory powers will need to be continuously updated as technical capability evolves.~~

~~This second aspect will leave value-added service providers in the position of not knowing in advance whether or not a new service that they may wish to introduce will be classified as a value-added service and whether that classification may change with time. This position could clearly hamper the introduction of new services.~~

. Thus, it would be easier to apply strict definitions to what is well known, i.e. basic services, and to place all of the services that appear every day on the market in the category of "new services". Once that has been done, it will be easier to define the "monopoly area" as the "basic services" area, with all other "new services" being either subject to regulation or free of regulation. Similarly, it will be easy to draw the borderline between regulated services and unregulated services; for example, a service is regulated if it involves the creation of a separate network, and it is competitive or unregulated if it uses existing infrastructures.

Reserved and competitive telecommunication services

117. The analysis shows the growing difficulty of PTOs to maintain the exclusivity on the provision of traditional and new services. In addition to these technically-based considerations, the benefits for countries derived from the introduction of competition rules in the sector is also suggested by the following socio-economic considerations:

- increasing the feasibility of quick response to the changing pattern of future growth of demand;
- the use of private financing, thus reducing the amount of scarce public funds required to be spent for these services;

- opening the possibility of attracting foreign funds, thus economizing on the use of scarce hard currency reserves of the countries, making these savings available for other uses;

- opening the possibility for private enterprises to invest in advanced technological features, taking their risks, but with the chance of economic advantages for all the country operators, while ~~PTOs cannot risk the public money and must invest only in consolidated technologies~~ it is often better for the PTOs to concentrate their resources on investments that form part of their chief mission as public service providers.

Recent developments virtually all over the world in recent years have shown a strong trend towards a narrower interpretation of those telecommunication services which must continue to be reserved exclusively to the PTOs and the growing number of those increasingly opening to competition.

118. In view of the foregoing, it is proposed that only the provision of the basic telecommunication services (such as telephone and telex services) be reserved for exclusive provision by PTOs. Both services are offered on an universal basis, i.e.:

- covering the whole geographical area; and
- provided on demand to all users, on reasonably the same terms, generally regardless of the user's location within the PTO's territory and the cost of the connection to the network.

119. As is well known, the revenue of the telephone service represents an important percentage of the total telecommunication revenues. The financial revenues of the PTOs - and thus their viability - will continue to be essentially determined by voice revenues. Competitive provision of non-voice services, including value-added services, with unrestricted share use or provision to third parties, is unlikely to have a substantial impact on the revenues of the PTOs and, therefore, on their ability to carry out the particular tasks assigned to them.

120. Telex service is converging rapidly with data and value-added services. Moreover, technological development is likely to make it more and more difficult to maintain a strict telex service monopoly. Personal computers are now available on the market which can operate data and telex services via both the telephone and telex networks. In any case, the revenue of this service represents a low percentage of the total telecommunication revenues.

121. PTOs should be permitted to compete in the open market to provide some of the other services. ~~included in the area of competitive services.~~

To conclude a "free" or "open" market does not mean the complete absence of any constraints. Fair competition must take into account certain regulations and rules issued by the national authorities.

Integrity of basic network infrastructure

122. Telecommunication network infrastructure means any form of installation or group of installations which ensure either the transmission - or transmission and routing - of telecommunication signals and the associated exchange of the control and operation information, between network termination points.The integrity of the basic network infrastructure must be maintained.This implies a continuing strong role for PTOs for the provision of network infrastructure and the need to safeguard their financial viability in order to renew telecommunication infrastructures and assure the necessary level of investment.

123. Given the PTOs' exclusive provision of voice telephony and telex (reserved services) and their competitive stance with private service providers in offering other services, an appropriate balance should be reached between:

- the need for PTOs to have adequate revenues necessary for performing the important tasks assigned to them;
- the benefits derived from the introduction of competition in the telecommunication services market.

124. While the basic services and the basic network infrastructure should remain under the responsibility of the PTOs, it would also be desirable to consider making provisions for private ownership of particular segments of the network, e.g. mobile telephones.This innovation would give greater opportunity for private entrepreneurship and financing to participate in the development of the telecommunication sector as a whole.

Access to network infrastructures

125. It will be necessary to develop common principles at regional/subregional level, enabling the access to basic network infrastructures - operated by PTOs - by competitive service providers under fair and equitable conditions. As examples, the ~~common~~ principles included in the regulatory frameworks elaborated in Europe (the Open Network Provision (ONP) concept) ~~and in the USA (the Open Network Architecture (ONA) concept)~~ are briefly described. Additional information on the ONP ~~and ONA concepts~~ and some indication on ~~their~~ its application is ~~are~~ given in **Annexes 6 ~~and 7~~**. ~~In view of the complexity of the process, African countries would benefit considerably in terms of the savings in effort, time, and expense by utilizing to the fullest extent possible such regulatory frameworks which are already in existence.~~ These examples may provide food for thought, but it must be borne in mind that the frameworks in question have evolved with time and many changes have taken place.

The ONP concept

126. In EU countries, the ONP concept has been developed in the second half of the 1980s in order to lay down the guiding principles and the structural framework within which the suppliers of telecommunication services may have access to and use of the public network. The ONP approach may be summarized as follows:

- The harmonized conditions for ONP must be based on objective criteria, be transparent and published in a suitable manner. They must not discriminate between nationals of a member State and other nationals and must guarantee equality of access.
- The ONP conditions must develop and be established gradually.
- Existing standardized technical interfaces must be used if possible.
- Harmonized conditions of use which must apply to ONP tenders and which concern a number of parameters such as the provision time, contractual period, service quality, conditions for shared use, use by third parties, resale of capacity and interconnection of networks, must be defined.

- Harmonized tariff principles based on a number of guidelines such as adjustment to costs, sufficiently wide publication and the application to all users without discrimination, must be defined.

127. The ONP concept focuses on transparency, objectivity, and non-discrimination, *inter alia*, in the ~~three~~ four key areas which need to be tackled in order to ensure market opening:

- technical interfaces,
- usage and supply conditions,
- tariff principles;
- network integrity.

~~In addition, these areas of opening are viewed within the framework of a number of essential requirements (for example, the need for network integrity).~~

The ~~ONA~~ Open Networking concept

128. The ~~ONP~~ Open Networking concept, ~~was~~ developed ~~taking into account the Open Network Architecture concept defined~~ in the United States, ~~The ONA concept~~ is a set of technical, economic and regulatory arrangements aimed at ensuring as much competition as possible in the fields of telecommunications, information provision and value-added services, and with the overriding target to avoid any misuse of dominant or monopoly market positions by existing telecommunication carriers. Under ~~ONA~~ Open Networking, dominant carriers have to provide features to other enhanced services providers with the same availability and efficiency that they provide themselves in their offering of enhanced services. ~~The ONA concept is not just a technical concept. Despite its name, it is not an architecture and is therefore unlike the Open Systems Interconnection (OSI) or the System Network Architecture (SNA) for example~~.

129. The most important similarity between ONP and ~~ONA~~ Open Networking is that both concepts aim at creating the best possible conditions for innovative development of value-added services in a competitive environment. To achieve this objective, in both cases it will be necessary to agree on common principles which apply when PTOs make their network infrastructures available to service providers. Both in Europe and in the US, these common principles will comprise technical, regulatory and economic aspects. There are also a number of significant differences. These result from different aims of ~~ONA~~ Open Networking and ONP, the different starting conditions and in particular the different regulatory environments.

Liberalization-cum-regulation

130. Liberalization in the services area must be accompanied by the setting of rules to ensure fair and equitable access conditions to network infrastructures.

131. As regards the provision of terminal equipment, the current trend is towards progressive full opening of the market to competition. The technological evolution towards multifunctional computer-based terminals will make the current trend towards competitive provision more and more inevitable. ~~However, the provision may still be reserved for PTOs for a number of items of terminal equipment, in particular the first telephone set. Actually, the change from the existing situation of sole supply by PTOs of certain terminal equipment (in particular the first telephone set) to a competitive environment will have to allow, in certain cases, for a sufficient but defined time period for PTOs to adapt to the new situation.~~

132. The opening to competition of terminal markets implies that certain rules and procedures be defined at regional/subregional level in order to verify that terminal equipment to be connected to the public telecommunication network satisfies the same requirements considered essential, such as user's safety, safety of PTOs' employees, electromagnetic compatibility, protection of the public telecommunication network from harm, effective use of radio-frequency spectrum, where appropriate, and interworking of terminal equipment via the public telecommunication network in justified cases.

Other action to be taken at the regional/subregional/and national levels

133. The definition of a new regulatory framework requires that a number of other decisions be taken at regional/subregional level. The following list of topics is not exhaustive:

- the establishment of a harmonizing regime of licensing, declaration and authorization which is transparent and non-discriminatory;
- the definition of tariff principles;
- the identification of those factors and mechanisms which are likely to stimulate investments in telecommunications;
- the creation of consultative mechanisms by which the interests of all sector actors and users are taken into account in the definition of the rules and in the choice of main regulatory principles;
- the introduction of a certain number of procedures which are necessary to implement an efficient regulatory policy, particularly with regard to frequency management and type approval of terminal equipment;
- the creation of mechanisms for the harmonization of technical standards;
- to promote the implementation and use, for inter-African communications, of pan-African telecommunication infrastructure;
- the definition of procedures for the resolution of disputes.

134. The introduction of regulated competition in the telecommunication sector implies the strongest role of the government as far as the policy, legal and regulatory aspects are concerned. An essential element in this process is the establishment, in the African countries, of a high level, multiministerial Coordination Committee as agreed in Resolution ATDC-90/RES1 (Harare, 1990) (see **Annex 2**). This Coordination Committee, responsible for studying and proposing to the government appropriate national information and telecommunication policies covering the regulatory and operational aspects of the sector, seems to be the most appropriate national body for participating in the decision-making processes at regional/subregional level. The participation of representatives of the Coordination Committee in these processes will contribute to the creation of a harmonized multinational regulatory environment.

135. The items to be considered by the Coordination Committee in presenting the proposals to the government should include:

- long-term policy;
- ownership (public or private) of the basic telecommunication infrastructure;
- the rights and obligations of the PTO (universal service obligations, including rural telecommunication development);
- the rights and obligations of the service providers;
- the management structure of public operating companies including financial management and staff policy;

- the modalities for determining tariffs and rate structures;
- the fiscal aspects;
- the modalities for performing the regulatory functions;
- a clear legal regime delimiting the roles of the various actors in the telecommunication sector.

136. The experiences gained at country levels will be of great interest for the discussions that will take place at regional/subregional level for the definition of common positions.

Functions to be performed by the NRA

137. The NRA will be responsible for the implementation of the legal measures issued by the government following the recommendations proposed by the Coordination Committee which, in turn, will reflect the decisions taken at regional/subregional level. The NRA can also be requested by the appropriate governmental authorities to participate in the definition of these legal measures.

138. Beyond the general rules which apply to the whole of the services sector and which aim to meet certain needs of society (fiscal policy, protection of privacy, social policy, national security, etc.) there exists - at the national level - a significant number of regulations applicable to the supply and to the use of telecommunication services. These regulations are intended to ensure intercommunication between the domestic and international networks and to apply usage conditions to access to the telecommunication networks, in order to safeguard the financial viability of the PTOs. The relevant functions to be performed by NRA in this context, may include:

- monitoring of the compliance with the rules governing the services offered by the PTO and others;
- monitoring of the correct use of the network infrastructures;
- tariff guidelines;
- the granting of licenses, authorizations, etc. (see **Annex 8**);
- the monitoring of compliance with standards and technical specifications;
- the issuing of product approval certificates (terminal type approval etc.);
- the frequency assignment.

A transparent, open process could take many forms. The basic components would include: (1) a notice by the NRA of any pending decision (initiated either because the NRA proposes to take action or because another entity, such as a service provider, proposes that the NRA take action, such as granting a licence); (2) an opportunity for interested parties to comment on the proposal; (3) a written explanation by the NRA, preferably recorded in a serial publication such as a gazette that is widely circulated, of why it is taking the particular action. Similarly, all processes for acquiring a licence or seeking other action from the NRA should be recorded in NRA rules that are printed and widely circulated and accessible. This will assist in providing regulatory predictability, encourage private sector investment, and foster public trust in the regulatory process.

An additional suggestion for enhancing public trust is to provide a mechanism for consumer complaints about service provision. Section 208 of the Communications Act of the Federal Communications Commission of the United States of America, as amended, is one example.

In general, the NRA would act as a watchdog in all matters of public interest.

A model organizational structure and staffing of an NRA is presented in **Annex 4**.

RECOMMENDATION 4.1 - Provision of basic services

The Green Paper recommends that public operators should initially be granted a monopoly on the operation and provision of basic telephone services. These services should be defined in such a way as to ensure the financial viability of the public operator, who will also have the possibility of offering other services on a competitive basis.

RECOMMENDATION 4.2 - Introduction of competition

The Green Paper recommends that the conditions for fair competition should be fulfilled in order to ensure that the customers derive all of the expected benefits. To this end, the opening of services to competition must be accompanied by the establishment of rules ensuring equitable access to network infrastructures.

RECOMMENDATION 4.3 - Integrity of the basic network

The Green Paper recommends that the basic infrastructure should initially be provided exclusively by the public operator. Conditions for the interconnection of the public infrastructure with those introduced by the private sector must be defined under the auspices of the regulatory authority and made known to all interested parties.

CHAPTER V. - OPERATIONAL RESTRUCTURING ~~OF NETWORK OPERATIONS AND SERVICES~~

Introduction

139. The telecommunication sector in Africa is very much State-dominated. Until just recently, the legal setup consisted of either a ministerial department or a public enterprise with its own board of directors. However, the real degree of independence of the telecommunication authorities is not easy to figure out from the legal status of the organization. For instance, ministerial departments may have budgets or contracting procedures which are independent from the ministry of finance, while the personnel of some public enterprises are considered part of the civil service. Equally, the same legal entity can cover both telecommunication services and postal services. Less often international telecommunications are run by a completely separate entity.

140. The present analysis of the overall performance of the operational sector addresses the issues of the independence of the telecommunication entities from State control, the problem of the separation between postal and telecommunication services, the internal management of entities in charge of telecommunication services, the importance of strategic planning.

Autonomy versus State control

141. The problem of the independent management of government agencies or entities arises in all sectors and, in the light of 20 or 30 years of experience, one is led to wonder whether better results could not be obtained by giving greater independence to the agencies, ~~without however doing away with~~ while maintaining the State's pre-eminence and ultimate responsibility in the sectors concerned.

142. In telecommunications, this problem is even more acute owing to the startling changes, even over a very short period of time, in terms of technology and the emergence of new services. In view of the huge gap between the supply of services and potential demand, it appears clear that the State entity exercising the telecommunications monopoly must have the necessary flexibility, authority and competence to identify without delay all possibilities of improving the response to user needs.

143. This requirement is not generally being met at present and reforms are needed to foster change. The main responsibility for initiating such reforms should lie with the political authorities and administrators in the ministries. The first step to be taken should be a complete review of the part they play in the system of State control, with a view to making the public network more autonomous and more responsible.

144. In practice, government involvement in ordinary management decisions by the network operator should be reduced as far as possible. The role of the government should be limited, for example, to:

- appointing only a small number of managers (e.g. the director-general and members of the Administrative Council or Board of Directors, in that kind of setup); appointments should be reasonably stable over time and should not be changed with every change of minister;
- deciding telecommunication network development policy, though only in very general terms and working to a horizon of several years, in order to ensure enough flexibility for the entity's management, as regards the details of running the programme (technical standards, procurement and other expenditure);

- establishing rules for the conclusion of contracts and granting enterprises freedom of decision within the framework of those rules in order to avoid delaying the planned investment;
- clarifying and justifying relations with other ministries and entities (finance, planning, etc.) involved in the medium- and long-term development of the network, so as not to inhibit the initiatives of the network operator;
- ensuring that the operator's internal budgeting procedures are satisfactory, based on the private sector's budget and accounting system and in general on its administrative management procedures, including the external auditing of the accounts;
- ensuring that the internal funds generated by the operator's activity should be used in effect for network development, by authorizing adequate tariffs and a flexible tariff review procedure, and by authorizing the necessary powers to recover debts from all subscribers, including government bodies and local authorities;
- leaving the operator reasonably free to fix salaries and other staff benefits in such a way as to attract and keep qualified staff;
- ensuring that the management by the network operators is based on clear legal, regulatory or contractual terms;
- in a more general way accepting, in order to ensure genuine management autonomy, "*a posteriori*" rather than "*a priori*" monitoring of the technical and financial performance of the enterprise which, together with the obligations and rights of the PTOs, may be set forth in a "programme contract" type agreement concluded between the PTO and the State;

Separation of postal and telecommunication services

145. For historic reasons going back to the invention of the telegraph and the telephone at the end of the 19th century, telecommunication services have for a long time been coupled with postal services in a great many countries. The trend towards separating the two services, which began in Europe deserves consideration in the search for more efficient telecommunications, as envisaged in this Green Paper. The issue of the separation of the two services is still being hotly debated. Opponents of the idea refer to the danger that the postal offices, as structural loss-makers, might disappear altogether, while those in favour point to the need for separate management of activities that are very different in nature as far as production factors are concerned, being capital-intensive in telecommunications and labour-intensive in the postal sector.

146. It should be borne in mind, however, that the African postal services are altogether more fragile than their European counterparts. Not only are their operating losses relatively greater, but they are also more exposed to having their best potential customers creamed off by very active, conspicuous competitors in the form of private mail services and the commercial banks for payment transfers and saving accounts.

147. The authorities in charge of devising sectoral policies should take account of these special constraints. Moreover, the countries concerned should ensure that the two activities are restructured simultaneously, after careful preparation, in close consultation with all the parties concerned, especially the staff.

148. The following tasks, if properly carried out, can contribute significantly to the success of the transitional stage prior to actual separation, as well as to the viability of the newly- separated entities:

- diagnosis of the strengths and weaknesses of the postal sector and of the telecommunication sector;
- separation of accounts;
- evaluation of fixed assets;
- full inventory of staff qualifications and work stations;
- evaluation of financial requirements, etc.;
- linkages in operations, e.g. at local level and for technical reasons;
- assessment of their respective public service functions for possible joint planning, e.g. for rural communication coverage and the creation of community teleservice centres.

Management problems

149. Most of Africa's network operators and service providers lack sufficient autonomy for their leaders to be considered as genuinely responsible managers. Changes take time and, in the present context, it is for the actual leaders of telecommunication agencies to secure the best possible results by making optimum use of all their internal resources, particularly human resources.

150. Areas for improvement include:

- the organizational structure, not suited to efficiently operating a telecommunication network or to the workload required for extending it. This situation is encountered frequently, and not only when postal and telecommunication services coexist within the same agency;
- quality of service and productivity standards to be clearly established and circulated within the organization;
- the delimitation of responsibilities and the system for delegating authority to be made precise in line with the size and complexity of the organization;
- overcoming major shortcomings in internal control procedures at both the administrative and strictly financial levels;
- making one unit specifically responsible for strategic planning and economic analysis;
- the accounting system to be adapted to commercial management and used in the decision-making process and for measuring performance. Management needs to make practical use of information from the financial and accounting system and in particular take sufficient account of cost constraints in its routine work;
- the billing and recovery system to be improved and therewith the agency's financial situation;
- key functions for rapid and sustained network development as planning, technical studies and project coordination and supervision need more attention and may be excessively dear owing to recourse to foreign technical assistance;

- the personnel training system is often limited to technical training and not properly geared to the requirements of the jobs to be occupied by trainees following their courses. In addition, training in administrative, financial and accounting management is often neglected;
- purchase and supply procedures are often unsuitable and delay unnecessarily the introduction of investment programmes.

151. Senior managers should therefore recast their organization's internal structure and management methods and systems with the clearly formulated objective of **providing the most efficient telecommunication service at the lowest cost**. If it is to be operational, that general formulation must of course be tailored and adapted to the political, economic and legal peculiarities of each country.

Importance of strategic planning

152. An agency can best define its objectives and equip itself for achieving them in time through strategic planning. All too often telecommunication agency managers, probably as a result of their initial training, confuse strategic planning with the preparation of telecommunication network investment programmes.

153. Strategic planning should precede and encompass the selection of specific investment projects. If properly carried out, strategic planning should ~~encourage~~ enable the top management to raise and answer ~~the following~~ certain questions, for example:

- Where exactly are we? How have we gauged our progress and the past results that have enabled us to define our present position?
- Where do we want to be next year, the year after that and in ten years' time? How will we know whether we have achieved our set target?
- What do we need in order to get there? Where, when and how shall we get what we need?
- What obstacles could prevent us from achieving our objective? How should we overcome them?

154. The answers to those questions will help to provide a guide for preparing multi-annual plans, programmes and annual budgets at both the agency and decentralized unit levels. Then again, vis-à-vis the external environment, strategic planning enables the agency's mission and general objectives, as well as its relationship to general socio-economic development, to be clarified with the public authorities.

Detailed diagnosis of agency management

155. Depending on the particular circumstances of each country, it might be useful to supplement the fundamental strategic planning approach by more specific considerations relating to a particular management subsystem (finance, production, maintenance, etc.) so as to point up those subsystems in which shortcomings are greatest and make the necessary changes.

156. To that end an open-ended list of questions ~~aimed at affecting~~ enabling an appropriate diagnosis should be drawn up for each subsystem. Such a diagnosis would be useful to both the authorities and the agency's management since it would ~~enable~~ make it possible, *inter alia*, to fix medium- and long-term performance objectives ~~to be fixed~~ and to ensure that the necessary action was followed up. The ~~following management~~ checklist could, for example, be ~~is~~ based largely on ~~a~~ the paper presented at the Regional Seminar on Development and Management of Telecommunications in Asia and the Pacific, held at Bangkok, Thailand, in January 1982[1] (see Annex 7) which includes the following questions):

a) general organisation and relations with the authorities

b) the information system and human resources management

c) planning

d) accounting system

e) billing and collection

f) inventories and stores

g) training [see also section below on human resource management]

h) audit

I) tariff policy and financial plans.

~~(a) General organization and relations with the authorities~~

~~Does the telecommunications operating entity have adequate autonomy, is it separated from the postal service, does it operate on a commercial basis, and is it given appropriate medium- and long-term sector objectives or guidelines relating to access to service, quality of service, finances, tariff policy, etc.?~~

~~(b) The information system and human resource management~~

~~Does the operating entity have an adequate management information system which facilitates effective and responsible control of current operations and financial affairs, and long-term planning and programming? Are the statistics collected on traffic, faults, equipment performance, management efficiency, etc., adequate?~~

~~Are there management control or coordination problems among departments, divisions or units? Do adequate procedures exist for maintenance, testing and checking on the quality of work performed?~~

~~Are there enough qualified professionals, managers, technicians and accounting officers?~~

~~Are job descriptions adequate at all levels?~~

[1] Organizational structure for telecommunications, Telecommunication Journal, Vol. 49, VIII/1982, pp. 481-487.

Can the existing staff cope with the additional responsibilities for implementing an expansion programme and managing the expanded entity? Are staff salaries adequate to retain qualified staff? Are policies relating to staff advancement and promotion appropriate, are the accompanying rules and regulations sufficiently flexible, and are incentives for staff achievement built into the system? Are géneral staff levels excessive? What use is made of expatriates, of consultants? Are present arrangements satisfactory, suitable for an expanded workload? Is technical assistance needed in the short run?

Does management make an adequate public relations effort to keep the public informed of major developments and to develop outside public support for the sector?

(c) Planning

Is economic analysis of the telecommunications development needs of both urban and rural areas carried out, and are the results of such analyses adequately conveyed to finance and planning ministry officials? Are the telecommunications development plans closely coordinated with governmental development plans and programmes in other sectors, and with private development? Do updated national numbering, charging, switching, signalling and transmission plans exist? Are they judged to be sound in light of the country's requirements and its technological and financial resources? Do regional development plans exist? Are there physical development plans for the capital city and major metropolitan areas? Are the service targets reasonable given current service levels and countrywide goals for access and quality of service? Do they reflect a proper balance in development of service and in service priorities? Is there adequate coordination between exchange equipment and external plant works? Are the costs of various works reasonable? Are civil works preparation a bottleneck?

Have the major works been subject to economic comparison of alternatives (coaxial cables versus microwave for a major trunk bearer)? Is the discount rate appropriate? Does it reflect capital scarcity?

Are there plant practices that specify the forward provisioning periods for the various classes of plant, e.g. main, secondary and tertiary distribution cable, junction cable, exchange equipment, multiplex equipment? Are the provisioning periods judged to be reasonable with regard to growth rates, availability of capital, prevailing plant costs and labour rates?

(d) Accounting system

Is the accounting system on a commercial basis, and if relevant, are telecommunication accounts kept separate from postal accounts?

Is the commercial accounting system adequate to keep management informed and permit it to foresee trends and possible problems? Are there adequate internal financial controls (control of cash receipts and payments, inventories, plant requirements and sales of property and related materials, etc.)?

Is the costing or cost control system adequate? What are the accounting practices being followed and are there any problems relating to depreciation, the transfer of plant investment from "under construction" to "in service", the handling of foreign exchange losses, bonuses, etc.? Are pension funding arrangements adequate? Are there adequate procedures for writing off bad debts?

(e) Billing and collection

Are billing arrangements satisfactory? What is the billing cycle and is the accounts receivable position satisfactory in terms of length of the billing cycle? Could billing be expedited through increased mechanization or computerization? What would this cost and what would it save in time and cash on hand? How are collections made? Are there disputed account problems and how can these be resolved? Are there satisfactory procedures for disconnections of nonpaying subscribers, including government?

(f) Inventories and stores

Is the inventory or stores control system satisfactory? Are inventory levels satisfactory? Is there an adequate system for timely replenishment of inventories, for checking whether turnover is reasonable in relation to the scale of operations, and for identifying and disposing of obsolete material?

(g) Training [see also section below on human resource management]

Have personnel development policies and practices been recently evaluated in the light of current and forecast requirements of the operating entity and of the sector?

How do training programmes and facilities compare to needs? Has this topic been adequately examined by national or international agencies or experts (ITU, consulting firms)? What action might be initiated to deal with any personnel shortages likely to affect current or future development within the sector?

(h) Audit

Are present arrangements for external and internal audits satisfactory? Are the nature and extent of the audits appropriate? Is there any reason for questioning the independence of the external auditors, the adequacy of the qualifications and experience of the personnel conducting the audit, or the adequacy of the procedures followed?

Do the audit reports contain all the financial statements and supplementary information needed for analyses and comparisons? Does the external auditor systematically advise management of weaknesses identified in the accounting system which should be improved? When used, is government audit adequate or should it be supplemented by other audit arrangements? What is a reasonable period for submission of audited financial statements? Are internal audits and inventories undertaken systematically? Are internal audit programmes adequate? To whom does the internal audit section report?

(i) Tariff policy and financial plans

Does the telecommunications operating entity generate sufficient resources from users of telecommunication services to cover operation and maintenance costs, debt and interest payments, and to generate a sufficient return on assets to attract needed capital, and to cover a reasonable proportion of the costs of future system expansion from internal cash generation? What is the expected percentage of internal cash generation over the next three to five years? Is it satisfactory? Is the amount of net internal cash generation influenced significantly by the capital structure and terms of debt financing (unusually low or high debt/equity ratios, easy or harsh debt repayment terms, use of supplier credits)? If the percentage of self-financing for capital requirements is below 35 or 40%, is it acceptable in view of the magnitude of the work programme, recent tariff action, expected tariff revisions, and/or expected level of internal cash generation after work programme completion when the full revenues from the work programme are realized? Are there special factors such as taxes, bonuses, dividends or other payments to government, or exceptional customs duties which are depressing the percentage of internal cash

~~generation? In excess demand situations, is some form of price rationing used to encourage business and government priority access or usage? Is peak period call pricing (local or long-distance) or toll ticketing practised? Do long-distance charges increase too rapidly with distance? Is access cheaper in non-urban areas? Do tariffs for specific types of service reflect the cost of those types of service? Are any deviations from pricing according to the cost of service justified on grounds of promoting a more efficient or equitable usage of, or access to service? Are telecommunication tariffs used partly for general government taxation purposes, or to subsidize postal services, etc.? What are the present implications of this and what are the longer term goals?~~

The special case of human resource management

157. Since the subsystem of human resources is a prime factor of success in the reform of enterprises, it is worth coming back to the subject and pointing out some of the shortcomings which we find in the majority of countries as a result of their common colonial heritage. In fact, the State enterprises are still run very much on the lines of the civil service, where the emphasis is placed more on bureaucratic procedures than on obtaining accountable results in terms of customer satisfaction. The changes needed to ensure the success of reforms imply a profound change of attitude, particularly in the areas of training, pay and performance management.

158. Training needs to be reconsidered to take account not only of the continual changes in technology, but also of the fact that attitudes and behaviour need to change, especially towards customers. Training must no longer be confined to the technical area only, but must also cover other aspects of the enterprise, such as management, design and the introduction of computing systems, service marketing, accountancy, etc.

159. The pay system with its related career management system, applied in telecommunication enterprises is often modelled on that of the civil service, extended to cover the very broad range of jobs in the sector. The system is no longer able, however, to cope with the special requirements of a rapidly changing telecommunication sector. Moreover, the present pay systems attach more importance to general academic training than to the real nature of the tasks required for the actual jobs performed. Some reorganization is therefore needed, not only in order to take better account of the specific characteristics of jobs in telecommunications, but also in order to attract and to retain qualified staff. Special attention should also be given to the matter of replacing imported expertise, which still plays a very significant part in maintenance work, planning and the implementation of network extension plans.

160. Lastly, telecommunication enterprises should attach more importance to the notion of performance, both on a personal plane and from a collective point of view, and should apply in the daily running of the enterprise a new emphasis on obtaining practical and accountable results in terms of customer satisfaction. With this aim in mind, a performance management system should be introduced, ~~which~~ This would imply, at all levels of the enterprise, establishing responsibilities and objectives; ~~a follow-up of~~ introducing a series of financial and other incentives to motivate personnel, following up completed tasks; and conducting regular evaluations.

RECOMMENDATION 5.1 - Marketing of services

Public operators should be granted a large degree of autonomy in order to ensure that they have the flexibility and authority needed to carry out both their public service function and that deriving from the commercial nature of telecommunication services.

RECOMMENDATION 5.2 - Choice of managers

Every effort should be made to ensure that criteria of competence and honesty prevail in the choice of managers for public agencies which, in return for the autonomy granted to them, must undertake to produce tangible results.

RECOMMENDATION 5.3 - Improvement of the efficiency of services

On the one hand, telecommunication services should preferably be managed separately from postal and financial services; on the other hand, the two entities should be simultaneously restructured in cases where they are not already separate. In any case, a certain amount of clarification and diagnosis will be necessary before the management of the two entities can effectively be separated.

RECOMMENDATION 5.4 - Rationalization of management

Network management and operation activities ~~must~~ should be conducted within the framework of a strategic plan incorporating all relevant factors.

RECOMMENDATION 5.5 - Optimum utilization of human resources

The development and management of human resources ~~must~~ should be given top priority. (~~M~~maximum use ~~must~~ should be made of the potential offered by endogenous human resources, having recourse to outside expertise only where absolutely necessary).

CHAPTER VI. - ECONOMIC, FINANCIAL, AND TARIFF ISSUES

Investment necessary to develop the basic network

161. Insufficient financial resources for telecommunication investment are one of the major reasons why the basic network in most African countries is not well developed. Where resources have been available, ~~in most cases~~ they have often been used inefficiently. There is consensus that telecommunications is an important factor for economic development and therefore new policies should be designed that will tap resources from various sources in order to increase funding for telecommunication investment. New policies are also required to promote sound business principles and improve operational procedures with the ultimate purpose of increasing efficiency. Such policies can also attract private sources of investment because of the high profitability of telecommunication ventures and thus ~~reduce the financial burden of providing public telecommunications from the government.~~ enable governments to use their limited financial resources for less profitable activities such as education and health.

Profitability of telecommunication investments

162. Telecommunication investments are very profitable if they are managed efficiently and under commercial principles. This has not been the case with public sector telecommunication services in a number of African countries. According to ITU indicator data (see item 1 of **Annex 1**), quite a few entities are profitable but have not yet been able to generate enough funds for further investment.

163. The underlying reason for not being profitable is, *inter alia*, the way in which entities are managed and controlled. Usually governments provide public telecommunications by establishing entities in the form of departments in the ministry, board or parastatal enterprise and interfere in day-to-day matters of management. They control sources of funding, price of services and personnel policies. These monopolistic entities also perform regulatory functions, issue licenses for private networks and allocate frequencies. In short, they perform policy and regulatory functions on behalf of governments.

164. Although lack of funding is one of the main problems, there is need for efficient utilization of available funds through changes in operational procedures and management. ~~In some countries, such changes will require the adoption of n~~ New policies ~~of which there are many options. The choice of policies for~~ should be adopted for the purpose of increasing investment funds and efficient utilization of existing resources. ~~is a national matter and will depend on local conditions and priorities.~~ Each country will have to decide its own policies in accordance with local priorities and conditions.

Investment required to develop the basic network

165. The investment required to accelerate the development of telecommunications in Africa is enormous. ITU statistics indicate that there were about 2.4m main telephone lines in sub-Saharan Africa and about 5.3m links in North Africa in 1994. The average telephone penetration per 100 inhabitants was 0.5 for sub-Saharan Africa and 4.2 for North Africa compared with ~~59.9~~ 60.1 in North America, 44.1 in Western Europe, about ~~15~~ 15.7 in Central and Eastern Europe, ~~8.4~~ 8.7 in Latin America and 4.8 in Asia.

166. If the African countries have to increase the current ratio of 1.67 main telephone lines per 100 inhabitants to three main lines per 100 inhabitants by the year 2000, a total investment of over US$ 26 billion would be required. For a density of two by the year 2000, the investment required would be at least US$ 9.6 billion, assuming a minimum cost of US$ 2000 per additional line.

167. The magnitude of funding required for the level of investment indicated above is beyond the capabilities of many African countries, given current levels of income. Even if they were to increase the percentage of income allocated to telecommunications from the current 3.2, the target cannot be met. The above indicates that radical policies have to be undertaken in order to tap investment funds from non-traditional sources.

Sources of funding

168. African countries have obtained most of their funding for the expansion of the networks from external borrowing and aid. The African Development Bank (ADB), ~~and~~ the African Development Fund (ADF) and other international or bilateral organisations have contributed significantly in providing loans at reasonable terms. A few of them which have undertaken reform measures have allowed telecommunication entities to adjust their tariffs ~~above costs~~ to largely cover operational costs and depreciation without government interference. This has resulted in the availability of internally generated funds for investment. Some of them still face the problem of converting local funds to foreign exchange which accounts for about 60 to 80% of the total investments.

169. Public telecommunication entities which do not perform well in terms of expansion due to unavailability of internally generated funds generally obtain funding through government budget allocation. In most cases all external borrowing, bilateral aid and grants are allocated through the central government which leads the donor to the perceived priority areas. The above environment has led to the telecommunication sector not always receiving the attention it deserves due to different national priorities competing for scarce resources.

Telecommunication investments and other national priorities

170. Many of the African countries are faced with the task of trying to meet the basic needs of society and at the same time implement projects which will accelerate economic development, including telecommunications. In the environment of scarce foreign exchange, most of the African countries have put their priority on national projects and programmes for water, food, shelter, health and education which are referred to as basic needs. In most cases the private sector was not allowed to participate and alternative sources of funding were not always sought.

171. It is now widely accepted that without an adequate telecommunication infrastructure even the success of basic need projects will be constrained. Due to this fact and the realization that telecommunications are essential to development, a number of countries have increased the share of public funding, loans and grants for telecommunication investments but with mixed results.

172. In a few countries availability of local funds is no longer a major problem. However, investment has not increased as expected because of managerial and operational problems which cause inefficiency. In this case, an increase in the share of public funding or availability of internally generated funds has to be accompanied by other measures such as reducing government interference, improving management and operational capabilities, adopting commercial/business principles and so on. Some of these measures cannot be undertaken without changing the legal and policy framework in which the telecommunication entities operate.

173. In other cases, the share of public funding for telecommunications will always be limited by pressures from the government which diverts funds to other competing claims. Sufficient funds for telecommunication investments in this case will not be available unless other innovative measures are sought. Some of the measures which are likely to generate additional funds are, for example, issuing bonds, establishing schemes through which funding can be generated from subscribers, establishing joint ventures with foreign investors, establishing Build Operate and Transfer (BOT) schemes, providing incentives for the private sector to participate and other measures which are mentioned below.

174. As indicated during the formulation of UNTACDA II, the measures to be taken to increase investment require the decision of each country and will depend on specific conditions and priorities. However, there is need for a common approach should be adopted to monitor and evaluate the implementation of the resolutions already passed at different venues. ~~Also there is need~~ Moreover, for cooperation in the African Region, it should be useful to exchange information on country decisions, implementation status and exchange in technical skills.

Recommended action

175. At the coordination level of the UNTACDA II Programme, the African Development Bank has been nominated as the coordinator of the Resource Mobilization Committee (RMC). In this regard, its role not only covers traditional financing of telecommunication projects in the region, but also of providing a forum for harnessing funding by bilateral and multilateral aid agencies of the UNTACDA Programme.

Action required at the national level

176. In order to seek funding for telecommunication projects, among other things development plans ~~have to be~~ should be prepared at the national level for the long, medium and short term in line with the overall national plan for socio-economic development. Consideration of the objectives in UNTACDA II (1991-2000) which calls for telecommunication interlinkages in the African Region in order to accelerate socio-economic development, should be included. Where national resources are inadequate, bi- and multilateral assistance should be sought to implement the said plans. ~~Countries which already have such plans will only need to update them.~~

177. New methods of generating additional funds for investment should be introduced at the national level. Possibilities which have been tried successfully in a number of countries are equity participation and issuing domestic bonds especially to State financial institutions, unit trusts, insurance companies and subscribers themselves. Funding can also be generated by establishing joint ventures with foreign investors, establishing BOT schemes, providing incentives for the private sector to participate and other measures mentioned in various studies and discussed at several regional conferences. A ~~complete~~ list of potential financial sources and instruments is provided in **Annex ~~9~~** 8.

178. Investment areas in which the private sector is allowed to participate should be clearly defined and a conducive environment be created to attract their capital. Some of the measures may require explicit statements from the government on investment policy, including guarantees and incentives to investors. ~~Also the~~ The liberalized areas for private participation (such as purchase and installation of terminal equipment "new services") ~~should~~ will also have to be defined at national level in order to tap resources from many sources and at the same time reduce foreign exchange requirements of the operating entities and the government. It is also possible, as a means of attracting capital, to make use of the garantee systems offered by organisations such as MIGA (Multilateral Investment Garantee Agency).

179. Strategies for increasing operational autonomy and efficiency should be undertaken by countries which are not already involved in institutional restructuring and where telecommunication entities are unable to manage their business commercially. Public telecommunication entities should be given more autonomy in return for performance improvement through ~~management~~ contracts with the State containing specified performance targets.

180. This is one of the options which has been undertaken by a number of countries in the African Region with the assistance of financial institutions such as the World Bank. The signing of Memoranda of Understanding (MOUs) between governments and operating entities with specified performance targets is proving to be a useful tool for putting pressure on management to perform well in return for increased autonomy.

181. Measures required to overcome institutional constraints and increase efficiency will enable operating entities to be profitable and increase availability of internally generated funds for further investment. In some countries such measures ~~have to~~ should be implemented gradually because of their policy and legal implications. A timetable or action plan to introduce the changes would be necessary in order to monitor the progress.

182. At national level, governments should also instruct all ministries and other implementors of development ~~major~~ projects initiated by them to include their telecommunication requirements at initial stages of project design. ~~This will be an additional source of funding which will also be beneficial to the project after completion.~~

Action required at the subregional level

183. Subregional working groups on investment financing should be established where they do not exist. These groups will harmonize the country strategies with the purpose of identifying the common approaches at regional level. The groups should also harmonize the action plans for implementing decisions taken at country and subregional levels, monitor the progress and prepare status information. It is important to establish a system of monitoring the implementation of decisions made at country level and the resolutions passed at various forums including Resolution ATDC-90/RES2 on Financing the Development of Telecommunications in Africa passed at the ATDC in Harare (1990). The Resolution calls for the separation of postal and telecommunication operations and such other measures mentioned earlier.

Action required at the regional level

184. In order to have a common regional approach in solving problems related to telecommunications and also in order to harmonize the different country choices, there are actions which ~~have to~~ should be coordinated at the level of the African Region.

185. Regional organizations such as PATU should use their coordinating capabilities to collect information on the experiences of different countries and regions, the strategic options available and assist African countries to develop a harmonized policy approach at regional level. ~~In this regard, the ITU/BDT can also assist and speed up the preparation of the African Telecommunication Policy Study which has been agreed upon by the World Bank, the EC, DANIDA, SIDA, other donors and the ITU.~~

186. The OAU should create a forum at regional level for consultation on issues concerning increasing investments in telecommunications. Such consultations will cover issues related to operational improvement, harmonization of planning and policy, and updating implementation of UNTACDA II and the OAU Protocol on Transport and Communications for the African Economic Community once it has been signed (see **Annex 3**).

Tariff issues

187. **Tariff problems** in the African Region generally include the following:

- lack of reliable cost accounting systems as a basis for determining accurate cost data for tariff assessment;
- inadequate tariffs which cannot generate enough revenue to sustain the viability of operating entities;
- ~~poor quality of services resulting from low call completion rates, and hence lower revenues;~~
- lack of foreign exchange required for settlement of accounts due to imbalances of traffic;
- tariff erosion in real terms due to inflation and devaluation;
- lack of adequately trained staff in tariff issues;
- high international tariffs which prevent full utilization of regional links and thus regional development;
- lack of tariff harmonization at regional level, and disparities in accounting rates at regional and subregional levels;

- problems of accounting rates between developed and developing countries.

188. Tariff setting has for a long time been a major problem area and in spite of the efforts by the TAF Group it has not been possible to develop viable tariffs due to inaccurate input cost data. African countries use different principles and methodology in determining collection charges. International accounting rates are usually determined through negotiations at national or subregional level, but there is no consensus in the African Region as a whole regarding tariff principles and procedures for inter-administrative settlement of accounts.

189. The existence of various subregional groups in Southern, Central and West Africa has helped in the commissioning of various studies which have identified specific problems and recommended solutions at subregional level. The disadvantage of small tariff groups is that Africa has different tariff structures representing interest groups. The TAF group has also conducted studies on tariffs leading to several recommendations.

Tariff principles

190. Tariff principles for determining international accounting rates and collection charges are specified in the Telecommunication Standardization Sector (ITU-T - the ex-CCITT) recommendations. The ITU has conducted several studies over a long period of time and produced recommendations in various documents.

191. The new accounting rate principles recently issued by ITU-T Study Group ~~III~~ 3 states that:

- accounting rates should be cost-oriented and relevant cost trends should be taken into account,
- the principles of non-discrimination should be applied by each administration,
- administrations should work to achieve cost-orientated accounting rates in an expeditious manner and on a scheduled basis within a period of one to 5 years,
- information on accounting rates for the international automatic telephone service should be made ~~public to ITU Members~~ available to ITU in an aggregated format. ITU then publishes worldwide accounting rate trend,
- administration should periodically review accounting rates to ensure that they continue to reflect current cost trends.

The above principles are aimed at stimulating demand for international telephone services and increasing efficiency in the utilization of the international network.

192. In line with the ITU's recommendations, most African administrations agree that tariffs should follow cost trends. In practice it is justified that tariffs should be sufficient to generate revenue to meet operational expenses, network expansion, social services, government tax, debt servicing, regional economic growth, settlement of the telecommunication balance of payments and customer satisfaction.

193. Rate fixing according to ITU-T recommendations and in meeting the above-mentioned objectives has not been successful and some administrations have higher tariffs without justified explanation while others have fixed their tariffs below cost. There are various opinions on tariff principles and on why application of ITU-T principles has not been successful.

Viewpoints on tariff principles

194. The ITU-T recommendations for determining accounting rates are applied by many African countries but collection charges differ widely from country to country since such charges are a national matter.

195. The ITU report on assistance to the Least Developed Countries (LDCs) entitled: "The review of tariff situations in LDCs and the need for a new approach" recommends that the old approach of dealing with tariff issues as a separate entity has not been successful. The report recommends for an integrated approach including all interrelated elements of management. In this regard, the report puts emphasis on integrating tariff with marketing management systems and improving the accounting systems, which are the source of cost data, by establishing an Analytical Account System. This recommendation ~~requires~~ should be given serious consideration by administrations since it deals with the practical problem of applying tariff principles with inadequate and unreliable data. However, there is some argument that accounting rates are too general and should not be used to determine subscriber tariffs due to differing conditions in each country and subregion.

196. Those in favour of the above arguments have the view that tariff principles cannot be the same for each country because priorities differ depending on revenue requirement of each particular administration, development goals and demand of services. Because of such arguments and beliefs, several African subregional groups are conducting their own subregional studies and have determined their own tariffs suitable to their national and subregional development goals.

197. Due to differing African telecommunication tariff structures several problems have arisen. Many of these problems and recommendations have been identified in studies conducted by the ITU, PATU, and subregional groups such as SATA (the Southern African Telecommunications Administrations) and Tariff Study Groups. Some of these problems are discussed below.

198. Because of the requirement to meet social and developmental goals, some of the African administrations have set their **tariffs so low** that they cannot generate enough revenue to meet operating costs, invest in network expansion and at the same time meet social obligations and fulfil the mandate of extending services to the rural areas. Also, some African administrations have set their **tariffs so high** as to deter the development of new services which are important for national development. Others are so high that they may be detrimental to regional trade and development. There is a **need to harmonize** the requirement to generate enough revenue and the above-mentioned social and developmental objectives in an orderly manner, for all regions of Africa.

Utilization of the PANAFTEL network

199. Excessive tariffs applied by some of the administrations in the African Region discourage subscribers from making international calls. Within Africa there are telecommunication infrastructures which have been constructed with the purpose of carrying intra-African traffic. Heavy investments such as the PANAFTEL network will be underutilized if the tariffs are not determined with the intention of promoting traffic. Since 1983, the TAF group has made a series of proposals aimed at establishing standard rates for Africa on the basis of ITU-T Recommendations. In spite of reductions in the various charge elements, the tariff problem is still one of the main reasons why the PANAFTEL network has been used to a limited extent only.

200. Technology, deregulation and other factors are encouraging different players in the telecommunication sector throughout the world to reduce their rates. It is recommended that with ITU assistance and the participation of the regional and subregional organizations concerned, a new questionnaire - better adapted to the African situation - should be drawn up on telecommunication service costs. In setting tariff standards for communications over the PANAFTEL network, the results obtained from the questionnaire should be analysed according to the following principles:

- making transit via the PANAFTEL network competitive as regards tariffs and quality,
- improving coherence between tariffs and costs, striking a balance to ensure the proper development of national telecommunication networks,
- adapting to the region's new routing plan with a view to reducing the number of transits - switched or not - for intra-African calls,
- integrating in national tariff structures those that are applicable to crossborder traffic not routed through the transit centres of the countries concerned.

201. There is a general consensus among African nations that there is a need to promote **intra-African trade** in order to stimulate economic development. For this purpose it is necessary to have a reliable telecommunications infrastructure and a tariff structure which encourages traders to make international calls. Tariffs aimed at promoting trade have been negotiated and established in a few subregional groups such as SATA but implementation differs from country to country. There is a need to harmonize these tariffs with proposals made by the TAF group and other subregional groups.

Settlement of accounts

202. One of the overriding problems in international settlement of accounts is that many African administrations do not have enough foreign exchange to settle balance of payments when outgoing calls exceed incoming calls. Some of the administrations with a negative balance are accumulating debts with foreign transit centres and other African administrations.

203. In regard to this problem, studies have been conducted at subregional levels and new approaches such as 'sender keeps all' accounting and the introduction of a multilateral clearing system are being implemented in the Common Market for Eastern and Southern Africa (COMESA) ~~Preferential Trade Areas (PTAs)~~. Subregional organizations such as ECOWAS, CAPTAC, ARTC (the Annual Regional Telecommunication Conference), the SATCC (the Southern Africa Transport and Communications Commission) and SATA should conduct studies and hold regular working group meetings for the purpose of promoting the utilization of existing clearing houses. Where clearing houses are not well established, efforts should be made to establish them.

Sender Keeps All Accounting (SKA)

204. The SATA tariff study of 1989 describes the SKA arrangement as follows:

"Under Sender Keeps All (SKA) accounting for international traffic, the two terminal administrations in a relation make no settlement, but simply retain the subscriber revenues for the interchanged calls ... SKA accounting is very convenient and economical for those relations where the traffic is currently balanced, and where no change in traffic pattern is foreseen for the future. It is also an option for relations where one administration has difficulty in ticketing all its outgoing calls, or in meeting its foreign exchange obligations to another SADC administration." The above arrangement has been adopted by all SADC PTOs in relations among themselves and by some ~~PTA~~ COMESA PTOs.

The ~~PTA~~ COMESA multilateral clearing facility

205. ~~The Preferential Trade Area of Eastern and Southern African States~~ The COMESA has introduced a multilateral clearing system whereby settlement of trade in goods and services is made through a clearing house. The Central Bank of Zimbabwe was initially selected to act as the clearing house. Under this arrangement, only net balances are paid in convertible currencies as it is intended to reduce the requirement of foreign exchange to pay for trade in goods and services. The multilateral clearing facility is recommended for other economic subgroups in Africa.

Action required at the national level

206. **At the national level** operating entities should conduct studies of the cost of providing services. Study results should be used to determine accounting rates and collection charges. In any case, tariffs should be sufficient to generate enough revenue for operation and expansion of the network. Although subsidies should generally be discouraged, particular social, economic and financial conditions may require setting tariffs at a level at which they can subsidize rural telecommunications and other social obligations. In this case, tariff structures may be designed so that non-profitable rural services are subsidized by high volume services, without in any way discouraging their development.

207. Ultimately, the determination of tariffs should remain a national matter and should support national policy on social and economic development.

208. In order to stimulate African regional trade and development and in line with the objectives of UNTACDA II, national tariffs should be kept at a level where they will encourage traffic through regional links such as the PANAFTEL network. Where possible, promotional cheap rates should be applied in order to increase utilization of such networks.

209. Every endeavour should be made to adhere to agreed routing plans including the use of regional transit centres. In order to reduce to the minimum the amount of traffic via non-African centres, competitive transit remuneration plans should be implemented.

210. In countries where tariff rates are constantly falling in real terms, operating entities should adopt a formula for increasing tariffs periodically which should be based on the rate of inflation and devaluation. A provision for efficiency improvement can be built into the formula. This method can also be useful for timely execution of tariff increases where such adjustments have to pass through lengthy bureaucratic procedures. Care should be taken to avoid disparity in collection rate levels.

Action required at the subregional and regional levels

211. There are many tariff studies and agreements being conducted by subregional groups. These should without doubt be encouraged to continue, but it would be beneficial also to exchange information among administrations and subregional groups in the African Region. PATU, which has already assumed an active part in this study, should increasingly take up the coordinating role in this aspect.

212. The problem of unavailability of foreign exchange required to settle the imbalance of outpayments can be reduced by introducing multilateral clearing houses for settlement of accounts at the subregional level. The subregional economic groups that have not introduced this arrangement should do so. Subregional economic groups also should establish Sender Keeps All accounting (SKA). Where the volume of traffic between the administrations concerned is balanced or agreement cannot be reached at the subregional level, negotiations should be conducted at the national level in order to establish SKA arrangements with regard to its application, and care should be taken to ensure that SKA does not mask deficiencies that might exist in the network, such as poor quality of service, etc.

213. Countries which are currently transiting through Europe and North America and thus paying out much foreign exchange due to increased outpayments can reduce the problem by transiting within the African Region. Arrangements and projects with the objective of transiting within Africa should be initiated at the subregional and regional levels. Subregional groups should increase the number of courses conducted for the purpose of understanding tariff issues, especially in tariff design and negotiations. Countries should therefore support regional transit centres and projects such as the RASCOM, PANAFTEL, and such like.

214. Regional organizations, such as PATU and ECA, should monitor tariff problems, discussions and agreements which are made at national and subregional level with the purpose of finding ways of harmonizing a common approach at regional level. The organization should also establish systematic ways of monitoring the implementation of objectives in UNTACDA II, the OAU protocol on transport and communications once it has been signed and the resolutions passed at different regional forums. Also a forum should be created at regional level to discuss tariff problems and recommend for solutions. The ITU/BDT should continue with assisting in providing logistic support.

RECOMMENDATION 6 - Economic, financial and tariff issues

The African Green Paper recommends:

at the national level

(i) that the necessary conditions be created at the structural and regulatory levels with a view to attracting the required capital and increasing the self-financing component of investment projects;

(ii) that the telecommunication network be developed according to a plan forming part of the country's overall socio-economic programme;

(iii) that an innovative approach be adopted in seeking sources of project financing. To this end, ways and means should be found, inter alia, of ensuring the involvement of the private sector;

(iv) that efforts be made to urge ministries other than the one in charge of telecommunications to include a "telecommunication component" in the major development projects for which they are responsible;

(v) that economic studies be undertaken to determine the actual cost of services and facilities offered, a prerequisite for the establishment of equitable tariffs and shares and that analytical accounting systems be introduced in PTOs as the appropriate tools for calculating actual cost;

(vi) that reliable statistics be kept on different intra-regional traffic flows;

at the subregional and regional levels

(i) that consideration be given to the creation of working groups on the financing of joint projects;

(ii) that a regional approach be adopted to solve problems of common concern and that efforts be made, at the same time, to harmonize certain national options;

(iii) that subregional and regional organizations be given a greater role in solving problems connected with the settlement of accounts and the determination of shares.

CHAPTER VII. - TELECOMMUNICATION NETWORK DEVELOPMENT

Development policy

215. In most of the developed countries at present engaged in reviewing their telecommunication policy, the existing infrastructure has a size, diversity and quality of service which meets the needs of very many users; to those countries, adapting to the new telecommunication environment chiefly means defining the new 'rules of the game' among the various players in order to ensure the optimum growth of the network and its associated services.

216. In Africa, particularly south of the Sahara, not only are the basic telephone and telex services inferior to real needs, even in the present economic climate, but the quality of the support network and associated services is far below international standards; and that situation is compounded by the new international environment factors. Short, medium- and long-term master plans, as tools for developing the network, are simply no longer sufficient to ~~cope with~~ address the situation because they only provide technical and financial planning guidelines covering different periods. What is needed in the present context is a development policy for developing the telecommunication sector and related fields.

217. Such a policy would incorporate all internal and external factors that are likely to influence the telecommunication network's technical, economic, financial and development policy options. In this way the agency responsible for developing and operating the network would be less vulnerable to environmental change. A development policy of this type should be drawn up by the authorities that have the required competence and open-mindedness; indeed, it would seem that the national high-level multi-ministerial coordination committee called for in 1990 by the ATDC in its Resolution No. 1 is tailor-made for that purpose. A separate regulatory organ would codify - in regulatory form - the development policy objectives which would subsequently be implemented within the telecommunication sector by the main players involved.

218. In the process of reflecting on ways and means for rationally extending, consolidating and operating the telecommunications network, it should be remembered that the social thinker and reputed futurologist, Alvin Toffler, once said while at one time telecommunications was regarded as a consequence of economic development, that belief was now dead; telecommunications had in fact become a precondition rather than a consequence.

The need for balanced development of the national telecommunication network

219. Available statistics on telecommunications in Africa reveal that:

- quantitative and qualitative needs are far from having been met despite the availability of equipment in some cases;
- rural areas are practically excluded from the benefit of telecommunication services whatever criteria are applied, e.g. penetration or accessibility rates;
- there are highly disparate levels of development among the subregions and the countries of any given subregion. In most cases the level of telecommunications network development is well below the real economic potential of each country.

220. Accordingly, the minimum quantitative development objectives set as part of the Second Transport and Communications Decade for Africa ~~are~~ seem realistic. They vary according to country, countries being classified in four groups, from the point of view of their levels of development at the end of the first Decade. While each country has its own particular strategies, material and human resources and timetable for achieving the objectives, the telecommunications network itself must be regarded as a coherent whole having two components, one urban, the other rural.

221. The telecommunication networks of some countries ~~are~~ still ~~without~~ have a ~~n~~ ~~appropriate~~ largely inadequate architecture. In the case of international traffic at least, the networks of one category of countries are regarded from the technical operations standpoint as an offshoot of a parent exchange usually located outside the African Region. In another category the network has a star configuration, with a single exchange handling all major functions including subscriber connection, national transit and the routing of international traffic. Besides lacking the flexibility needed for expanding the network economically, both types of network structure make any interconnection policy a costly business. The countries concerned are therefore recommended to work out and gradually implement a switched network plan with hierarchical levels, ~~even if~~ while the present situation ~~is~~ may be warranted, in the transitional phase, by the prevailing economic circumstances.

Introduction of new technologies and associated services

222. Although most telecommunication networks are of the analogue type, a fair start has been made to digitize telephone exchanges. According to ~~ECA~~ available information, the coverage rate ~~approaches 29 per cent.~~ for 1994 is approximately 60%*.

223. ~~Other than in exceptional situations justified by sound economic analysis, it is recommended that countries discontinue purchasing analogue equipment for expansion purposes. Instead, c~~ Countries should ~~formulate coherent digitalization plans and~~ avoid a piecemeal approach to digitaltization and implement coherent digitization plans.

224. There are several switched telephone network digitization scenarios and the ITU has conducted valuable studies on the subject. Each country should adopt a scenario that best suits its situation, but based on sound economic analysis and fundamental plans.

225. Each country should formulate a digitalization plan with a set of realistic targets for achievement of complete network digitalization and subsequent establishment of integrated services digital network (ISDN).

226. Economic studies should be carried out in order to determine the optimum pace of digitalization, taking into account the following factors:

- ~~none of the countries concerned in the region produces equipment; it is obtained from manufacturers who have already halted the production of analogue equipment, since such equipment is still under production only in a few developing countries which have their own specific standards;~~
- the effective introduction and operation of an analogue network presupposes the availability of human resources with the appropriate qualifications; these qualifications differ from those needed for performing similar tasks in a digital network and thus render it more ~~efficient~~ preferable to train those rare resources available for the future ISDN;

* World Telecommunication Development Report, 1995.

- telecommunications are discussed in all regional and international forums against a background of standardization and restructuring based on the application of present and future digital technologies. African representatives attending such type of events, from which a great deal can be learned, can only derive full benefit from them if they are routinely involved in the subjects discussed;
- missing the digitization train now would mean refusing to confront the current and medium-term need for new services, with its inherent implications (the proliferation of private networks, loss of revenue, etc.); it would also mean risking in due course being disconnected from a world network built around national ISDNs, ~~a world already at the embryonic stage in some countries;~~
- lastly, given the present technical obstacles, the optimum solution for interconnecting Africa's telecommunication networks as the cornerstone of economic integration lies in the concerted digitization of national networks.

227. The number of "so-called new services" ~~which fall into that category~~ as understood at present is very small, and the lack of any study of real and affordable demand for services born of the 1980 generation makes constructing networks for new services risky. Where the problem exists, administrations should be able to solve it through relatively liberal regulation, particularly as concerns the leasing of circuits ~~from~~ by the public operator.

Interconnection of public and private networks

228. Some countries have many private telecommunication networks because the public network is unable to meet the needs of the promoters concerned. Such networks are generally for the internal use of the promoter and are radio based. Terminal equipment comprising automatic switching exchanges (PABXs) is usually unsophisticated in comparison to the new operating facilities afforded by digital exchanges.

229. In order to develop the network for the benefit of users of all categories, without discrimination, it is suggested that the installation of shared-resource radio or wire networks that can be used by groups of users having similar needs should be encouraged. Their construction could be co-financed by the public operator and interested business users on mutually advantageous terms.

230. The interconnection of private and public networks must be fostered even if that involves national leased circuits. The technical, tariff and utilization conditions governing such facilities offered to a given user group are a matter for regulation in each country.

231. It may be essential to create independent networks in certain situations, *inter alia,* through the use of plants built around very small aperture terminal (VSAT) antennas. Such networks should not be connected to the public telecommunications network, but if exceptions are required, the integrity of the public network itself must be safeguarded.

Rural telephony

232. The international community is generally anxious to improve living conditions in rural areas, as shown by the recommendations on the subject, some by the United Nations. Telecommunications as the "infrastructure of infrastructures" play a leading role in any policy aimed at improving living standards in rural areas. Even before the economic crisis became a constant factor of planning, some African States had already included integrated rural development in their socio-economic development plans. Even in the current situation, although they are by no means adequate, efforts are nonetheless being made to provide rural areas with minimal telecommunication services.

233. Be that as it may, and in spite of present difficulties, the extension of rural telecommunications should be pursued or undertaken, as appropriate. Rural areas are reservoirs of human and material resources and as such cannot be left out of policies and strategies for the region's lasting development.

234. The main obstacle facing the establishment of rural telecommunication infrastructures is the **mobilization of the necessary financial resources**, even though relevant studies have shown that while investment in rural telecommunications may not produce direct financial returns, it is quite definitely beneficial in overall socio-economic terms. Further, despite decreases in the cost of equipment due to technological developments, the cost of rural telephone lines remains higher than that of lines in built-up areas where telecommunication services are nevertheless still insufficient. Apart from the possible pre-financing by certain types of users in rural areas, the inclusion of the telecommunications component in any project for such areas might receive a positive response from donors if the project forms part of a coherent development programme. Similarly, rationalizing requirements within a subregion can lead to economies of scale, and if related projects are implemented simultaneously, this may well provide access to sources of financing on softer terms.

235. The penetration rate of telecommunication services in rural areas may be improved if governments and public network operators establish clearly the distinction between the operator's public duties on the one hand and his business responsibilities on the other. Governments should subsidize the operational losses by way of incentives like tax exemptions or direct contributions for the rural telephony.

In this connection, liberalisation of the operation of terminals in rural areas should be encouraged in order to pave the way for the development of "telecentres" or "teleshops" which have been introduced with great success in certain African countries.

Technical options

236. Rural areas are served by homing exchanges in a variety of possible configurations which depend on a number of specific local factors. In an environment in which demand cannot be controlled easily since no statistics are available, thorough planning is necessary so as to make the right technical choices thereby allowing future requirements to be met at low cost. In addition to overhead lines, which are widely used at present in rural areas and which are extremely vulnerable to bad weather, modern technology offers a wide range of radio systems, including satellite systems allowing the use of small antennas to serve rural areas. ~~In the near future, p~~ Personal and cellular radiotelephony communication systems ~~will~~ have recently provided alternative technical options for rural areas.

237. Whatever the circumstances, technical choices should involve the optimum use of resources and take various factors into account, including: (1) the system's flexibility; (2) its maintenance requirements; (3) its compatibility with the existing public network, in order to provide users with a universal service; and (4) that the equipment purchased should integrate perfectly into the tariff pattern of the area concerned.

Installations maintenance

238. Telecommunication installations maintenance is even more problematic in rural areas than in the built-up areas. And since maintenance of the latter is poor, even though it monopolizes whatever meagre resources are available, the scale of the problems encountered in rural areas is readily understood: on the one hand there is no qualified workforce available, and on the other there is little to support the establishment of a permanent team of technicians.

239. It is suggested that a central team responsible for rural telephony be set up within the organization operating the telecommunication network. Initially, and following suitable training, the team would work jointly with the supplier to install the equipment. Subsequently, the team would install the equipment under the technical supervision of the supplier, and later still would assume full responsibility for installation and maintenance operations. Modern equipment is well suited to this approach, which would also reduce costs.

Communications charging

240. Services in rural areas should not be charged on a cost basis. At most, since subscribers in such areas are some distance away from their homing exchanges, they may be considered merely part of the charge zone furthest away from the homing exchange zone.

Accompanying measures

241. Accompanying measures either should precede or follow major decisions if national telecommunication networks are to be economically and harmoniously developed.

Network operation

242. Technical and commercial network operation must be of as much concern to the decision-making authorities as the construction of new infrastructural work. This should be allowed for in both the management structure and the project planning, study and implementation phases; in particular, network extension programmes should also cover the improvement and upgrading of that part of the infrastructure in which new equipment is to be placed. With regard to maintenance of the existing network, national plans for the improvement of maintenance drawn up with ITU assistance still provide relevant guidelines that can be constantly updated.

Charging for products

243. Working out the structure and level of tariffs for telecommunication products offered to users is often regarded as a minor problem and, at best, operators seek from the political authorities greater room for manoeuvre in determining their tariffs for services provided. Yet charging must reflect an optimum combination of such varied factors as product costs, commercial and financial policy, incentives to national industries facing international competition, the public service mission which ~~still~~ belongs to telecommunications, the need for financial viability on the part of the public network operator(s) and competition within the sector. All these factors make charging primarily a national matter.

244. In framing national policy on charging for telecommunication products, however, it is necessary to observe international standards on the subject but also to make allowance for the global down trend which is threatening the financial viability of small network operators whose revenue is already being hit by phenomena such as:

- the bypassing of certain relations by international traffic;
- the call-back system used when the same service costs less at the correspondent's end. It should be noted that some major operators have over a four-year period reduced their international tariffs by 18-22 per cent;
- the green numbers used by some companies to offer free telephone calls to their correspondents abroad.

245. Notwithstanding the foregoing, it is suggested that a think-tank on charging for telecommunication products be set up in each country to collect the technical details for deciding on charging structures and levels, bearing in mind that distance from the parent exchange should not penalize users in rural areas. Then again, the regulations governing tariff setting and the associated administrative rules should be flexible enough to allow the different service providers, including the public operator, to keep pace with the environment.

Network development structure and management

246. It should be pointed out that some activities of fundamental importance to harmonious, balanced and economical network development are very often carried out by the organization in a random, haphazard way. For example, most countries have no management information system for collecting, storing and updating the data on their network's technical and commercial management. The network's structure should cater for these elements. Furthermore, whichever management structure is adopted, each country should have a telecommunication "work unit" that is not overly involved in everyday network management and that is capable of carrying out the technical studies, autonomously or with outside expertise, as needed. A workframe of this kind would also provide a useful bridge for technology transfer.

Integration of development policies

247. The telecommunications network is a tool for developing other socio-economic sectors, and cannot develop in isolation; it should be planned as an integrated part of each country's overall development strategy, without constituting an obstacle to project implementation. In this integration process, those responsible for telecommunications should take the initiative of establishing dialogue which, if demand is taken appropriately into account, should also involve potential service users.

248. In line with the above, when other types of infrastructure are established, steps should be taken to facilitate the inclusion of a telecommunications "package" in the services provided; it will be up to the interested parties to determine the financing and subsequent operation of the "package".

249. In some cases, individual countries have independent networks (shared resources networks, VSAT networks, etc.) built by individual groups of users, sometimes without authorization from the relevant authority. ~~This kind of situation jeopardizes the integrity of the national telecommunications network and also results in considerable income losses for the public operator(s).~~ In order to avoid wasting resources and to provide a framework for the development of national telecommunications, it would be wise to introduce regulations that are liberal enough not to impose restraints on needs that are often justified by a concern for the development of local industries, but at the same time strict enough not to jeopardise the integrity of the national network. It might also be useful to authorise the connection of these private networks to the State operator's network subject to strict regulation. This could provide the PTO with a significant source of traffic involving no investment on its part. Similarly, the telecommunications infrastructure of a particular area of a country may be the result of private initiative, under State license. Whatever the circumstances, there should be technical standards governing the installation and operation of these networks in order to maintain and/or safeguard the integrity of the national telecommunications network.

Interconnection of national network with a particular type of global network

250. Interconnection of the national public network with the global network is subject to technical and operating norms drawn up by the ITU. Nevertheless, the new environment of new services means that most national networks can not provide their customers, especially their professional clients, with such services. Professional clients will therefore look for other solutions from the providers of such services, which are value added and provided through "global networks" set up by businesses that belong to different sectors of activity but wish to share certain information resources.

251. This is a new situation which is not fully covered by current legislation, though it may lead to *de facto* legislation if the necessary steps are not taken in time. Hence the suggestion that this category of requirement might be catered to by providing leased circuits, perhaps even switched and point-to-point ones. This would be an interim solution pending standardization or at least harmonization at the international level.

252. Future world telecommunication networks based on non-geostationary satellites represent a similar challenge which must be taken up. Even if the operational configuration of such networks is not yet known, the RASCOM solution should be taken into account in any approach intended to take advantage of the benefits of satellite networks.

The regional level

253. Over 22 years ago, the governments decided that it was necessary to set up a pan-African telecommunications network. Considerable and varied efforts were made towards that objective. The results obtained vary from one subregion to another, and while not insignificant, they have not met expectations. The "MONROVIA SOLUTION", aimed at setting up seven regional transit centres for Africa, did not really materialize. This was due to a number of reasons. There were real technical obstacles, but the major reason was lack of political will and commitment.

254. The main technical obstacle is that in individual subregions the different national network development plans, including basic plans such as signalling plans, have not been harmonized. The fact that some countries have no national expertise in the field is another factor. Intra-African traffic is very low compared with international traffic which, for each country, is directly related to trade flow.

255. The interconnection of national telecommunication networks is now seen in the context of the future African common market which, given the present unfavourable environment and the various unsuccessful attempts to improve it, represents a sort of "SPARE WHEEL" for the region, especially for sub-Sahara. A pan-African telecommunications network is an important element in the creation of this African economic area and the specific measures required should be adopted without delay.

256. In the near future, most national network operators will be, *de jure* or *de facto*, public operators whose autonomy will vary depending on the country in which they operate. They will be required to produce results set forth in a plan, contract or similar document. The objective of implementing the PANAFTEL network must be written into any contract established between an administration and its public operator(s). However, and notwithstanding the economic factor, this objective should not be seen as a *sine qua non* for setting up direct inter-State telecommunication links.

257. In order to set up such links where they do not already exist, a regional routing plan should be established urgently. The plan should be based on regional transit zones and on existing, subregional routing plans, updated if necessary. For the implementation of the regional routing plan, it is suggested that, where this is not already the case, agreement is reached on digitization for the international part of each involved network. The RASCOM network, in its final phase with its dedicated satellites, could constitute a useful overall structure for implementing such a plan.

258. This plan together with the national network development plan may at first seem ambitious in view of the financial resources available and the degree of solvency of the States, both nationally and internationally. But once internal obstacles are removed, especially structural obstacles, telecommunications will substantially increase the sector's self-financing capacity and, if suitably managed, will create a favourable climate with regard to eligibility for externally financed projects.

Setting up a common infrastructure/common support system

259. One of the options for setting up a pan-African telecommunications infrastructure lies in the implementation of the RASCOM project, in its final version. Initially, the only space resources of this recently-created organization will be shared transponders. Difficulties must not be allowed to hamper the introduction of an African satellite communications network. Naturally, the implementation of the PANAFTEL network should go ahead as planned.

Service interconnectivity

260. Given the present development of national networks and related services, services interconnectivity on a pan-African scale is a long-term objective. There must be regional intercompatibility and interworking of the services provided by public network operators if services are to be provided freely in an African economic area; these factors therefore affect the extent to which the region's national economies can be integrated.

261. Services interconnectivity presupposes the definition and adoption of common service and interconnecting standards for the network's infrastructures. Meanwhile, an agreed or at least a common approach should be adopted for the introduction and use of certain new services for which individual countries have already made choices, for example:

262. As a result of improved technology, the digital cellular radio telephone, which is currently being developed worldwide, ~~will soon replace~~ is increasingly replacing the analogue mobile telephone. Harmonization here will involve reaching agreement on a cellular network architecture which will enable any user of the service visiting the region to use his own portable set.

263. Following the proliferation of cellular technologies and equipments, satellite-based or land-based, the countries in the region should seriously study the best way to introduce them in their networks taking into consideration the indispensable need for compatibility between the networks of the various countries notably that of roaming.

Harmonization of network development norms/standards

264. A pan-African telecommunications infrastructure of real benefit to the continent's integrated development can only be built on the basis of equipment and services norms/standards that are accepted by all parties. These common standards are a precondition for the setting up of an equipment manufacturing industry within the telecommunication sector; this will make the region a homogeneous market whose needs can be taken into account at the manufacturing stage by present and potential equipment suppliers.

265. The standardization process is nevertheless long and complicated, involving considerable human and material resources. It also takes time to establish telecommunication standards at the international level, and this increases the determination of regional standardization organizations to work closely with the ITU which has just adopted the structural measures required for it to continue to play its leading role.

266. In view of the above, the establishment of a regional standardization structure is not a matter of urgency in the medium term. However, each country should have a body responsible for drawing up the technical specifications of equipment to be purchased. Such specifications should be based on international norms and initially should be harmonized at the regional level without an organization specifically established for the purpose.

Industrialization policy

267. It would be unrealistic to imagine an integrated, balanced African telecommunications network without the necessary tools to go with it, i.e. manufacturing units for equipment suited to the region's environment and development rhythm. As "The Missing Link" stresses, "where information flows so does commerce". There is no doubt as to the importance of telecommunications for the future African economic community and the need to take whatever action is required, particularly action to obtain at least partial control over equipment supplies. Industrialization of the telecommunication sector is subject to specific constraints related to the development and specifications of the equipment to be manufactured which has to be designed so as to fit in smoothly as an integral part of a working telecommunications network.

268. Industrialization of the telecommunication sector should be a process whose first phase aims at setting up by the year 2010 two or three assembly plants for the whole region, in the following fields:

- terminal equipment, including telephone sets;
- telephone and electric cables manufactured by common production facilities inorder to reach a critical volume so as ensure a proper return on investment;
- digital switching equipment, providing there is sufficient demand. The objective set by the second UN Transport and Communications Decade in Africa is to increase current telephone facilities by 4.2 million lines; however, even though this figure is realistic when viewed in light of the first Decade's results, it is below actual requirements and could be increased if a regional assembly unit existed.

269. This kind of industrialization can only come from private sector initiative; and it is vital that States should create a legal and fiscal framework favourable to such an undertaking. The question could even be discussed with the region's main creditors, who could then consider how much interest such a project might attract and, consequently, to what extent to which it could be included in solutions aimed at solving the private debt problem.

The establishment of RASCOM will create new opportunities in industrial development and manufacturing of earth station equipment.

RECOMMENDATION 7.1 - Development of the network

The Green Paper recommends that a plan for the economical digitization of the telecommunication network should be drawn up and implemented within a reasonable time limit, bearing in mind the imperative need to interconnect networks at the subregional and regional levels. The implementation scenario for such a plan will depend on the particular configuration of each network.

RECOMMENDATION 7.2 - Offer of services in rural areas

The Green Paper recommends that efforts to increase the penetration rate of telecommunication services in rural areas should be continued using modern techniques, including radio systems and the various technical possibilities offered by telecommunication satellites.

RECOMMENDATION 7.3 - Economical maintenance of the network

The Green Paper recommends that programmes for network extension and renewal should provide for the repair of existing installations while ensuring that future equipment can be properly maintained.

RECOMMENDATION 7.4 - Service interconnectivity

Prior to the introduction of new services, States should agree on the technical standards to be adopted in order to facilitate, in the long term, the interconnectivity of services in the region. It is particularly important, at this point, to adopt compatible architectures and norms with respect to digital cellular telephony, so that eventually all users moving within the region will be able to use the same type of portable telephone set.

RECOMMENDATION 7.5 - Industrialization

The Green Paper recommends that the studies currently under way with a view to providing Africa with a telecommunication industry, a prerequisite for minimizing the influence of external factors on network development policy, should be continued. In this connection, States should create the kind of legal and regulatory environment which would arouse private sector interest in such an undertaking.

RECOMMENDATION 7.6 - Determination of tariff levels and structures

It is suggested that a study group should be set up at the national level to examine the question of tariffs for telecommunication products and to provide all the technical elements required to determine tariff structures and levels.

CHAPTER VIII. - REGIONAL AND INTERNATIONAL COOPERATION

Introduction

270. More than in any other sector, cooperation in the telecommunication sector is both an obligation and a need irrespective of the level of development of the parties concerned. As the representative of the Economic Commission for Africa (ECA) rightly stated at the World Telecommunication Development Conference held from 27 to 30 May 1985 at Arusha, Tanzania, it is essential for the countries of the African Region to realize the similarity of their objectives and the complementarity of their needs, to combine their resources in order to obtain better results and, collectively, to take maximum advantage of the region's resources. Cooperation structures and frameworks exist at both the regional and international levels and the problem is rather one of managing those structures rationally. It should be stressed, however, that regardless of circumstances, cooperation will only benefit the region if it comes as a back-up to local and regional initiatives, failing which it will provide merely a varnish that is vulnerable to the first bad weather.

Organizing regional cooperation in a simpler and more efficient manner

271. Africa has a multitude of organizations concerned exclusively or partially with the telecommunication sector (AMU, ECCAS, UDEAC, ~~WAEC,~~ ECOWAS, SATCC, ~~PTA~~ COMESA, OAU, ECA, PATU, CAPTAC, ~~UAPT,~~ etc.). Some countries thus contribute directly or indirectly to at least a dozen such bodies but, regrettably, they do not seem to draw the full benefits that such profusion suggests. In practice many of these bodies suffer from major shortcomings as to the precise definition of their mission and the means at their disposal.

272. Clearly it would be advantageous to reduce the number of telecommunication development organizations in which a country is expected to play an active part. An idea might be to counter the trend towards creating bodies with permanent headquarters and staff, and even consider closing some which are chronically deprived of financial, material and human resources. The African countries should take into account and follow closely recent developments within the International Telecommunication Union (including the institutionalization of a four-yearly cycle of regional telecommunication development conferences and the creation of a regional office for Africa) and take full advantage of those instruments to which they contribute financially and intellectually.

273. Consideration should also be given to solutions which are more flexible than bodies with permanent headquarters, such as subregional conferences, and to purpose-built and time-limited committees to which adequate operating resources could be provided on an *ad hoc* basis. Despite the disproportions between the results obtained and the means applied, intraregional cooperation is a necessity for all; in particular it remains the only mechanism likely to create a homogeneous area of an economically attractive size for the imported or locally manufactured telecommunications equipment market.

Issues to be tackled within the framework of regional cooperation

274. The limited size of national markets and the shortage of all types of resources should encourage African countries to seek ways of pooling their skills and technological facilities in different fields. Since the needs to be met in this way are both numerous and varied, priorities should be defined in concert, preferably at the subregional level, if only between two neighbouring countries. The following activities are mentioned by way of example:

- the preparation of model laws, regulations, contracts and service agreements to accompany the restructuring effort in progress;
- the granting of franchises and licenses and the conclusion of joint ventures with private companies on a subregional basis;
- elaboration of a mandatory legal instrument relating to the decisions taken by governments with a view to interconnecting networks ahead of the future African economic community;
- setting up of a mechanism for exchanging all manner of information relating to the planning, implementation and operation of national networks and to fields in which each country has resources that can be made available to others;
- introduction at the regional level of a technical research unit responsible *inter alia* for technically paving the way for regional equipment manufacturing and assembly units and providing the focal point for the transfer of technology (know-why and know-how);
- creating and running joint manpower development facilities and programmes;
- planning of certain portions of the network on a subregional basis and joint negotiation of the necessary financing, particularly, cross-border links;
- tariff development and harmonization;
- the common purchase of certain equipment with a view to securing price reductions, sharing the cost of procurement services and certain related costs such as training in operation and maintenance, and above all to obtaining, through volume, equipment that is better geared to the special needs of the countries;
- purchase and use of digital synchronization equipment;
- creation and startup of subregional maintenance centres;
- adoption of modern telecommunication network management systems that are compatible or even common (human resources, marketing, technical specifications, traffic routing, computerization system, etc.) with a view to facilitating performance comparisons and, through emulation, to encouraging a permanent drive for improved productivity within each country;
- codification of regional expert recruitment and employment conditions within the region and as part of operations for which the beneficiary country has no skills of its own.

275. Cooperation should also make appropriate technical tools available to States engaged in international negotiations concerning telecommunications and related fields, e.g. the ~~GATT~~ WTO negotiations and those of the African, Caribbean and Pacific countries (ACP) with the European Union. Moreover, given the phenomenon of globalized telecommunication service supplies at a time when industrialized countries' operators are seeking to build alliances to meet the needs of agencies operating on the international market, cooperation between African countries would enable them to present a common front to the major world operators. If properly thought out and implemented, regional cooperation in the telecommunication sector could well lead to some integration of the more highly performing national networks and thus foreshadow the economic and political integration to which the peoples of Africa aspire.

International cooperation

276. The African Region, particularly the part lying south of the Sahara, has attracted much international attention but its often passive role has meant that its own priorities sometimes have been overlooked. This explains to some extent the poor results achieved to date. Opportunities abound in the telecommunications field but for want of suitable institutional frameworks at the national and regional levels, plus a clear political commitment, the countries, individually and collectively, are in danger of paying a high price in future for their lack of effective participation in building a new world, a world shaped, *inter alia,* by telecommunications, and where cooperation will be as important as competitivity. Every country of the region is a member of at least six organizations in which telecommunications are either the main or a related activity. This multiplicity of structures for cooperation and even aid to telecommunications development admittedly bears witness to the importance of the sector, but it leads to a waste of energy and means whenever action taken here or there with the same aim and for the same beneficiary is not coordinated.

277. If it is to take proper advantage of international cooperation in the telecommunication sector, Africa must:

- readapt its national, subregional and regional cooperation instruments;
- in cooperation with the international agencies (the IBRD, IMF, ITU, ECA, UNDP, etc.) to devise and codify a mechanism for coordinating their different inputs to telecommunications development in Africa, having regard to the role of the ITU as the United Nations specialized agency for the sector;
- create at the national, subregional and regional levels an environment favourable to the transfer of the different flows which foster cooperation, yet without losing its own identity;
- follow the example of countries which have similar conditions but have done better in the telecommunications field.

Least developed countries in the region

278. The least developed countries (LDCs) form a group classified by the United Nations as meeting a set of criteria adopted by the Development Planning Committee of the Economic and Social Council. When the list was first drawn up in 1971 there were 19 LDCs; by 1995 they numbered 48, 33 of which are in the African Continent. Some LDCs have telecommunication networks that are better developed and managed than those of certain non-LDC countries of the region.

279. At present and given the urgent challenges for all concerned, it would not be wise to undertake specific action on behalf of the LDCs within the framework of intraregional cooperation. On the other hand, Africa must bring its full weight to bear internationally so as to ensure the implementation of programmes on behalf of the LDCs, such as that prepared at the United Nations conference held in Paris in September 1990. Similarly, efforts should be made to ensure that all the measures taken by the ITU decision-making authorities on behalf of the LDCs are implemented, for unless energetic measures are taken the number of LDCs in Africa will go on increasing (**see item 1 of Annex 1**).

RECOMMENDATION 8.1 - Efficient cooperation

The Green Paper recommends that a thorough examination should be conducted of the mandates and operating structures of the subregional and regional organizations in the telecommunication sector, eliminating, where appropriate, any duplication of work and, if necessary, reducing the number of such organizations.

RECOMMENDATION 8.2 - Deriving maximum benefit from cooperation

The Green Paper recommends that a strategy should be drawn up for cooperation with the other international organizations involved in the development of telecommunications in Africa, ensuring that all action undertaken is directed towards the same objective and carried out at optimum cost.

RECOMMENDATION 8.3 - Use of endogenous human resources

The Green Paper recommends that cooperation among developing countries be stepped up in this domain and that periodic evaluations be conducted of such cooperation with a view to improving its cost-effectiveness.

ANNEXES

LIST OF REFERENCE DOCUMENTS

1. Series of telecommunication indicators, ITU, Geneva ~~(see attached list)~~
   - Africa, 1990, 1993, 1994 (to be published)
   - Americas, 1990, 1993 (to be published)
   - Europe, 1992
   - Former Soviet Union, 1992
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   - Arab States, 1992, 1993
   - Asia Pacific States, 1993

2. Telecommunications: World Bank experience and strategy, World Bank, Washington, D.C., 1992.

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7. UN/ECA, "UNTACDA II, The Second United Nations Transport and Communications Decade in Africa 1991-2000", Volume I: Programme, Volume II: Projects approved in 1991.

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9. Communications Outlook, OECD, Paris, 1993.

10. Final report of the African Telecommunication Development Conference, Harare, 1990, Volume I.

11. Telecommunications development and policy in Africa. Pressure for policy changes, ECA, Addis Ababa, November 1991.

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(RASCOM), November 1990.

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14. Follow-up study of the costs of providing and operating international telephone service
between industrialized and developing countries, ITU, Geneva, 1990.

15. "The Missing Link" report of the Independent Commission for World-Wide Telecommunications Development, December 1984.

16. Bangui Colloquium PANAFTEL Report, March 1990

17. Mexico City Declaration on Population and Development adopted by the International Conference on Population, Mexico City, 14 August 1984

18. Report of the World Telecommunication Development Conference, Buenos Aires, Argentina, 21-29 March 1994

AFRICAN TELECOMMUNICATION DEVELOPMENT CONFERENCE
(Harare, Zimbabwe, 1990)

Resolution ATDC-90/RES1

AFRICAN INFORMATION AND TELECOMMUNICATION POLICY AND STRATEGY

RESOLUTION ATDC-90/RES1

AFRICAN INFORMATION AND TELECOMMUNICATION POLICY AND STRATEGY

The African Telecommunication Development Conference (Harare, 1990),

having reviewed

the relevant documents presented at the Conference;

recalling

Resolution No. 14 of the Plenipotentiary Conference (Nice, 1989) entitled "*Changing Telecommunication Environment*";

reaffirming

that telecommunication is an effective tool for nation building and increasing productivity and efficiency in all major sectors of the economy;

concerned

by the slow progress of telecommunications development in Africa;

considering

that technological changes occurring in both the industrialized and the developing nations, and particularly the convergence of computer and telecommunication technologies, have brought about many new services and service providers;

noting

the current worldwide trends with respect to telecommunication regulation, deregulation, liberalization, commercialization, privatization, etc.;

recognizing

the pressing need to provide new and advanced services for the conduct of modern business while the provision of basic telecommunication services which are essential for socio-economic development is far from being universally available in Africa;

recognizing further

that it is essential to establish national and regional governmental policies to orient the development of the sector to satisfy the needs of the economy as a whole;

recalling

the decision of the African Governments to integrate their economies progressively, with a view to creating the *African Economic Community* by the year 2000;

being aware

that telecommunication services are included in the *Uruguay Round* of negotiations within the framework of GATT;

being aware also

of the "*Green Paper*" of the *European Commission* which guided its Members to adopt appropriate national and regional telecommunication policies to support and enhance their objectives of economic integration,

recommends that African Governments

1. separate the regulatory and operational functions of telecommunications to enable greater decision-making autonomy of each important function (see also ATDC-90/RES2, "*recommends that African Governments ...*", paragraph 1 i) and paragraph 2 and ATDC-90/REC6, "*invites the African Governments ...*", paragraph 1);

2. separate the postal and the telecommunication management functions, as appropriate, so that each service can develop the specific management processes best suited to its needs;

3. merge domestic and international operating entities so as, *inter alia*, to maximize the use of the limited high-level management skills and resources available;

4. give the telecommunication operating entities a large financial and managerial autonomy, along with the appropriate accountability, so as to enable them to develop and improve the services required on a competitive basis (see also ATDC-90/RES2, "*recommends that African Governments ...*", paragraph 1 i) and paragraph 2 and ATDC-90/REC6, "*invites the African Governments ...*", paragraph 1);

5. create a consultative mechanism that allows the involvement of users and other parties concerned in the improvement of the efficiency of the sector;

6. establish in each country a national high-level multi-ministerial coordination committee to study and propose to the government appropriate national information and telecommunication policies that will cover the regulation and operation of the sector;

7. include in the national coordination committee representatives of at least the following:

- the Office of the Head of Government
- the Minister responsible for telecommunications
- the Minister responsible for information
- the Minister responsible for finance
- the Minister responsible for planning
- the Minister responsible for agriculture/rural development
- the Minister responsible for trade/industry
- a representative of users/clients,

resolves

1. to create within the framework of the BDT a standing *African Information and Telecommunication Policy Study Group (AITPSG)* to study and propose guidelines that match the requirements of the countries at the subregional and regional levels;

2. that all interested African countries should participate in the work of the AITPSG;

3. that the AITPSG should elaborate, within one year, a first draft of a regional telecommunication policy paper ("African Green Paper") and submit it to the appropriate economic subgroupings and to the OAU, via the good offices of PATU, for consideration and appropriate political guidance;

4. that the AITPSG should further elaborate and formulate suitable recommendations to the African countries on the basis of the guidance received from the appropriate political and economic organs,

instructs the Telecommunication Development Bureau (BDT)

1. to provide all relevant information;

2. to develop appropriate case studies;

3. to support and service the proceedings and meetings of the AITPSG in close collaboration with PATU,

requests the Secretary-General of the ITU

1. to transmit this Resolution to the Organization of African Unity, the Pan African Telecommunication Union and the four African economic subgroupings;

2. to submit a report on the implementation of this Resolution to the next African Telecommunication Development Conference.

AFRICAN ECONOMIC COMMUNITY

Draft
OAU Protocol on transport and communications

Article 10
(Rev.2)
TELECOMMUNICATIONS

AFRICAN ECONOMIC COMMUNITY
Draft
OAU Protocol on transport and communications

Article 10
(Rev.2)
TELECOMMUNICATIONS

HAVING REGARD TO the growing importance and the key role of telecommunications for the political, social, economic, and cultural development and integration of the Community, Member States shall:

(a) Harmonize and coordinate their activities in the fields of policy formulation planning, human resources development, and in the introduction of new and appropriate technology;

(b) Evolve and regularly update suitable policies in telecommunications including modalities for the participation of the private sector so that adequate and efficient telecommunication services are provided to the community and, so far as possible, are generally available to the public;

(c) Plan and implement telecommunications networks in coordination or consultation with all countries with a view to establishing efficient telecommunications networks and services geared towards promoting intra-African trade and economic integration;

(d) Increase the utilization of the Pan-African Telecommunications Network through coordinated maintenance and operational measures;

(e) Promote and encourage the development of Communications Satellite Systems in the continent with a view to ultimately establishing a Pan-African Network of Satellite and other communications systems as called for in Article 63 of the Treaty, ~~provided that in taking any decision,~~ taking account of the commercial viability of the project;

(f) Adopt and apply harmonized rates and tariffs structures that will promote the increased utilization of intra-community communications facilities and evolve appropriate procedures including use of Clearing Houses established by Regional Economic Communities (RECs) for settling of accounts arising from the provision of intra-African communication services to each other;

(g) Ensure that intra-Community traffic is as much as possible routed through transit centres within the Community and whenever possible give preference to African transit centres to route extra-continental traffic;

h) Establish a cooperative mechanism through PATU to jointly develop research and manufacturing capability for telecommunications equipment designed to operate in an African environmental condition;

(i) Establish fora at regional and continental levels to ensure adequate consultation on technical operations, planning and policy issues for the expansion and operation of telecommunications networks and services;

(j) Promote the development of telecommunications in the rural and remote areas in order to stimulate their economic and social development;

(k) Formulate appropriate policies, regulations and institutional frameworks for the telecommunications subsector designed to promote accelerated development and integration of the Community;

(l) Eliminate barriers to cross-border communications, by harmonizing legislation, regulations and administrative procedures;

(m) Ensure that all new services are introduced on the basis of a common harmonized approach, notably with regard to services between Member States so that compatible services are offered throughout Africa taking into account relevant international standards;

(n) Establish and develop a compatible mobile radio communications services in a way which will lead to a future Pan-African Mobile Radio Communications Network;

(o) Lend effective support to African continental and regional organizations responsible for coordinating the development of telecommunications in Africa;

(p) Utilize African experts through dynamic inter-State cooperation with a view to providing employment and reducing the costs of telecommunications services;

(q) Introduce and strengthen pan-African cooperation in the field of radio frequency management with the objective of efficient use of the frequency spectrum for all services, according to the needs of the African market and taking into account the requirements of existing services and different categories of users;

(r) Develop common African positions in relation to the use of the frequency spectrum and development of standards, in particular with regard to ITU and its relevant administrative radio conferences, based on coordinated strategy by PATU which will undertake research beforehand and prepare Africa's common positions;

(s) Actively cooperate in the use of national, regional and continental training institutions in the sector.

MODEL ORGANIZATIONAL STRUCTURE AND STAFFING OF AN NRA

(This article is an excerpt from a paper written by Timothy E. Nulty and Eric Schneidewind which appeared in A WORLD BANK SYMPOSIUM on Restructuring and Managing the Telecommunications Sector, edited by Bjorn Wellenius, Peter A. Stern, Timothy E. Nulty, and Richard D. Stern)
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1. Model organizational structure and staffing of an NRA

The Figure shows a hypothetical National Regulatory Authority.

A full-service National Regulatory Authority must include at least five sections: engineering, accounting or auditing, tariff analysis, legal analysis, and a policy-making head or collegial body that may or may not supervise the other four components. Obviously the precise form that these take and their relative size will differ greatly from country to country, depending on circumstances and on the goals being sought.

1.1 Engineering

A team of telecommunication engineers is necessary to check matters relating to quality of service, franchise violations, and some aspects of the process by which revenues are divided.

Concern with ensuring quality of service usually focuses on frequency allocation, compatibility of equipment protocols and technical parameters, equipment service parameters (such as percentage of calls connected), and compatibility of numbering plans. Various national and international standards exist for customer and transmission equipment, but trained professionals are necessary to apply these standards, particularly where the network has more than one carrier. Engineers must also check the performance of equipment to ensure that calls are completed and audible.

The division-of-revenues process involves allocating the costs of jointly used facilities to various kinds of traffic (tool, local and so on) and then among the entities serving that traffic so that each pays its share of costs and receives its fair share of revenues for calls using more than one entity. This function requires a detailed knowledge of the technical capacities and characteristics of a wide variety of telecommunications equipment.

1.2 Accounting or auditing

Accountants or auditors are necessary to verify revenues and expenses for the rate-setting process. The rates of a privately owned monopoly entity must be restrained or charged by a private monopoly, all rate-setting methods require the periodic verification of assets, revenues and expenses.

1.3 Tariff analysts

Tariff analysts develop or check telephone rates to ensure that a required gross revenue will be collected by a certain set of tariffs or vice versa. Even publicly owned monopoly utilities will require tariff analysts to deal effectively with international carriers and allocate system revenue requirements among different types of customers.

1.4 Lawyers

Lawyers are necessary to, *inter alia*, interpret or draft contracts where public and private operating entities must interconnect. Where a private entity is subject to regulation, the regulatory agency head may require legal advice to apply disciplinary sanctions or decide disputes between operators and their customers.

1.5 Agency head

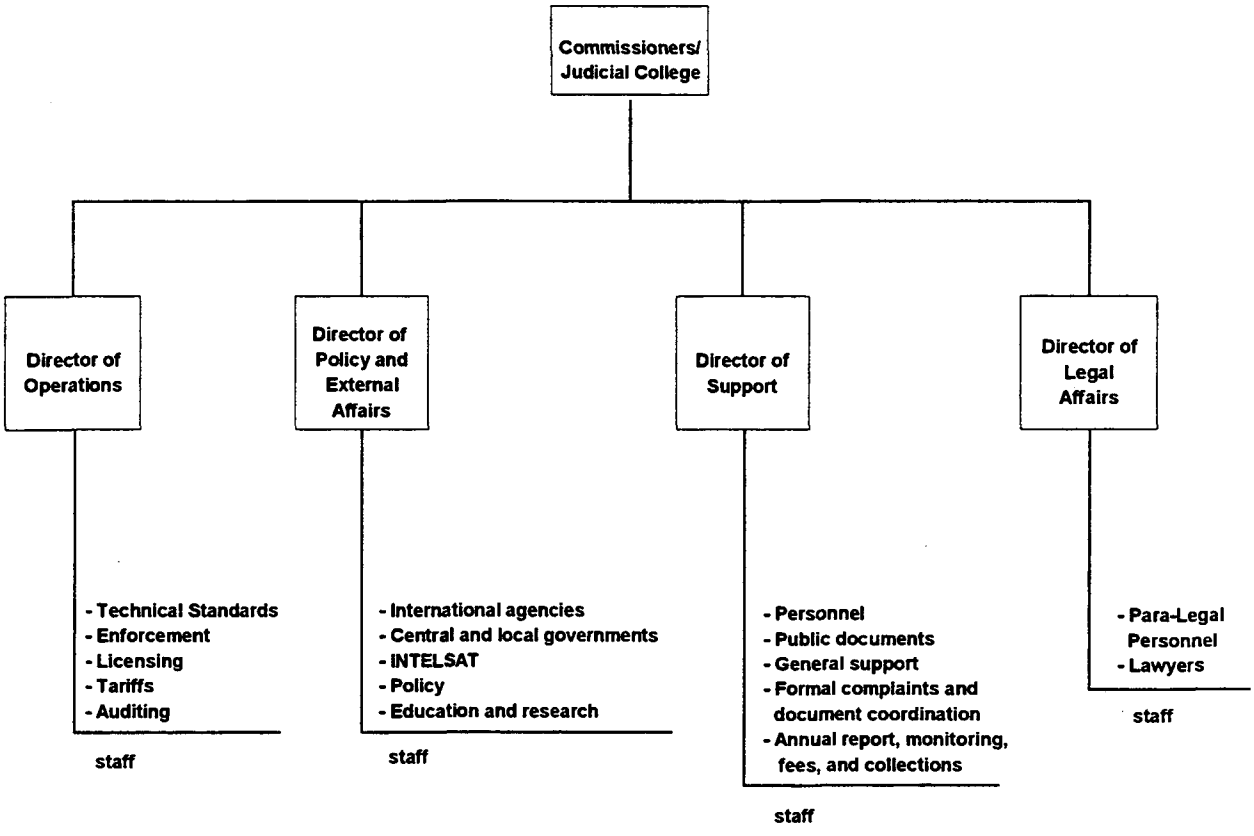
A person or collegial body must supervise the employees of the regulatory agency and make final decisions regarding the applications of regulatory policy to public or private operators. Sometimes the supervisory role is vested in a chief executive who reports to the person or collegial body resolving disputes or applying policy.

1.6 Staffing and equipment required

The staffing requirements will vary from country to country or even region to region depending on the number of entities to be regulated and volume and complexity of issues anticipated. For example, if the equipment or plant is not in a state of the art condition you will need a lot more engineers. If the books and records of the entities to be regulated are not in order then, naturally, your demand for more support and even operational staff will be high. The frequency, complexity and volume of complaints and policy issues will dictate the size of the Commissioners cum Judiciary and the legal affairs staff.

FIGURE

Model organizational chart of a National Regulatory Authority



~~EXAMPLE OF A DRAFT LAW DETERMINING A REGULATORY FRAMEWORK FOR THE TELECOMMUNICATION SECTOR~~

~~Note: This example of a draft model law is only indicative and by no means exhaustive. It may therefore be expounded further to take account of national peculiarities such as security and even population setup which may influence network configuration and market forces. The bottom line, however, being to legislate and provide for a liberalized telecommunication environment and market.~~

OUTLINE OF A LAW DETERMINING A REGULATORY FRAMEWORK FOR THE TELECOMMUNICATION SECTOR

This document cannot be considered as a model law for telecommunications. The provisions of any such law will vary greatly according to the choices made by different countries in terms of the structure of the telecommunication market (monopoly, duopoly, free competition) and the existence or otherwise of a State-owned operator. Moreover, since not all countries have the same legal tradition, the level of detail to be entered into in the law will depend on whether or not such detail can be embodied in regulations set by decree or in some other regulatory text. The outline given here, which attempts to summarise the salient points to be covered in a law, will serve as a guide for drafting of the law.

ANNEX 5
(page 2)

EXAMPLE OF A DRAFT LAW DETERMINING A REGULATORY FRAMEWORK FOR THE TELECOMMUNICATION SECTOR

1. Definitions and principles

See relevant items in "glossary".

2. Ministerial and other obligations

In the exercise of the powers conferred on him by the present Act, the Minister for Telecommunications is responsible for ensuring:

2.1 That the regulation of the telecommunications sector, on the one hand, and the operation of networks and the provision of telecommunications services, on the other hand, are performed independently.

2.2 That telecommunication services which are not provided exclusively by the PTO are operated according to conditions aimed at promoting a fair competitive environment, in which the PTO and the competitive Service Providers are stimulated to develop telecommunication services included in the non-reserved area.

2.3 That the PTO and the telecommunication Service Providers respect the principle of neutrality, regardless of the content of a transmitted message.

2.4 That access to the public network is provided under objective, transparent and non-discriminatory conditions.

3. The PTO persons authorized to establish a network open to the public and the telecommunication Service Providers and their personnel are under obligation to respect the secrecy of correspondence.

4. In order to perform his missions, the Minister of Telecommunications may:

4.1 Collect from private individuals and corporate entities who operate telecommunication networks or provide telecommunication services any information or document required to ensure that the said individuals and entities respect, *inter alia*, the obligations imposed on them by legislative and regulatory Acts or by the terms of the operating licence granted to them.

4.2 Conduct inquiries concerning the said individuals and entities.

The Minister of Telecommunications is responsible for ensuring that the information gathered under the terms of this Article is not divulged when the said information is protected as secret.

5. Basic telecommunication network infrastructures

Basic telecommunication network infrastructures may only be established under the terms of the present section, regardless of the service provided.

5.1 The PTO alone may establish basic telecommunication network infrastructures which are open to the public in general.

~~By derogation, the Minister for Telecommunications may license a person other than the PTO to establish or operate a radio network in order to provide a public telecommunications service, provided that this service, on the one hand, meets the market requirements, and, on the other hand, does not hinder the PTO in the successful accomplishment of the public service obligations assigned to it and respects the constraints relating to tariffs and geographical coverage which results from this.~~

~~A licence of this type must state the conditions for establishing the network and those for operating the service. This licence shall be subject to a number of operating conditions as follows:~~

~~(a) the nature, characteristics and area of coverage of the service;~~
~~(b) the operating hours, quality and availability of the service;~~
~~(c) the confidentiality and neutrality of the service with regard to the messages transmitted;~~
~~(d) the standards and specifications of the network and service;~~
~~(e) the use of frequencies;~~
~~(f) restrictions relating to national defense and public security;~~
~~(g) fees payable for the use of the radio spectrum and the conditions for management and control expenses;~~
~~(h) the contribution of the operator to telecommunications research, training and standardization;~~
~~(i) interconnection conditions and, if applicable, the basis of paying access charges for use of the public network;~~
~~(j) the conditions for commercial operation required to ensure fair competition and fair treatment of users;~~
~~(k) the duration, conditions for terminating service and renewal procedures of the licence.~~

~~5.2 Subject to any reciprocal regional or bilateral arrangement regarding telecommunications such a licence may only be granted to a company whose shareholders are local nationals.~~

~~Under the terms of the present Article, a foreign national is considered to be any individual foreign national and any company the majority of whose shares are not held, directly or indirectly, by local nationals or corporate entities.~~

~~6. The establishment of independent network infrastructures, other than those described in Article 7 is subject to a licence granted by the Minister for Telecommunications.~~

~~The Minister shall issue regulations defining the conditions under which independent networks may, on an exceptional basis, be connected to a public network, provided that these networks do not allow the exchange of information other than between those persons for whom the use of the network is reserved.~~

~~7. On condition that the radio installations and when relevant, terminal equipment conform to the provisions of Article 14, the following may be established without any licence:~~

(1) internal network infrastructures;
(2) independent network infrastructures, other than radio network infrastructures, whose termination points are less than ... apart, the connection capacity of which is less than the limit set by regulation of the Minister for Telecommunications;
(3) radio network infrastructures composed exclusively of low power and short range devices as categorized by joint decision of the Minister of Defense, the Minister of Internal Security or Home Affairs and the Minister for Telecommunications.

The Minister for Telecommunications shall be responsible for defining the technical operating conditions applicable to the networks and installations described in paragraphs 2 and 3 above.

8. The publication of directories is not restricted, subject to prior notification of the Minister for Telecommunications.

Telecommunication services

This section applies to the telecommunication services provided to the public in general.

9. Telephone service between fixed points and telex service can be provided by the PTO only.

Public boxes established in the public domain, allowing access of the public in general to telephone and telex services can be operated by the PTO only.

10. The provision to the public of telecommunication services, other than those described in Article 9 which use radio frequencies, requires a licence from the Minister for Telecommunications under the following conditions:

(1) if the provision to the public of a service entails the establishment of a new radio network or the modification of a licence to establish a network previously granted by the Minister for Telecommunications, the provisions of Article 5 shall apply;

(2) if a service is operated through the radio network which uses frequencies attributed by an authority other than the Minister for Telecommunications, the licence shall be subject to a set of specifications relating to one or all the points referred in a) to k) of paragraph 1 of Article 5. This licence is given once the authority which assigned the frequencies has agreed to the use of these frequencies for this purpose.

11. The provision of telecommunication services, other than those described in Articles 9 and 10 is free, subject to respect of the essential requirements.

The Provider of such services must inform the Minister for Telecommunications or obtain a class licence only if he uses leased lines from the PTO. If the overall capacity of these leased lines is below the limit established by the Minister for Telecommunications, only prior notification to the Minister is required. If the capacity exceeds this limit, prior class licence from the Minister for Telecommunications is required to operate such a service.

12. The Minister for Telecommunications shall be advised by specialized consultative committees. These committees shall be composed of, in equal proportion, representatives of Service Providers, users and experts appointed by the Minister of Telecommunications.

The competent committee shall be consulted by the Minister for Telecommunications on any draft relating to licensing procedures, statement or modification of technical standards, operating conditions and specifications.

13. Licences granted under the terms of this Act are issued to the applicant personally and cannot be transferred to a third party.

A refusal to grant licence must be justified in the decision itself in writing.

If the licensee does not comply with the obligations set out in legislative and regulatory Acts, and the terms of licence, the Minister for Telecommunications will give notice to conform.

If the licensee does not comply with the notice to conform sent to him, the Minister for Telecommunications may impose one of the following penalties, taking into account the gravity of the situation:

(1) once a notice has been issued, the licence may be suspended for at least one month;

(2) the duration of the licence may be reduced by up to one year;

(3) the licence may be withdrawn. However, licences granted under the terms of Article 5 may be withdrawn without prior notice if substantial changes occur regarding registered capital.

Decisions to suspend or withdraw a licence may be appealed before the High Court.

Terminal equipment

14. The market for terminal equipment shall be open to free competition. If such an equipment is designed for connection to a public network, it shall be subject to prior type approval of the Minister for Telecommunications. Such type approval is required for all radio terminal equipment, whether or not they are to be connected to a public network.

The type approval is intended to ensure that the essential requirements described in the "Glossary" are met.

The National Regulatory Authority (NRA) acting for the Minister for Telecommunications, shall stipulate the type approval procedure including the specific conditions for granting approval. It shall publish specifications for terminal equipment including specifications for its connection to the public network.

Terminal equipment and installations which require the type approval described above may be manufactured for the national market, imported for sale, stored for sale, sold or distributed free of charge, connected to a public network or advertised only if such type approval has been granted and if such equipment complies with these requirements at all times.

ANNEX 5
(page 6)

Other provisions

A. The PTO may be held legally responsible only for very serious offences, when communications services operated through the public network are involved. This restriction does not apply when such services are supplied in competition with other providers.

The same provision applies to errors and omissions which may arise in the compilation, distribution or transmission of directories established by the PTO.

B. Any person found guilty of one of the offences listed below will be subject to imprisonment for ... or a fine of between ... and ..., or both:

(1) the establishment of a public network without the licence described in Article 5 or the operation of such a network after withdrawal of the licence;

(2) the provision of telephone service or telex service between fixed points in violation of the terms of Article 9;

(3) the provision of a telecommunications service which uses radio frequencies without the licence described in Article 10 or after withdrawal of the licence.

C. Any person found guilty of one of the violations described below will be subject to imprisonment for ... or a fine of between ... and ..., or both:

(1) the establishment of an independent network without the licence described in Article 6 or the continued operation of such a network after withdrawal of the licence;

(2) the provision of a telecommunications service without the licence described in Article 11 or the continued operation of such a service after withdrawal of the licence.

Any person using a frequency or a radio installation without the licence where one is required or in violation of the terms of such a licence will be subject to the same punishment. If an illegal broadcast interferes with the broadcasting or radio links provided by the public service or an authorized service, these sentences may be doubled.

D. Any person who contravenes the provisions of Article 5.2 will be subject to a fine of between ... and ... .

E. Any person who advertises or is responsible for an advertisement which contravenes the provisions of the fourth paragraph of Article 14 will be subject to a fine of between ... and ... . The maximum fine may not exceed ... of the amount spent on the illegal advertisement. The Court may order the termination of the illegal advertising campaign at the expense of the guilty party.

F. Any person who, without a valid reason, refuses to supply information or documents or who obstructs an inquiry as described in Article 4 will be subject to imprisonment for ... or a fine of between ... and ..., or both.

G. In the event of a second violation, the sentences described in B to F may be doubled.

H. If a person is found guilty of violating one of the provisions of B and C, the Court may, further, order the confiscation or destruction, at the expense of the guilty party, of the materials and installations which formed the network or enabled the operation of a service and bar the said party from applying for a licence, as described in the relevant sections of this Act for a maximum of two years.

I. Any employee
- of the PTO, or
- of a network operator authorized under the terms of Article 5, or
- of a telecommunications Service Operator

who violates the secrecy of correspondence, may be punished under the terms of an appropriate provision of the Penal Code.

J. In the event of a conviction for several offences or contraventions as described in B and C or in the Penal Code, the most severe sentence will be applied.

K. With the exception of the .... described in clause 3 of Article 7, the use of radio frequencies in order to either transmit or transmit/receive signals is subject to prior government licence.

L. The Minister for Telecommunications shall issue an order establishing the categories of radio broadcasting installations which may be installed, maintained, etc., only by qualified personnel who are required by law to hold operator certificates. The procedure for obtaining the said certification shall also be stipulated.

M. The radio installations described in Articles 5, 6 and 7 of the present Act shall be established, operated and maintained by and at the risk of their operators.

ANNEX 5
(page 2)

OUTLINE OF A LAW DETERMINING A REGULATORY FRAMEWORK FOR THE TELECOMMUNICATION SECTOR

Chapter I: Introductory provisions

1. **Aims of the law**: This article should identify the social and economic aims pursued by the legislation, in line with government policy. It is very important, since it gives operators in the sector a clear idea of the government's intentions and also reassures users of telecommunication services.
2. Precise definitions of all the terms used in the law.
3. Protection of the secrecy of communications.

Chapter II: Legal regime governing telecommunications

This chapter will establish, *inter alia*, the different regimes applicable to telecommunication networks, services and equipment: licences, authorisations, simple declaration, type-approval, and so on.

Section 1: Telecommunication networks

1. Public networks
2. Use of public and private land for the establishment of public networks.
3. Closed user group networks
4. Internal networks
5. Official networks
6. Network interconnections (technical and tariff considerations)

Section 2: Telecommunication services

1. Basic services
2. Other services

Section 3: Terminal equipment

1. Approval
2. Conditions for connection to network termination points

Section 4: Radiocommunication

1. Radio-frequency management
2. Authorities responsible for management and monitoring
3. Conditions governing the establishment and operation of radio networks and equipment (licensing, frequency allocation, equipment type-approval, freedom of use)

Section 5: Implementation of the legal regime

This section recommends the establishment of a precise framework for implementation of the legal regime, leaving the procedural details of implementation to executive decrees (where legal traditions so allow).

1. **Exclusive rights** (only where policy prescribes that a monopoly should be maintained, for a given period of time for instance on the network and basic services).
   - Duration of monopoly
   - Scope of monopoly
   - Conditions and obligations attached to the monopoly
   - Tariff framework

(The latter points may be addressed in detail in the licence granted to the holder of such exclusive rights).

2. Licences

- Conditions for granting, modifying and revoking licences
- Rights and obligations prescribed in a license

(The details and specific features of the rights and obligations listed in the law shall be spelt out in a set of terms and conditions annexed to the licence).

3. Equipment approval

- Technical standards
- Approval procedures

Chapter III: Authorities responsible for implementing the law

(The authorities considered here are given a generic title, such as Ministry or Regulatory Authority, to allow for adaptation to the specific situation in each country).

It is recommended that the organisation and running of the Ministry and Regulatory Authority should be established by decree.

1. - **Minister responsible for telecommunications**
   - Duties
   - Powers, delegation of authority.

2. - **Regulatory Authority**
   - Constitution of regulatory authority, whose independence is guaranteed within the limits of other prevailing legislation.
   - Duties
   - Powers (including those delegated by the Ministry)
   - Obligations (including the obligation to provide and facilitate access to information).

3. Consultative bodies

It is worthwhile making provision in the law for the creation of such a body, which may be an essential guarantor of transparency.

Chapter IV: Criminal provisions concerning breaches of regulations

1. Right to investigate
2. Powers of investigators
3. Types of infringement:
   - absence of licence
   - fraudulent use of network or service
   - interference in or modification of a message
   - interception of a message
   - damaging of equipment used for telecommunication service
4. Protection of telecommunication networks
5. Compensation for damage
6. Appeal procedures

Chapter V: Miscellaneous

1. Derogations to permit and promote subregional integration
2. Provisions prohibiting alliances and mergers that jeopardise the competition prescribed by law (anti-trust provisions)
3. Abrogation of previous texts and transitional provisions

OPEN NETWORK PROVISION (ONP) - THE EUROPEAN CONCEPT

Note - The ONP concept is presented in this annex as an example for consideration by the regional/subregional bodies which will have to define the regulatory framework adequate to the African environment.

OPEN NETWORK PROVISION (ONP) - THE EUROPEAN CONCEPT

1. Introduction

Open Network Provision is a concept that was developed in the second half of the eighties with the aim of creating within the European Union (EU) a mechanism by which the network infrastructure, in the form of a number of switched services and non-switched transport services could be offered by PTOs to users and competitive Service Providers. ONP is intended to maximize the utilization of the network and to stimulate new market opportunities in the range of non-reserved services.

In other words, ONP is the mechanism:

- to stimulate the development of non-reserved services, provided both by the PTOs and by competitive Service Providers;

- to promote fair competition between PTOs and Service Providers in the market of non-reserved services.

ONP has been elaborated in such a way that erosion of the position of the PTOs in the overall market place is avoided.

Both the PTOs and competitive Service Providers can offer all services other than those which are reserved. Therefore, ONP has promoted a degree of commonality and standardization within the EU for a range of interfaces and access arrangements offered by the PTOs to all users. This is primarily aimed at servicing the needs of Service Providers when offering value-added services to third parties.

It is recognized that non-reserved services are essentially built "on top" of the basic offerings of the PTOs. Figure 1 shows the basic offerings by the PTOs for the provision of the network infrastructure. Non-reserved services can be built on top of these two basic offerings: non-switched transport services (in particular leased lines) and switched services.

Therefore, ONP aims at the definition of common interface arrangements for the provision of the network infrastructure. Currently, two levels of service interfaces may be considered:

- interfaces to non-switched transport services (e.g. virtual or physical point-to-point connections, including leased lines);

- interfaces to a range of switched services.

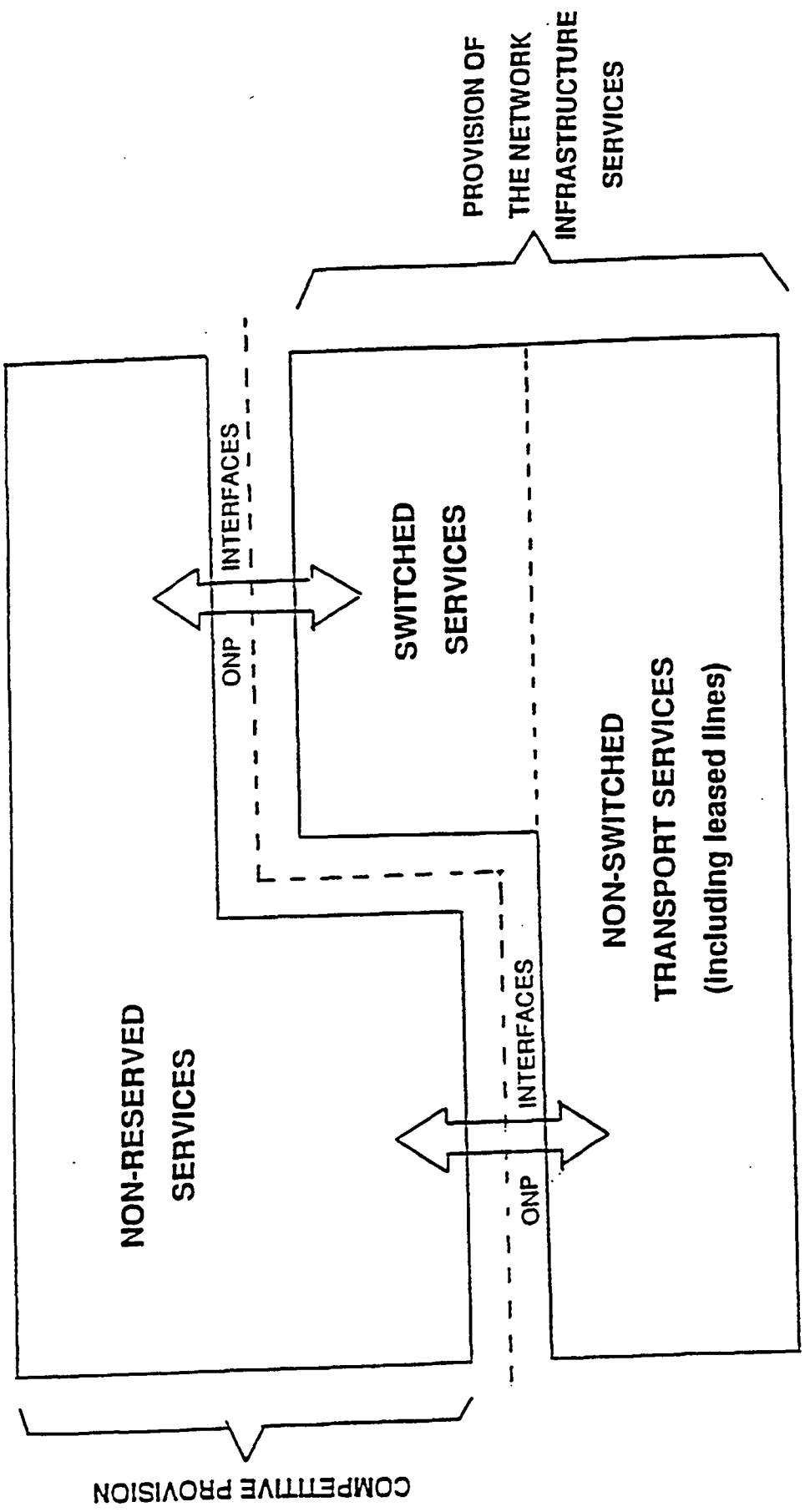
This is shown by the two arrows in Figure 1.

2. Scope of Open Network Provision

2.1 Scope in time

Initially, ONP was intended to be applied to certain reserved services provided by the PTOs.

FIGURE 1


PROVISION OF THE NETWORK INFRASTRUCTURE SERVICES
INTERFACES
ONP
SWITCHED SERVICES
NON-SWITCHED TRANSPORT SERVICES (Including leased lines)
INTERFACES
ONP
NON-RESERVED SERVICES
COMPETITIVE PROVISION

With the progressive implementation of ONP, the PTOs gradually extended their offerings under ONP on the basis of technological progress, telecommunication regulatory evolution, market demand, and technical operational and commercial viability.

Offerings under ONP differ from previously existing offerings in technical interfaces, usage conditions and/or tariff principles.

Open Network Provision is a natural evolution of the offerings provided in the past by the Telecommunication Administrations, and, therefore, has adopted similar technical and operational functions wherever appropriate.

Currently, some of the services provided by PTOs are offered under ONP terms. These ONP offerings are additional to the ordinary offerings which remain unchanged.

In future, the remaining current services which are still being offered under non-ONP terms would gradually be offered under ONP terms. At some stage, a point should be reached at which all current non-ONP services would be offered under ONP terms, and, therefore, the PTOs would be able to market a complete range of ONP services in addition to their ordinary offerings. New services introduced at this time would be offered under ONP terms.

Given the situation that network infrastructures differ in the EEC countries, and that there are, at present, different reserved services in such countries and that the evolution of the networks will not be uniform over time, ONP implementation has taken this into account and, therefore, a certain degree of flexibility in the introduction of the different countries of the EEC is allowed.

The areas of reserved services and competitive (non-reserved) services are shown in Figure 2.

2.2 The ONP trilogy

ONP offerings can be defined in terms of:
- technical interfaces;
- usage conditions;
- tariff principles.

These are typically "interlinked" and may differ from the equivalent conditions for previously existing offerings. In some cases previously existing technical interfaces are adopted, having different usage conditions and tariff principles.

ONP offerings are intended to meet the specific needs of providers of non-reserved services and to define the technical interfaces together with the stipulated usage and tariff conditions.

The terms and conditions that are applied to ONP offerings are aimed at ensuring a large degree of "openness"* for these offerings. As it is foreseen that PTOs will retain their existing offerings for some time, ONP will provide an additional range of choice for the telecommunication users, suited, in particular to Service Providers.

* "Openness" in this context means well-defined and published conditions of supply and usage for the services offered at the network termination points.

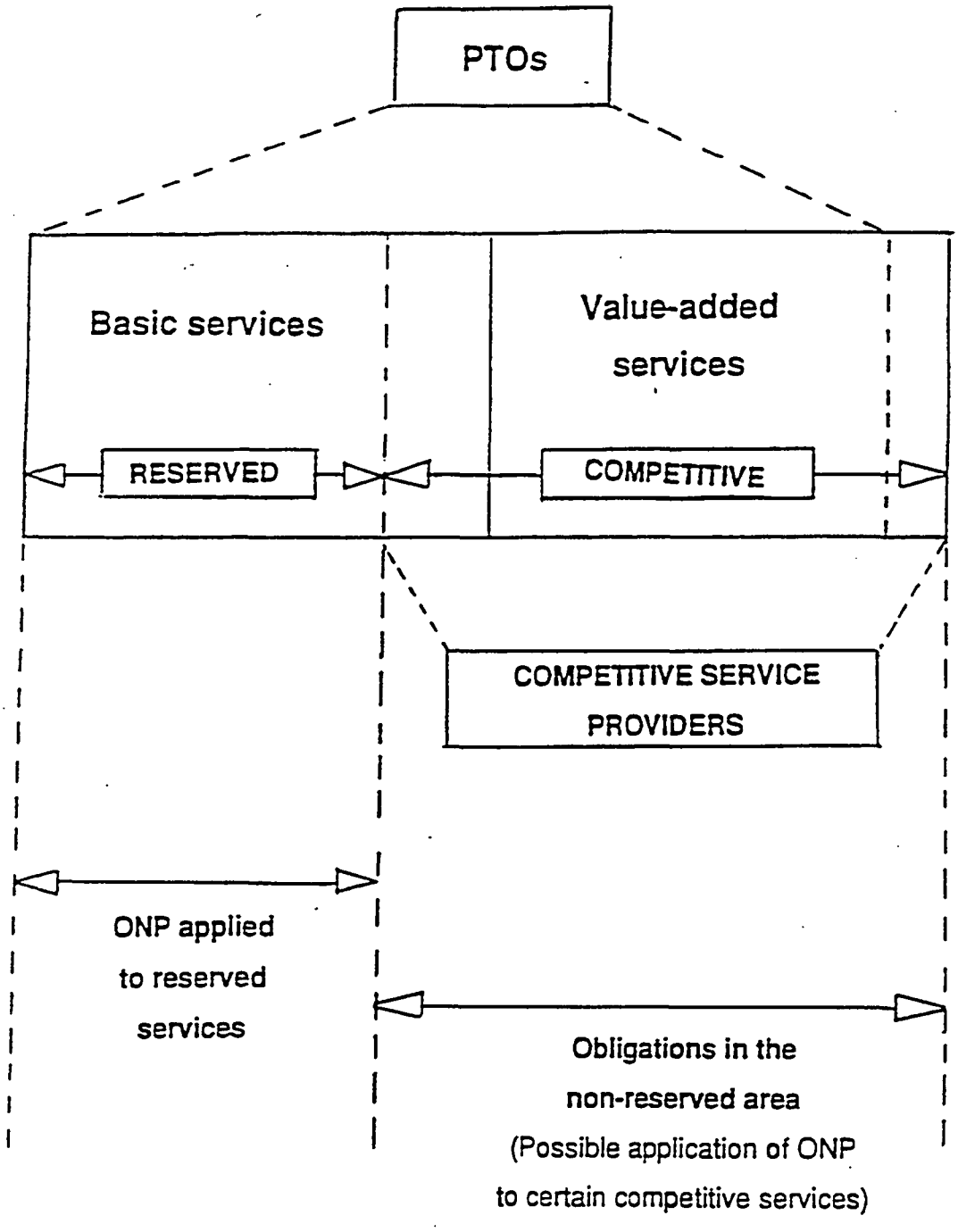


FIGURE 2

ONP from the regulatory viewpoint

The telecommunication users, therefore, have a choice: either to continue to use leased lines and switched services under the already existing terms and conditions (and, thus, retain, for example, existing interconnection constraints); or to use ONP offerings.

The usage conditions and tariff arrangements that apply to ONP offerings are such that they tend to make these lines attractive, in particular to Service Providers. Even so, it is anticipated that not all Service Providers in all circumstances will find ONP offerings attractive.

It is expected that only a proportion of users would adopt ONP offerings and that many users will continue to use already existing PTO's offerings (and, thus, will retain existing technical interfaces, usage conditions and tariffs).

The availability to the users of this choice between ONP offerings or already existing offerings would have an impact on the size and planning of the network elements and the marketing approach of the PTOs.

The introduction of ONP offerings is ensuring that there is uniformity in the usage conditions and tariff principles and that the technical interfaces are, as far as possible, common throughout the EEC countries.

This permits Service Providers to provide their services in a manner that allows free and fair competition between all operators. By this means, ONP could stimulate the development of value-added services throughout the EEC and, in particular, the development of pan-European value-added services.

3. The reference framework for ONP

3.1 The scope of the reference framework

The EEC Green Paper on the development of the common market for telecommunication services and equipment initiates a new action line on ONP* :
"Common definition of an agreed set of conditions of Open Network Provision ("ONP") to service providers and users

Working out in common the principles of the provision of the network to competitive service providers is a necessary requirement for a Community-wide competitive market for terminal equipment and for competitive services, including, in particular, value-added services, if a long period of case-to-case decisions is to be avoided.

This concerns, in particular, the definition of clear Europe-wide network termination points, usage conditions and tariff principles and availability of frequencies where relevant."

In this Appendix, a general approach to this concept is outlined by specifying criteria and attributes for Europe-wide technical interfaces (at appropriate network termination points), usage conditions, and tariff principles.

* Chapter X, Section 4.2 - Initiation of new action lines.

These criteria and attributes form together the **reference framework** for ONP.

The general principles in the reference framework must, in turn, be applied to the reserved offerings of the PTOs for which Open Network Provision is implemented, and it may lead to necessary obligations for non-reserved services offered by PTOs or Service Providers.

ONP, therefore, has introduced a new way in which existing or new services can be offered.

The areas to which ONP has been applied, or is in the process of definition, are:
- leased lines;
- a range of switched services:
- telephony;
- circuit-switched data;
- packet-switched data;
- ISDN.

In the future, the scope of ONP may be extended to certain services, which might have the character of a basic service (e.g. mobile services) and for which PTOs or competitive Service Providers could hold a dominant position in the market place.

Subject to further study, ONP could be applied to new types of access to the network, such as access, under certain conditions, to the circuits connecting subscriber premises to the public network exchange ("data over voice") and access to the network's new intelligent functions, according to progress on definition and technological development.

3.2 Criteria and attributes in the reference framework

In the following sections, the criteria and attributes that have been considered in the ONP reference framework will be presented.

3.2.1 Technical interfaces

Telecommunication services traditionally have been offered by telecommunication entities entrusted with the provision of undifferentiated services (telephony, telex) to the general public. In doing so, they have had to ensure global end-to-end compatibility. Throughout the world, these traditional services are now well-established and correspond to basic needs. It is clear that such global compatibility has not been achieved through an ad hoc approach; it has been made possible through agreements reached within the ITU which have been implemented by each entity.

The provision of new services will cover a much larger spectrum and it might not be possible to aim for global compatibility for many of them. However, some new services, such as mobile telephony, paging, or EDI (electronic data interchange of documents) have already been singled out as requiring wide compatibility. Other services will appear which might call for compatibility in order to ensure open communication of data and information.

In cases where compatibility is required, the reference to international standards provides not only a sound basis for resolving problems, but also facilitates an extension to global compatibility under competitive conditions, through the use of interfaces which are publicly available and agreed on the basis of a consensus between all interested parties.

The ONP concept emphasizes international standards, and transparency for technical interfaces. In addition, interoperability - which implies a certain amount of standardization - is emphasized in appropriate cases.

These considerations relating to compatibility naturally do not exclude the development of innovative applications and the provision of services which are mainly of local interest or are limited for the time being to private networks or closed user groups. On the contrary, the use of international standards for communications and transport functions will facilitate the rapid introduction of new services which can accelerate future integration of networks and services markets, thus increasing trade.

3.2.1.1 EEC-wide uniformity

Under certain circumstances where no EEC-wide standard for an interface to be adopted under ONP is available, the appropriate standardization bodies are requested to elaborate such an interface within a given time-frame. When existing national interface standards are utilized by PTOs, these are published throughout the EEC, in accordance with the existing EEC legislation in this field, aiming to prevent the introduction of new national regulations potentially impeding intra-EEC trade.

3.2.1.2 Evolution from the "traditional" offerings

For ONP offerings the following scheme has been taken into account for the definition of technical interfaces at the network termination points:

a) for existing services, existing interfaces have been adopted. Enhancement of such interfaces have been considered for additional capabilities;

b) for entirely new services, existing interfaces should also be adopted when suitable. When existing interfaces are not suitable, then enhancements, or a new interface, will have to be specified;

c) for services and networks that are yet to be introduced, but for which the standardization programme has already commenced, ONP requirements should be taken into account when specifying new interfaces. ONP requirements will be, whenever possible, in line with the ongoing work on TSB and ETSI Recommendations.

3.2.2 Usage and supply conditions

Under ONP, it is foreseen that the provision of public networks and certain public services will comply with a number of basic principles. For example, conditions of supply must be transparent, non-discriminatory and must guarantee equality of access. Moreover, conditions must be based on objective criteria, which means, for example, that costs and tariffs for a service must be fairly related, in order to prevent misuse of a dominant position.

The usage conditions should not restrict the access to public networks or public services, except where such conditions are based on essential requirements, namely:

- security of network operations;
- maintenance of network integrity;
- interoperability of services, in justified cases;
- protection of data (e.g. confidentiality of information, protection of personal data, privacy, etc.).

No additional restrictions are allowed, except those which may be derived from the exclusive or special rights.

The limited set of usage conditions for public networks and services, based on essential requirements, are applicable both to PTOs and Service Providers.

In the ONP context, the usage conditions which apply EEC-wide to the basic offerings of PTOs have been reconsidered.

The common usage conditions have been studied for including a set of attributes such as:

- maximum provision time (delivery period);
- minimum contractual period;
- quality of service, where commercially viable and if requested by the users.

Some examples are:

- availability (as defined in the relevant specifications, for example of the TSB);
- repair time;
- mean-time to repair, and
- transmission quality (if applicable);
- conditions for resale of capacity (the retention of a prohibition of simple resale for voice is recognized, for the time being, as being necessary for safeguarding the financial viability of PTOs;
- conditions for shared use of network capabilities;
- conditions for interconnection with public and private networks.

3.2.3 Tariff principles

Common tariff principles have been recognized as a major issue in the concept of ONP.

Under the ONP concept, tariffs must be cost-oriented. Implementation of cost-oriented tariffs will be a gradual process, owing to the present imbalance in tariffs which exists; abrupt change would endanger the public service mandate of the PTOs as a consequence of reduced revenue.

ONP tariff principles should aim at encouraging private offerings that add genuine value to the basic offerings of the PTOs, while at the same time discouraging privately offered services that, in effect, only duplicate these basic offerings. Cost-oriented tariffs are expected to reduce the incentive to resell basic offerings.

The application of ONP concept to leased lines is presented below, as far as tariffing principles and cost-accounting is concerned, as defined in the EEC Council Directive 92/44 of 5 June 1992. Article 10 of such directive states:

"1. Member States shall ensure that tariffs for leased lines follow the basic principles of cost orientation and transparency in accordance with the following rules:

a) Tariffs for leased lines shall be independent of the type of application which the users of the leased lines implement.

b) Tariffs for leased lines shall normally contain the following elements:
- an initial connection charge;
- a periodic rental charge, i.e. a flat-rate element.

When other tariff elements are applied, these must be transparent and based on objective criteria.

c) Tariffs for leased lines apply to the facilities provided between network termination points at which the user has access to the leased lines.

For leased lines provided by more than one Telecommunications Organization, half-circuit tariffs, i.e. from one network termination point to a hypothetical mid-circuit point, can be applied.

2. Member States shall ensure that their telecommunication organizations formulate and put in practice, by 31 December 1993 at the latest, a cost-accounting system suitable for the implementation of paragraph 1.

Without prejudice to the last subparagraph, the system referred to in the first subparagraph shall include the following elements:

a) the costs of leased lines shall, in particular, include the direct costs incurred by the Telecommunication Organizations for setting up, operating and maintaining leased lines, and for marketing and billing of leased lines;

b) common costs, that is costs which can neither be directly assigned to leased lines nor to other activities, are allocated as follows:

i) whenever possible, common cost categories shall be allocated based upon direct analysis of the origin of the costs themselves;

ii) when direct analysis is not possible, common cost categories shall be allocated based upon an indirect linkage to another cost category or group of cost categories for which a direct assignment or allocation is possible. The indirect linkage shall be based on comparable cost structures;

iii) when neither direct nor indirect measures of scoots allocation can be found, the cost category shall be allocated based upon a general allocator computed by using the ratio of all expenses directly assigned or allocated to, on the one hand, services which are provided under special or exclusive rights and, on the other hand, to other services.

After 31 December 1993, other cost-accounting systems may be applied only if they are suitable for the implementation of paragraph 1 and have, as such, been approved by the National Regulatory Authority for application by the Telecommunications Organization, subject to the [EEC] Commission being informed prior to their application.

3. The National Regulatory Authority shall keep available, with an adequate level of detail, information on the cost-accounting systems applied by the Telecommunication Organizations pursuant to paragraph 2. It shall submit this information to the Commission on request."

OPEN NETWORK ARCHITECTURE (ONA) - THE UNITED STATES CONCEPT

Note 1 - Consideration similar to the one expressed in the Note in Annex 6 applies also to this annex.

Note 2 - The information contained in this annex is not up to date. Consequently, it must only be considered as a preliminary draft and will be revised when preparing the final version of the African Green Paper.

ANNEX 7
(page 2)

OPEN NETWORK ARCHITECTURE (ONA) - THE UNITED STATES CONCEPT

Introduction

The Open Network Architecture (ONA) concept was born in the United States' regulatory environment and in the wake of the public comments starting with the Computer III Notice of Proposed Rulemaking (released 16 August 1985).

The main issue under consideration all along, the Computer Inquiry III process, was to remove structural separation imposed on AT&T and the Bell Operating Companies (BOCs) by Computer II decision and to replace it by non-structural safeguards. ONA is one of these safeguards. Others are the interim concept of Comparably Efficient Interconnection (CEI), allocation of joint and common costs, disclosure of network information and access to "Customer Proprietary Network Information".

Regulatory situation in the United States before Computer III Report and Order (released 16 June 1986)

Under Computer II regulation, all services were divided into basic transmission services, enhanced services and the supply of terminal equipment (Customer Premises Equipment - CPE).

The Bell Operating Companies had a regional monopoly on the first category, and their tariffs were regulated. They could not offer other services, except through structurally separated subsidiaries.

At the same time, by the terms of the Modified Final Judgment (MFJ), they were excluded from providing:

- inter-exchange telecommunication services;
- information services;
- international telecommunication services;
- manufacturing of equipment;
- customer premises equipment (CPE);
- any other product or service that is not a natural monopoly service regulated by tariff.

In practice, upon court approval of a specific waiver, BOCs were allowed to offer one or another of the so-called enhanced services.

Relief from structural separation requirements

The costs of Computer II structural separation were very high. Under Computer II rules, AT&T and the BOCs actually had to separate offices, to maintain separate accounting books, to employ separate personnel for operation, installation and maintenance, to undertake its own marketing, including all advertising, to deal with any affiliated manufacturing entity on an arm's length basis and to utilize separate computer facilities in the provision of any enhanced services. The subsidiaries were prohibited from owning any network or local distribution facilities and equipment and from providing any basic services.

Thereby, these requirements made it impossible for AT&T and the BOCs to offer services which combine, even partly, the functions of transmitting and switching of information with the functions of storing, converting and processing information.

However, with the technological developments towards digitalization, the technical boundary lines between telecommunications, electronic data processing and office equipment functions have disappeared. Therefore, the traditional regulatory boundary lines between voice, text and data, or between transferring information and storing, converting, processing information, do not make sense today.

Therefore, all regulatory steps to find clear definitions for, or to establish boundary lines between, "basic telecommunication services" and "value-added telecommunication services" could not be successful because of these technical trends.

Thus, the costs of structural separation stifled innovation and was an obstacle to exploiting the advantages of technical integration of new services, which were both technically and economically possible. It led to duplication of facilities and an ineffective waiver process.

Instead of structural separation, non-structural safeguards were proposed as being best suited to the United States' competitive telecommunication markets, to directly address the discrimination problem and to focus on cross-subsidization.

Aims of ONA requirements

ONA and other non-structural safeguards are designed:

to promote the efficiency of the telecommunications network by permitting the technical integration of basic and enhanced services;

to preserve competition in the enhanced services market, through the control of potential anti-competitive behaviour by dominant carriers.

Under ONA, dominant carriers have to provide features to other enhanced services providers with the same availability and efficiency that they provide themselves in their offering of enhanced services.

ONA general principles

Open Network Architecture plans have to be built on two general principles:

"equal access", which was first imposed by CEI requirements;

"unbundling".

Under CEI requirements, dominant carriers must provide interconnection opportunities to others on "equal access" basis. This decision requires the basic services functions including technical specifications, functional capabilities and other quality and operational characteristics such as installation and maintenance time, to be equal to these provided in the carrier's own enhanced service offerings.

The equal access principle aims to prevent undue exploitation of the dominant position by control of bottle-neck or discriminatory practices.

Under ONA requirements, a dominant carrier "must unbundle key components of its basic services, regardless of whether its enhanced services utilize the unbundles components. These components, such as trunk side interconnections, may utilize subcomponents that are themselves offered on an unbundled basis, such as separate channel signalling ...".

"Unbundled basic service building blocks" (basic service elements - BSEs) must be offered to all others on a tariffed basis.

These BSEs will be developed by carriers themselves with input from the whole industry, through ONA forums proposed by the FCC. ONA forums are taking place, organized by Bellcore, on a nationwide basis, and by the Regional Bell Operating Companies (RBOCs), on a regional basis.

Steps towards implementation of ONA

AT&T and the RBOCs filed their ONA plans on 1 February 1988. These plans describe their compliance with Computer III requirements and list their initial set of Basic Service Elements. The plans will be subject to public comments and FCC approval.

Therefore, definitions of a set of BSEs is the first step towards implementation of ONA. The FCC directed the RBOCs to develop the initial set of BSEs with enhanced service competitors participation through an ONA Forum (ONAF 2 on 30 March - 2 April 1987), where the RBOCs collected requests from enhanced services providers and other users.

The BSEs filed on 1 February 1988 have to be implemented within one year of acceptance of the filing by the FCC. Consequently, in practice, it is expected that BSEs will only be specified for existing networks (i.e. they will be largely based on voice services).

Each RBOC has to file his own ONA plan. The problem of producing a nationwide uniform plan has not yet been solved, and it is expected that different plans will be filed.

ONA plans must meet CEI parameters and other CEI requirements.

CEI parameters deal with:

- interface functionality (standardized hardware and software interfaces);
- unbending of basic services;
- resale environment;
- technical characteristics;
- installation and maintenance procedure;
- unbundled end-user access;
- availability (on the same date as offering for own services);
- minimization of transport costs;
- recipients of CEI (general availability, not restricted to any class of customer).

The other CEI requirements primarily deal with pricing. This is a key issue to determine the real conditions of fair competition in the enhanced services market between the RBOCs and competitors, and to determine who will reap the benefits of integration.

CEI pricing principles distinguish distance-sensitive transmission costs, interconnection costs, traffic concentration costs and network usage costs; each of them should appear as an unbundled rate element in the RBOC's tariff. The operating companies have to set terms for tariffs and usage conditions which comply with these requirements.

After implementing an Open Network Architecture, a RBOC which wishes to offer new basic service elements must file an amendment in its first ONA plan at least 90 days prior to offering that enhanced service. If necessary, the FCC shall request public comments on the amendments.

Position of the parties on ONA

The parties involved in the United States' regulatory process are very numerous: the most important being the FCC, which initiated the process, but only the Department of Justice as regulation source at the federal level. The Public Utility Commissions intervene at the state level. Congress, the Department of Defense and the Department of Commerce gave advice and were involved to a certain degree.

On the side of the operating companies, there are the RBOCs and the independents at the local level, AT&T and its competitors in the long-distance market, and all the resellers.

Enhanced services providers and information service providers are the third category of parties involved.

Then there are the telecommunication and computer manufacturers and finally the end-users, the largest of them being very important participants.

The FCC

The FCC, which initiated Computer Inquiry III, supports ONA in the following terms (Computer Inquiry III, Report and Order):

"ONA is the key to developing the enhanced services marketplace in a pro-competitive way by permitting the exchange carriers to offer these services in an integrated manner and at the same time assuring that other service provider companies can utilize the basic network capabilities on comparable terms and conditions."

"We require each carrier to develop an initial set of key basic elements that can be used in a wide variety of enhanced services. We would expect such a set to contain unbundled basic services functions that could be commonly used in the provision of enhanced services to the extent technologically feasible."

The Department of Justice (DOJ)

The Department of Justice's view of ONA is very similar: (Judge Greene's Opinion and Order regarding proposed modification of the MFJ - 10 September 1987.

"ONA permits all would-be providers of competitive service, including the company that presently holds the bottle-neck monopoly, to provide service on the basis of relatively equal costs of interconnection to the bottle-neck."

Nevertheless, in his decision of 10 September 1987, Judge Greene rejects most of the proposed modifications to the MFJ. His main reason is that there is no sign that the RBOCs can prove that the line-of-business restrictions in the MFJ should be lifted because there is "no substantial possibility" for them to misuse their monopoly power in the inter-exchange service markets.

Under this decision, the RBOCs are still excluded from the information services market. They should only transmit "information services", but are still barred from setting up their own information services. They are permitted to offer protocol conversion and enhanced services, but cannot enter the inter-exchange market.

The RBOCs

The Regional Bell Operating Companies accept ONA as a new concept by which they hope to achieve the following targets:

- Relief from current line-of-business restrictions, which prohibit the RBOCs from providing enhanced services except on a structurally separate basis.
- Identification, development and stimulation of new markets and market opportunities.
- Increased profits and improved earnings by maximizing the utilization of the basic network infrastructure.
- Maintain their existing revenue base.
- Minimize by-pass.

In a general sense, ONA is viewed as a trade-off between the openness of the network of the entry in the enhanced services market.

AT&T

In the view of AT&T, from the beginning of the process, the requirements imposed on it by CEI and ONA are unnecessary, inappropriate and the cost involved will outweigh the benefits of being allowed to integrate enhanced services.

AT&T argue that it is already in a competitive environment and is, by its nature, motivated to serve all enhanced services providers.

AT&T filed a "Petition for Reconsideration". A Reconsideration Order (March 1987) modified CEI/ONA requirements for AT&T. It will only have to file service specific CEI plans, to offer transparent transport critical to national ONA uniformity and to consult with RBOCs for transport of BSEs.

Services providers and end-users

(Views of the "coalition of ONA parties", CONAP)

These views are interesting as they represent a quite complete comment on ONA issues.

For services providers and end-users, the basic goal of the ONA plan should be to ensure the widespread availability of network functions that are, or should be, integral to the national common carrier telecommunication networks. Currently, network functions are "bundled" by end-user tariff services.

Enhanced services providers (ESP) normally do not need these bundled functions of the network, but require single elements of services, which are called Basic Service Elements (BSE). Recognizing that excessive granularity in the definition of unbundled network functions may have the effect of increasing the aggregate cost of providing all network services and functions, any BSE structure must be based on a reasonable balance between the goals of maximum availability of network functionality and overall network efficiency.

In this context, CONAP propose that the following specific principles should underlie any ONA plan:

- National uniformity extended to administrative procedures, tariff structures, ordering, installation, testing, maintenance of services and functions.
- Neutrality of access to ensure that no one, including the RBOCs, should be afforded pre-emptive control of any entry point or gateway.
- Demand for unbundled network functionalities. The RBOCs must propose a specific process of determining when, and under what circumstances, an expressed desire for a given network functionality will be translated into the offering of one or more BSEs to provide that functionality.

Conclusions on ONA developments in the United States

The following tentative conclusions can be drawn concerning the ONA developments in the United States:

- ONA will be a continuous process which will be strongly influenced by the technical developments in the existing networks, e.g. the development towards ISDN.
- The integration of enhanced services functions in modern exchanges will not be hindered by ONA, despite the demand for "neutrality" of technical interfaces for all providers of value-added services (i.e. RBOCs, ESPs and all other users).

- The demand-oriented policy of individual RBOC ONA plans raises the problem of standardization for nationwide or global uniformity.
- The "fair competition" in the value-added services market will only be expressed by non-technical means (e.g. tariffs and usage conditions).
- The next step for ONA studies is now 1 February 1988, when real ONA plans are available and open for public comment.

MODEL CHECKLIST FOR A DETAILED DIAGNOSIS OF AGENCY MANAGEMENT

a) General organization and relations with the authorities

Does the telecommunications operating entity have adequate autonomy, is it separated from the postal service, does it operate on a commercial basis, and is it given appropriate medium- and long-term sector objectives or guidelines relating to access to service, quality of service, finances, tariff policy, etc.?

b) The information system and human resource management

Does the operating entity have an adequate management information system which facilitates effective and responsible control of current operations and financial affairs, and long-term planning and programming? Are the statistics collected on traffic, faults, equipment performance, management efficiency, etc., adequate?

Are there management control or coordination problems among departments, divisions or units? Do adequate procedures exist for maintenance, testing and checking on the quality of work performed?

Are there enough qualified professionals, managers, technicians and accounting officers?

Are job descriptions adequate at all levels?

Can the existing staff cope with the additional responsibilities for implementing an expansion programme and managing the expanded entity? Are staff salaries adequate to retain qualified staff? Are policies relating to staff advancement and promotion appropriate, are the accompanying rules and regulations sufficiently flexible, and are incentives for staff achievement built into the system? Are general staff levels excessive? What use is made of expatriates, of consultants? Are present arrangements satisfactory, suitable for an expanded workload? Is technical assistance needed in the short run?

Does management make an adequate public relations effort to keep the public informed of major developments and to develop outside public support for the sector?

c) Planning

Is economic analysis of the telecommunications development needs of both urban and rural areas carried out, and are the results of such analyses adequately conveyed to finance and planning ministry officials? Are the telecommunications development plans closely coordinated with governmental development plans and programmes in other sectors, and with private development? Do updated national numbering, charging, switching, signalling and transmission plans exist? Are they judged to be sound in light of the country's requirements and its technological and financial resources? Do regional development plans exist? Are there physical development plans for the capital city and major metropolitan areas? Are the service targets reasonable given current service levels and countrywide goals for access and quality of service? Do they reflect a proper balance in development of service and in service priorities? Is there adequate coordination between exchange equipment and external plant works? Are the costs of various works reasonable? Are civil works preparation a bottleneck?

Have the major works been subject to economic comparison of alternatives (coaxial cables versus microwave for a major trunk bearer)? Is the discount rate appropriate? Does it reflect capital scarcity?

Are there plant practices that specify the forward provisioning periods for the various classes of plant, e.g. main, secondary and tertiary distribution cable, junction cable, exchange equipment, multiplex equipment? Are the provisioning periods judged to be reasonable with regard to growth rates, availability of capital, prevailing plant costs and labour rates?

d) Accounting system

Is the accounting system on a commercial basis, and if relevant, are telecommunication accounts kept separate from postal accounts?

Is the commercial accounting system adequate to keep management informed and permit it to foresee trends and possible problems? Are there adequate internal financial controls (control of cash receipts and payments, inventories, plant requirements and sales of property and related materials, etc.)?

Is the costing or cost control system adequate? What are the accounting practices being followed and are there any problems relating to depreciation, the transfer of plant investment from "under construction" to "in service", the handling of foreign exchange losses, bonuses, etc.? Are pension funding arrangements adequate? Are there adequate procedures for writing off bad debts?

e) Billing and collection

Are billing arrangements satisfactory? What is the billing cycle and is the accounts receivable position satisfactory in terms of length of the billing cycle? Could billing be expedited through increased mechanization or computerization? What would this cost and what would it save in time and cash-on-hand? How are collections made? Are there disputed account problems and how can these be resolved? Are there satisfactory procedures for disconnections of nonpaying subscribers, including government?

f) Inventories and stores

Is the inventory or stores control system satisfactory? Are inventory levels satisfactory? Is there an adequate system for timely replenishment of inventories, for checking whether turnover is reasonable in relation to the scale of operations, and for identifying and disposing of obsolete material?

g) Training [see also section below on human resource management]

Have personnel development policies and practices been recently evaluated in the light of current and forecast requirements of the operating entity and of the sector?

How do training programmes and facilities compare to needs? Has this topic been adequately examined by national or international agencies or experts (ITU, consulting firms)? What action might be initiated to deal with any personnel shortages likely to affect current or future development within the sector?

h) Audit

Are present arrangements for external and internal audits satisfactory? Are the nature and extent of the audits appropriate? Is there any reason for questioning the independence of the external auditors, the adequacy of the qualifications and experience of the personnel conducting the audit, or the adequacy of the procedures followed?

Do the audit reports contain all the financial statements and supplementary information needed for analyses and comparisons? Does the external auditor systematically advise management of weaknesses identified in the accounting system which should be improved? When used, is government audit adequate or should it be supplemented by other audit arrangements? What is a reasonable period for submission of audited financial statements? Are internal audits and inventories undertaken systematically? Are internal audit programmes adequate? To whom does the internal audit section report?

i) Tariff policy and financial plans

Does the telecommunications operating entity generate sufficient resources from users of telecommunication services to cover operation and maintenance costs, debt and interest payments, and to generate a sufficient return on assets to attract needed capital, and to cover a reasonable proportion of the costs of future system expansion from internal cash generation? What is the expected percentage of internal cash generation over the next three to five years? Is it satisfactory? Is the amount of net internal cash generation influenced significantly by the capital structure and terms of debt financing (unusually low or high debt/equity ratios, easy or harsh debt repayment terms, use of supplier credits)? If the percentage of self-financing for capital requirements is below 35 or 40%, is it acceptable in view of the magnitude of the work programme, recent tariff action, expected tariff revisions, and/or expected level of internal cash generation after work programme completion when the full revenues from the work programme are realized? Are there special factors such as taxes, bonuses, dividends or other payments to government, or exceptional customs duties which are depressing the percentage of internal cash generation? In excess demand situations, is some form of price rationing used to encourage business and government priority access or usage? Is peak period call pricing (local or long-distance) or toll ticketing practised? Do long-distance charges increase too rapidly with distance? Is access cheaper in non-urban areas? Do tariffs for specific types of service reflect the cost of those types of service? Are any deviations from pricing according to the cost of service justified on grounds of promoting a more efficient or equitable usage of, or access to service? Are telecommunication tariffs used partly for general government taxation purposes, or to subsidize postal services, etc.? What are the present implications of this and what are the longer term goals?

METHODS OF GRANTING LICENCES. RENEWAL

Excerpt from the ~~December 1993~~ March 1996 draft of "The Blue Book"
TELECOMMUNICATION POLICIES FOR THE AMERICAS

Interamerican Telecommunications Conference (CITEL)

Telecommunication Development Bureau (BDT)

International Telecommunication Union (ITU)

ANNEX 8
(page 2)

METHODS OF GRANTING LICENCES. RENEWAL

1. Need for licences

The use of the frequency spectrum requires the issuance of licences. Depending on the legal framework of each country the terms authorization, permission, concession, franchise, etc., can be used together with or instead of the term licence. The rationale for the need of a licence before a station is constructed or starts operation is:

a) the frequency spectrum and the geostationary satellite orbit are scarce natural resources;

b) not everyone wanting a radiocommunication channel can get it;

c) to be meaningful, radiocommunications operations should be free from harmful interference;

d) even in cases of wire communications, public interest considerations may, and in many instances effectively do, impose the need of a licence to build and operate a station, a system or a network.

2. Licensing process

The following steps normally could be followed in a process to select a service provider (licensee):

(I) public announcement that the Regulatory Organ will start a process to select a licensee to provide a given telecommunications service. The Organ will announce the service area, the technical parameters involved, the technical, legal and financial requirements applicable, etc.

(II) every interested party will have a reasonable period of time to apply for the provision of the service;

(III) the Regulatory Organ, applying the appropriate means of selecting the licensee, will announce the winner;

(IV) every interested party shall have the right to appeal the decision, in case it finds the result unfair or unjust, directly to the Regulatory Organ or to a superior body. Judicial remedy should also be a permissible redressing tool. It should be permissible to address appeals with respect to the Regulatory Organ's procedural measures as well as with regard to deficiencies in the applicant's technical, legal and financial qualifications.

3. Methods of granting licences

The following methods of granting a licence can be used:

a) comparison

b) lottery

c) auction

d) first come, first served
e) open entry
f) a mixture of one or more of the above

The method best suited for a given circumstance depends on a number of elements, including:

a) number of applicants
b) number of licences to be granted
c) type of service
d) degree of complexity of the subject
e) cost and time consumed to examine each application
f) economic and social environment
g) status of existing licensees

3.1 Comparative method

The comparative method consists in an evaluation of the relative merits of each applicant. It is, on the one hand, the most time consuming method, and, on the other, the one more likely to yield the more meritorious service provider. Historically, licences of the broadcasting services have been granted through a comparative process.

This method tends also to be the most burdensome to both applicants and the Regulatory Organ. The magnitude of this burden depends on the number of reviewing and appellate instances administratively and legally available to the interested parties.

It is also important to consider whether the Regulatory Organ will or will not allow resale or transfer of the licence, because, if so, the trouble of going through a comparative process may lose much of its attractiveness. If the licence can be transferred, the ultimate licensee may not be the person the Regulatory Organ deemed most worthy.

In a comparative procedure, it may be appropriate to grant some type of preference, if mandated by the telecommunications legislation or possibly by a public/social interest component. It may be the country's policy to foster diversity in ownership of telecommunications facilities or services, to increase participation of minorities or to give incentives and reward to innovators, including those that have created new services or technologies or have significantly improved the efficiency to the public of existing services and technologies.

3.2 Lottery

The granting of a licence in a lottery process can be, in certain cases, a simple matter to both the applicants and the Regulatory Organ. To maximize the benefits of this method the required initial applications should be restricted to essential information, and only the selected applicant should provide the regular and complete set of information. The burden imposed by this method tends to be much lighter than that of the comparative method.

The lottery seems to be particularly suitable for situations where a great number of applicants exist and there is a great number of licences to be granted. Situations such as these have occurred in the introduction of some new services (e.g., cellular mobile).

One problem with a lottery is that the Regulatory Organ may be faced with a large number of speculative applications, due mainly to the simplicity of preparing them. This phenomenon is known as "application mills"; applications can be easily copied or a specialized firm may provide them at very low costs. Ways of discouraging such speculative applications include:

a) limiting the filing window to a short period of time starting as soon as possible after its announcement;
b) setting appropriate filing fees;
c) setting conditions for resale of licences.

One drawback of a lottery is that the best service provider may not be granted the licence, which may eventually counter the public interest. If, however, minimum appropriate conditions are established by the Regulatory Organ in order to guarantee a satisfactory service, such a drawback may be greatly minimized.

The question of giving preferences is also relevant with lotteries. As mentioned in section 8.3.1. above, a preference could eventually be granted to achieve a greater diversity in telecommunications control, to minorities or to innovators. The system of preferences shall be clearly enunciated before the selection procedure is initiated.

3.3 Auction

Apart from the administrative advantages of a lottery, the auction method has the feature of causing the licence to be granted to the one who values it most. The drawback could be the risk that financial power would be the prime element in the selection of the licensee. While auction may, in principle, make it more difficult for smaller firms to get licences, this will ultimately depend upon the ease with which financing could be obtained in the capital market.

The auction can be conducted through a sealed bid or through an oral bid. The sealed bid is both simpler to administer and less subject to manipulation: in cases where there is only one bidder it is likely to promote higher bidding values. The need to set a minimum permitted bid is more clear in case of oral bid. There are several ways of setting the payment of the value bid. It may be cash (one payment); it may be paid by installments during the timespan of the licence plus an up-front payment; it may involve an up-front payment plus royalties, etc.

Although the number of applications may well be inferior in comparison with that in a lottery scenario, there could still be frivolous applications. One way of preventing this would be to require a convenient deposit which would be refunded to losing bidders while the winner's refund would be subject to certain pre-established conditions.

3.4 First come, first served

This method consists in granting the licence to the first applicant who is legally, financially and technically qualified. This method can be applied, for example, when the available amount of spectrum exceeds the corresponding demand. Probably, this is the simplest and least burdensome of all licensing methods.

3.5 Open entry

The open entry method is very similar to the first-come, first-served process. All parties which have submitted their application within a given time period (window) and which have been found legally, financially and technically qualified, are entitled to a license. If the applications are mutually exclusive they may be required to coordinate, or the Regulatory Organ may assign convenient channels (or orbital positions, if appropriate).

4. Renewal of licences

In general terms, many procedures adopted to award initial licences likewise apply to renewals. Possibility of effective public participation, transparency, objectivity and predictability are important elements of a renewal proceeding.

In considering whether or not to renew a licence the Regulatory Organ basically has two alternatives:

a) either it examines the past performance *per se* of the incumbent licensee together with its plans for future operation, or
b) it compares an incumbent licensee with a challenging applicant, taking account, *inter alia*, of their promises, and the past performance record of incumbent.

In many cases the examination of the past record *per se* may provide enough public/social elements for the Regulatory Organ to decide on the renewal of a licence.

An advantage of permitting competing applications in a renewal process is the incentive provided to the incumbent licensee to perform well. On the other hand, careful consideration is needed in order not to disrupt an entire industry by simply comparing concrete past performance with mere paper promises. The renewal expectancy concept may be a balanced instrument to warn the incumbent that he may face competition in the renewal process but he will have its licence renewed if he has performed well.

The justification for a renewal expectancy is three-fold:

1) there is no guarantee that a challenger's paper proposals will, in fact, match the incumbent's past performance. Thus, not only might replacing an incumbent be entirely gratuitous, but it might even deprive the community of an acceptable service and replace it with an inferior one;
2) licensees should be encouraged through likelihood of renewal to make investments to ensure quality service. Comparative renewal proceedings cannot function as a "competitive spur" to licensees if their efforts to provide good service and their dedication to the community is not rewarded;
3) comparing incumbents and challengers as if they were both new applicants could lead to a haphazard restructuring of the concerned industry.

The weight to be awarded the incumbent's past performance may vary from service to service. In broadcasting, for example, the Regulatory Organ may well establish that an incumbent rendering minimal service would receive no preference. The strength of the

expectancy depends on the merit of the past record. Factors such as integration of owners and managers with local community and ownership diversification should have lesser weight *vis-à-vis* the preference arising from substantial past service (of course, integration and diversification are fundamental factors in granting initial licenses). A superior past performance should enable incumbent the renewal of its licence regardless of competing applications.

In the case of cellular, for example, a licensee would receive renewal expectancy if it:

1) substantially used the frequency spectrum associated with the licence for its intended purpose;
2) substantially complied with rules, regulations and policies; and
3) had not otherwise engaged in substantial relevant misconduct.

It is logical that even incumbents who have been awarded initial licences through lottery will not be subject to a renewal proceeding using lottery again; rather, renewal would take account of past performance *per se* or in comparison with challengers with or without consideration of renewal expectancy.

It has to be noted that the concept of renewal expectancy is not aimed at serving the interests of licensees, but rather the interests of the public.

METHODS OF GRANTING AND RENEWING LICENSES

Need for Licenses

The use of the frequency spectrum requires coordination, virtually always within the framework of international agreements on the allocation of bands for specific uses and national decisions on the assignment of those bands to users. National coordination usually involves administrative authorization for the use of frequencies, in the form of license, concession, permission, authorization or franchise, which for the purposes of this chapter we shall refer to globally as "license".

The rationale for licensing spectrum use is:

a) the frequency spectrum and the geostationary satellite orbit are scarce natural resources;

b) not everyone wanting a radiocommunication channel can get it;

c) to be meaningful, radiocommunication operations should be free from harmful interference;

In cases of installation or operation of telecommunication facilities not using the radio spectrum, there may be other public interest considerations that justify the requirement for a license to build or operate a station, system or network. For example, in the case of the public switched telephone network, there frequently is a strong public interest in assuring the continued operation of the network on a non-discriminatory basis. A license requirement would allow the Regulatory body to ensure that the public needs are met.

Of the criteria for granting licenses to service providers (irrespective of the medium used to provide the services), mention may be made of the need for control over entry to the market, thus guaranteeing minimum levels of suitability and capacity, and the need for subsequent control of services provision. In all cases, the license to provide a service is often linked to frequency assignment. In this chapter, we shall analyze the procedures for granting licenses. However, when spectrum scarcity is not a concern and where unlimited entry is possible and a fully competitive market is to be encouraged, individual licenses may not be required. A simple registration or class license could be sufficient.

Licensing Process

The following steps normally could be followed in a process to select a service provider (licensee):

i) public announcement that the Regulatory body will start a process to select a licensee to provide a given telecommunications service. When it does not submit guidelines for prior consultation, the Body will announce the service area, the technical parameters applicable, the technical, legal and financial requirements to compete for selection, etc.;

ii) every interested party will have a reasonable period of time to apply for the license or, as appropriate, to make suggestions or hold consultations on the selection process or the service;

iii) the Regulatory body, applying appropriate selection methods , will announce who will be granted licenses;

iv) every interested party should have the right to appeal the decision, when found unjust, either directly to the Regulatory body or to a superior body. Judicial remedy - within the parameters set to define its intervention - should also be a permissible tool for redressing an injustice. Appeals should be regarded as permissible even if they question the Regulatory body's procedural measures or deficiencies arising from the evaluation of the applicants' technical, legal and financial qualifications.

Methods of Granting Licenses

The following methods of granting a license can be used:

a) comparison

b) lottery

c) auction

d) first come, first served

e) open entry

f) a mixture of one or more of the above.

The method best suited for a given circumstance depends on a number of elements, including

a) number of applicants

b) number of licenses to be granted

c) type of service

d) degree of complexity of the subject

e) cost and time consumed to examine each application

f) economic and social environment

g) status of existing licensees.

Comparative Method

The comparative method consists of an evaluation of the relative merits of each applicant. It is, on the one hand, the most time-consuming method, and on the other, the one most likely to yield the more meritorious service provider. It is appropriate only if there are true differences between applicants that are relevant to performance. In many cases, licenses of the broadcasting services have been granted through a comparative process.

This method tends also to be the most burdensome to both applicants and the Regulatory body. The magnitude of this burden depends on the number of reviewing and appellate instances administratively and legally available to the interested parties.

It is also important to consider whether the Regulatory body will or will not allow resale or transfer of the license, because, if so, the disadvantages of the comparative method will remain but without the advantages, since the license can be transferred, the ultimate licensee may not be the person the Regulatory body deemed most worthy.

In a comparative procedure, it may be appropriate to grant some type of preference, pursuant to a clear directive provided for in the legislation or for reasons of public/social interest. It may be the country's policy to foster diversity in ownership of telecommunication facilities or services, to increase participation of minorities or to give incentives and reward to innovators, including those that have created new services or technologies or have significantly improved the efficiency to the public of existing services and technologies.

A variation on the comparative method consists of the Administration establishing specific public-interest objectives (such as, population coverage, geographical coverage, speed of operation and/or tariff applicable over a given period of time), and for those applicants which satisfy the stipulated technical and economic requirements to compete against one another to see who best meets the objectives. Bids may be compared transparently and automatically by computer. This method has been used successfully in granting national licenses for mobile communications.

Lottery

The granting of a license in a lottery process can be, in certain cases, a simple matter to both the applicants and the Regulatory body. To maximize the benefits of this method, the initial requirements should be restricted to essential information, and only the selected applicants should be required to provide more detailed information. The burden imposed by this method tends to be much lighter than that of the comparative method, although very time consuming. This method is only appropriate when a comparison of the applications on the merits is not necessary or relevant.

The lottery seems to be particularly suitable for situations where a great number of applicants exist and there is a large number of licenses to be granted. This has occurred in the introduction of some new services (e.g., cellular mobile, where licenses were granted on the basis of locality).

One problem with a lottery is that the Regulatory body may - because requirements for the offers are simple - be faced with a large number of speculative applications. This phenomenon is known as "application mills"; applications can be easily copied or a specialized firm may provide them at very low costs. Ways of discouraging such speculative applications include:

a) limiting the filing window to a short period of time starting as soon as possible after its announcement;

b) setting appropriate filing fees;

c) setting conditions for resale of licenses.

A lottery will not guarantee that the best service provider is granted the license. If, however, minimum appropriate conditions for applicants are established by the Regulatory body in order to guarantee a satisfactory service, such a drawback may be greatly minimized.

The question of giving preferences is also relevant with lotteries. A preference could eventually be granted to achieve a greater diversity in telecommunications control, to minorities or to innovators. The system of preferences shall be clearly enunciated before the selection procedure is initiated.

Auction

Apart from the administrative advantages of a lottery, the auction method has the feature of causing the license to be granted to the one who values it most. One argument used against this system is that the price to be paid for the license will have a negative effect on the business plan and therefore, possibly, on tariffs or quality of service, even though in reality any negative impact of this kind will often affect profit, since with free prices and competition the values and conditions of services are set by the market. Seen from another angle, the auction system has the disadvantage of making financial power the prime element in the selection of the licensee. While auction may, in principle, make it more difficult for smaller firms to get licenses, this will ultimately depend upon the ease with which financing could be obtained in the capital market. Competitive bidding works best where there are only a limited number of authorizations to be granted. One issue is that the economic benefit will flow to the government (not private parties). The method tends to promote concentration among those with resources –other tactics will have to be employed to broaden market.

The auction can be conducted through a sealed bid or through an oral bid. The sealed bid is both simpler to administer and less subject to manipulation: in cases where there is only one bidder, it is likely to promote higher bidding values. The need to set a floor level or minimum permitted bid is more clear in case of auction through oral bid. There are several ways of setting the payment of the value bid. It may be cash (one payment); it may be paid by installments during the time-span of the licensee; it may involve an up-front payment plus payment of royalties, as a percentage of income, in kind /utilities), etc.

Although the number of applications may well be inferior in comparison with that in a lottery scenario, here too there could still be frivolous applications. One way of preventing this would be to require a convenient deposit which would be refunded to losing bidders while the winner's refund would be subject to certain pre-established conditions.

First Come, First Served

This method consists of granting the license to the first applicant who is legally, financially and technically qualified. This method can be applied, for example, when the available amount of spectrum exceeds the corresponding demand. Probably, this is the simplest and least burdensome of all licensing methods.

Open Entry

The open entry method is very similar to the first-come, first-served process. All parties which have submitted their application within a given time period (window) and which have been found legally, financially and technically qualified, are entitled to a license. If the applications are mutually exclusive, it may be necessary to coordinate among bidders, assign fewer channels to each of them, or proceed to competition using one of the other methods discussed above.

Renewal of Licenses

In order to encourage substantial investment and reliability in the provision of services, it is important for license renewal conditions to be known when licenses are granted. Many administrations have preferred to grant permanent licenses with a view to developing services and attracting strong competitors.

It is also very important, where monopolistic licenses or dominant positions are granted (this is not the case with true competition, where positions are regulated by the market), to set reasonably short intervals and clear guidelines for review of the terms. To realize this, one only need look at the radical, dramatic changes which have taken place in the sector in such a short pace of time. The elements considered under this heading refer to renewal of licenses for specific parts of the radio spectrum for services provided without open competition. In general terms, many adopted procedures to award initial licenses likewise apply to renewals. The possibility of effective public participation, transparency, objectivity and predictability are important elements of a renewal proceeding.

In considering whether or not to renew a license, the Regulatory body basically has two alternatives:

a) either it examines the past performance *per se* of the incumbent licensee together with its plans for future operation, or

b) it compares an incumbent licensee with challenging applicants, taking account, *inter alia*, their promises and the past performance record of incumbent.

In many cases, the examination of the past record *per se* may provide enough elements for the evaluation of public and social interest and for the Regulatory body to decide on the renewal of a license. Nevertheless, in order to ensure greater transparency and objectivity, it is preferable to establish clear guidelines concerning the licensee's obligations.

An advantage of permitting competing applications in a renewal process is the incentive provided to the incumbent licensee to perform well. On the other hand, careful consideration is needed in order not to disrupt an entire industry by simply comparing concrete past performance with mere paper promises. The renewal expectancy concept may be a balanced instrument to warn the incumbent that it may face competition in the renewal process, but it will have the license renewed if it has performed well.

There are three reasons justifying a high renewal expectancy:

1) its is difficult to guarantee that a challenger's promises will match the incumbent's actual past performance. Thus, not only might replacing an incumbent service provider be entirely unjustified, but it might even deprive the community of an acceptable service and replace it with an inferior one;

2) licensees should be encouraged through likelihood of renewal to make investments to ensure quality service. Comparative renewal proceedings cannot function as a "competitive spur" to licensees if their efforts to provide good service, their investments and their dedication to the community are not rewarded;

3) comparing incumbent service providers with challengers as if they were both new applicants could lead to a haphazard restructuring of the concerned industry.

The weight to be awarded to the incumbent's past performance may vary from service to service. In broadcasting, for example, the Regulatory body may well establish that an incumbent rendering minimal service would receive no preference and that the strength of the expectancy depends on the merit of the past record. A satisfactory past performance should enable the incumbent renewal of his/her license regardless of competing applications.

To take another example, namely cellular, a licensee should receive renewal expectancy, whether or not obliged to pay for it, if it:

1) efficiently used the frequency spectrum associated with the license for its intended purpose;

2) substantially complied with rules, regulations and policies; and

3) showed a satisfactory record, in the line with forecasts

It is logical that even incumbents which have been awarded initial licenses through lottery should not wish to be subject to a renewal proceeding using lottery again; rather, it would seem to make sense for renewal to take account of its past performance.

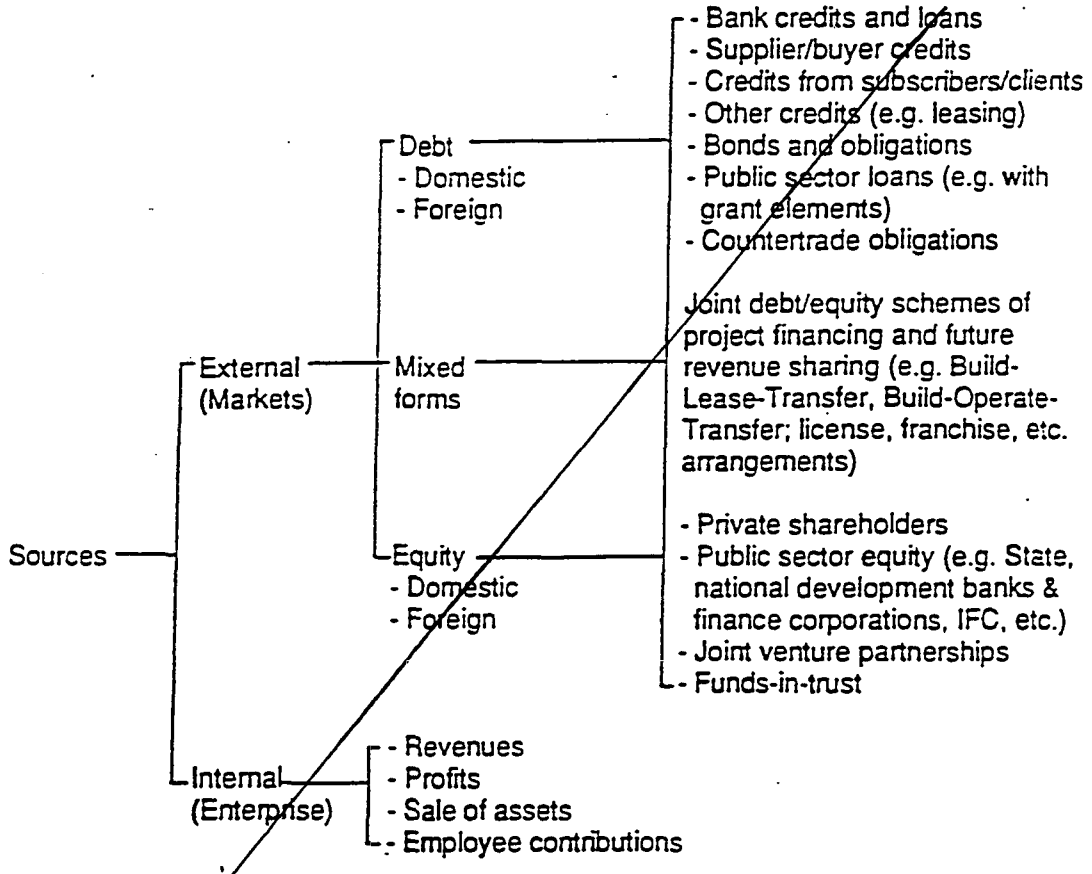
It has to be noted that the concept of renewal expectancy is not aimed at serving and should not serve the interests of licensees, but rather the interests of the public.

FINANCIAL SOURCES, INSTRUMENTS AND STRATEGIES

depending on the telecommunication sector/market structure

(varying combinations and percentage shares)

~~ANNEX 9~~
~~(page 2)~~

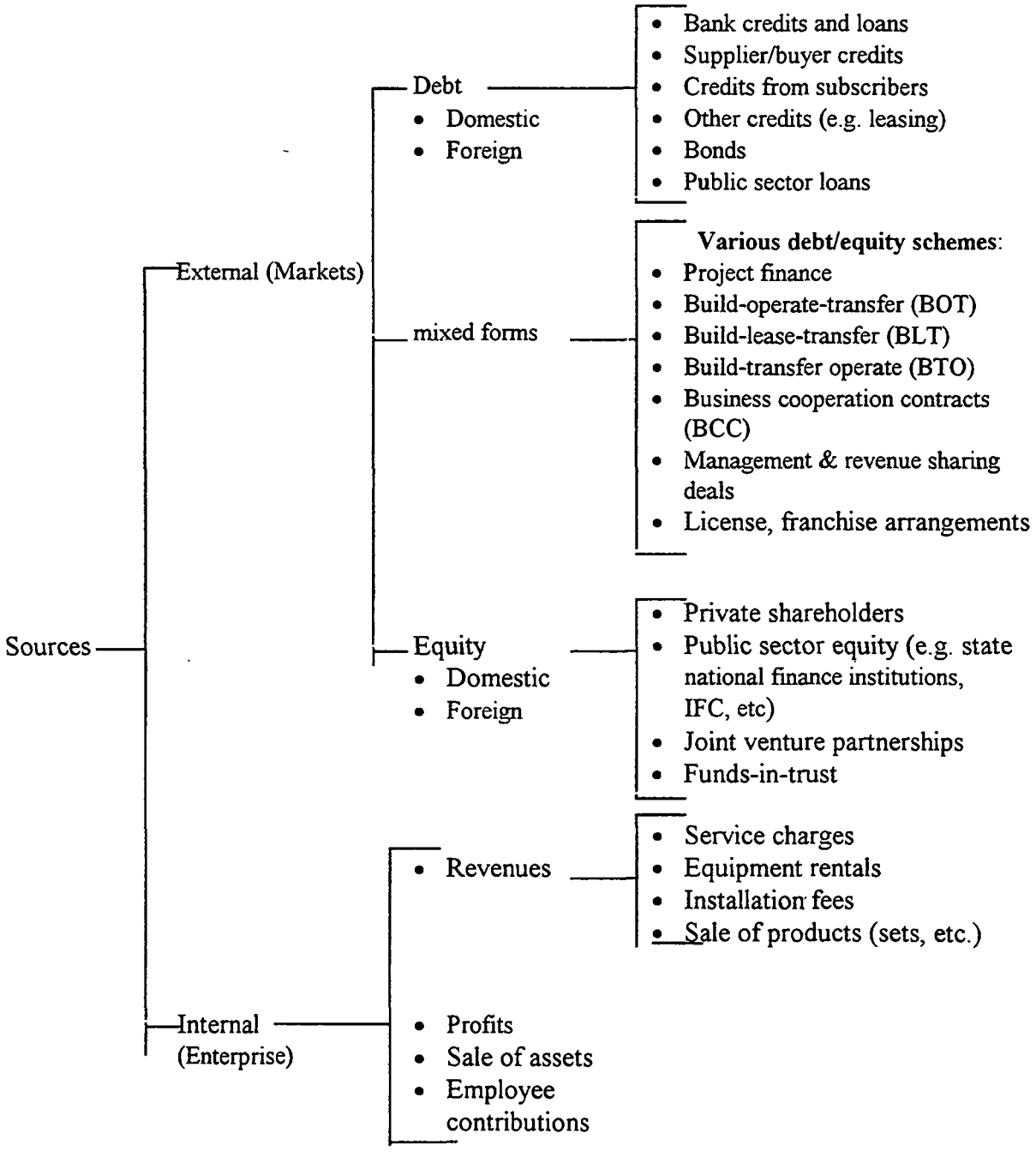


PRIVATE SECTOR REQUIREMENTS

- Political and economic stability (risk assessment, credit rating)
- Unambiguous regulatory framework
- Clear government policy regarding public/private mix, domestic/foreign private participation, rules on establishment of companies, non-discriminatory treatment in respect of ownership of assets, taxes and custom duties, revenue retention and profit transfer, procurement, employment, local content, repatriation of assets, etc.

FINANCIAL SOURCES, INSTRUMENTS AND STRATEGIES

depending on the telecom sector/market structure
(varying combinations and percentage shares)



Private sector requirements

- **Political and economic stability (risk assessment, credit rating)**
- **Unambiguous regulatory framework**
- **Clear government policy regarding public/private mix, domestic/foreign private share**
- **Rules on establishment of companies**
- **Non-discriminatory treatment in respect of: ownership and control of assets, taxes and custom duties, revenue retention and profit transfer, procurement, employment, local content, repatriation of assets...**

BUENOS AIRES ACTION PLAN

BUENOS AIRES ACTION PLAN FOR THE GLOBAL DEVELOPMENT OF TELECOMMUNICATIONS

Work Programme of the Telecommunication Development Sector for the period 1994-1998

INTRODUCTION

This work programme for the Telecommunication Development Sector (ITU-D) for the period 1994-1998 was developed by the first World Telecommunication Development Conference (WTDC, Buenos Aires) which was convened from 21 to 29 March 1994. It comprises the following parts:

Chapter I: A programme of cooperation among the members of the Telecommunication Development Sector

Chapter II: A plan of action by the BDT for assisting the developing countries

Chapter III: A special programme for the Least Developed Countries

These three parts are based on the Buenos Aires Declaration, specifying the long-term goals and orientation and a Resolution defining the policy and strategy for the Sector over the same period.

This work programme also contains in chapter III a certain number of activities which could be financed by extrabudgetary resources (including voluntary contributions) in accordance with Nos. 486 and 487 of the Convention of the ITU (Geneva, 1992) and Resolution 24 and Recommendation 1 of the Plenipotentiary Conference (Nice, 1989).

CHAPTER I

Programme of cooperation among the members of the Telecommunication Development Sector

I.1 Introduction

This programme is intended to include all meetings in world and regional development conferences, in study groups, in associated working parties and in the Telecommunication Development Advisory Board (TDAB).

I.2 World telecommunication development conferences

It is assumed that in accordance with the Convention, the Council will convene a world telecommunication development conference in 1998.

I.3 Regional telecommunication development conferences

Taking into account the programme of meetings in the period 1994-1998 and considering the need to plan for meetings of the study groups set up by this Conference, the Director of the BDT in consultation with the Secretary-General shall propose to the Council the regions for which such conferences should be convened.

I.4 Study groups

In accordance with Resolution No. 2, this Conference sets up two study groups as well as the Questions to be studied by them and their working methods. Each of the two study groups shall normally have two meetings within the study period. Study groups may set up working parties and decide on their meetings within their budgetary limits.

The following Questions were adopted by the Conference for study by Study Groups 1 and 2 during the period 1994-1998. Council (1994) may consider the order of priority.

Study Group 1

Question 1/1: Role of telecommunications in economic, social and cultural development

Question 2/1: Telecommunication policies and their repercussions at the level of institutional, regulatory and operational aspects of services

Question 3/1: Impact of the introduction and utilization of new technologies on the commercial and regulatory environment of telecommunications

Question 4/1: Policies and ways for financing telecommunication infrastructures in developing countries

Question 5/1: Industrialization and transfer of technology

Study Group 2

Question 1/2: Special concerns of developing countries in relation to the work of the Radiocommunication and Telecommunication Standardization Sectors[1]

Question 2/2: Preparation of handbooks for developing countries

Question 3/2: Planning, management operation, and maintenance of telecommunication networks

Question 4/2: Communications for rural and remote areas

Question 5/2: Human resources development and management

Question 6/2: Impact of telecommunications in health-care and other social services

Question 7/2: Telecommunication support for the protection of the environment

Question 8/2: Public service broadcasting infrastructure in developing countries

I.5 Priority

The Conference agreed that the special programme for the LDCs will be the first priority.

I.6 Telecommunication Development Advisory Board (TDAB)

The Conference considered that a more efficient management of the Sector would require a review of the membership and the function of the TDAB and adopted in this respect a Resolution recommending to the Plenipotentiary Conference (Kyoto, 1994) to make consequential changes to the Convention. Six meetings of the TDAB are foreseen for the period 1994-1998.

[1] The study of the work of the Radiocommunication and Telecommunication Standardization Sectors relating to regulation and tariff aspects as well as to the development of new services will be dealt with jointly by Study Groups 1 and 2.

CHAPTER II

Plan of action by the BDT for assisting the developing countries

II.1 Introduction

This chapter covers all BDT activities in supporting the study groups in carrying out global or regional programmes and studies, in assisting individual countries, and in executing United Nations Development Programme (UNDP) and Funds-in-Trust projects.

II.2 Global and regional programmes and studies

These programmes and studies are either in support of the study group or are undertaken within the framework of the normal assistance provided by the BDT.

II.2.1 Updating existing programmes and studies

A number of programmes and studies were carried out by the former Technical Cooperation Department. Other programmes and studies have been initiated by the BDT and are on the way to completion. Appropriate manpower is required for updating and compiling these programmes and studies.

II.2.2 New programmes

The Buenos Aires Action Plan proposes 12 new programmes which will provide a focus for the work of the ITU Development Sector. The underlying philosophy is to use resources available within the budget of the ITU Development Sector to leverage a much wider, coordinated effort on the part of the telecommunication community.

The Action Plan refers mainly to coordinated activities of regional and global relevance. It is expected that these activities will be complemented by multilateral and bilateral projects, executed or supported by the BDT and its development partners. The impact of such projects and their contribution to the goals and objectives of the Buenos Aires Action Plan will be greatly enhanced if they are designed and implemented in a coordinated manner within the framework of this Plan. This should be taken into account when assigning priorities related to proposals and requests for multilateral and bilateral programmes and projects.

a) Programme No. 1: POLICIES, STRATEGIES AND FINANCING

1. Programme goals, objectives and strategies

The purpose of this programme is to develop models and guidelines for the harmonization of national policies, regulations, including national regulation of the spectrum and its pricing, and institutional structures conducive to accelerated and balanced development of telecommunication systems worldwide.

Such policies and strategies would enable all nations in the world to fully exploit all telecommunication tools for sustainable social, economic, and cultural development, for international and regional cooperation, for protection and improvement of the environment, for rescue and relief operations, and for peaceful coexistence. One of the objectives of the programme is to facilitate the exchange of information and experiences between and among members of the ITU Development Sector and other development partners.

2. Proposed actions:

The following actions are recommended and shall be reviewed by Study Groups 1 and 2.

1. To organize roundtables, seminars, and workshops on telecommunication policies, strategies, and financing.
2. To develop documentation on national telecommunication policies, strategies, finance and regulation. (Can also be useful for Programme No. 11.)
3. To produce surveys and studies (handbooks) on the specific policies carried out in various countries, and to bring the results of these studies to the attention of national policy-makers and planners.[2]
4. To train national policy-makers, regulators, and planners in this field and provide other assistance that may be necessary.

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2 Refer to Questions 1/1, 2/1, 3/1 and 4/1 of Study Group 1 and 4/2 and 5/2 of Study Group 2.

b) Programme No. 2: HUMAN RESOURCES MANAGEMENT AND DEVELOPMENT (HRM/HRD)

1. Programme goals, objectives and strategies

The long-term goal is to provide human resources, particularly in developing countries, with the competencies and motivation required for regulatory bodies and telecommunication service providers to operate efficiently in the changing telecommunication environment and contribute effectively to the achievement of the goals of the Buenos Aires Action Plan.

These goals also imply that the HRM/HRD programme, besides providing a framework for coordination of ITU Members' and other development partners' efforts to develop the human resources within the telecommunication sector, should contribute to the development of flexible and open learning systems which particularly address the needs of people and small enterprises in rural and low-income urban areas (see also Programmes Nos. 9 and 12 - Integrated Rural Development and Development of Telematics and Computer Networks).

Thus, the HRM/HRD programme will contribute to improve the relevance and accessibility of distance education and training offered at regional and global levels and support current initiatives to bring together academic and R&D institutions as well as other potential suppliers of distance learning in a global effort for the transfer of know-how and harmonization of diplomas and certificates. In particular, the competent study group and the BDT should continue to play a leading role in the development of models and standards for the cooperative design of flexible, portable and adaptable, modular distance learning programmes as well as standardized management information systems capable of handling both needs for and supply of such programmes, i.e. an "electronic market place" easily accessible by users as well as providers of training courses.

2. Proposed actions:
The following programmes are recommended and shall be reviewed by Study Groups 1 and 2.

1. Management Development for Telecommunications (MANDEVTEL)
2. TeleProject
3. Needs analysis, provision of training (joint ventures, etc.)
4. Global distance learning system for technicians[3]
5. Development of standards, models, guidelines and other tools
6. Global Telecommunication University
7. Development of R&D capabilities
8. Direct assistance for improvement of HRM/HRD
9. Distance education and training for rural and low-income areas[4]
10. Information system on HRM/HRD activities ("electronic market place" for training).

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3 Feasibility studies and pilot projects.

4 In coordination with Programmes Nos. 9 and 12 (Integrated Rural Development and Development of Telematics and Computer Networks).

c) Programme No. 3: GUIDELINES FOR THE ELABORATION OF A BUSINESS-ORIENTED DEVELOPMENT PLAN

1. Programme goals, objectives and strategies

The long-term goal is to enable national administrations to produce and update their business-oriented development plan.
The immediate objective of the programme is to prepare a guide, to prepare the corresponding training material, and to organize regional seminars to disseminate the know-how. In view of the large number of countries in the developing regions, regional ITU-sponsored training centres such as the ESMT (multinational telecommunication high school) and AFRALTI (African Advanced Level Telecommunication Institute) could be used to achieve a faster and sustainable penetration.

2. Proposed actions:

The following actions are recommended and shall be reviewed by Study Group 2.

1. Preparation of guidelines for the elaboration of a business-oriented development plan
2. Development of training material
3. Field trial(s)
4. Training courses.

d) Programme No. 4: DEVELOPMENT OF MARITIME RADIOCOMMUNICATION SERVICES

1. Programme goals, objectives and strategies

The goal of this programme is to provide a framework for the development of maritime radiocommunication services which will: provide facilities for the introduction of the Global Maritime Distress and Safety System (GMDSS) within the time limit established by the Safety of Life at Sea (SOLAS) Convention; provide facilities for the efficient operation of maritime transport systems and the development of trade; promote further use of maritime activities, such as commercial fishing, off-shore oil exploration, tourism and transport of people, animals and goods.
The immediate objective is to prepare for each country a plan for the development of maritime radiocommunication services including the implementation of the GMDSS, and to train national counterparts to undertake this work. Such plans will contain all information needed to be submitted to national and multinational financial institutions. The projects for all regions are planned to be concluded two years before the deadline for implementation of the GMDSS.

2. Proposed actions:

The following actions are recommended and shall be reviewed by Study Group 2.

1. Training courses
2. Preparation of plans
3. Review of plans
4. Resource mobilization for implementation of plans.

e) Programme No. 5: COMPUTER-AIDED NETWORK PLANNING

1. Programme goals, objectives and strategies

The long-term objective is to develop telecommunication network planning capabilities in all interested organizations, particularly in developing countries, in order to increase their self-reliance in this field. Participation in these activities will promote the acceptance of globally standardized tools, including the further development of ITU software (PLANITU), for telecommunication network planning, reduce duplication of software development and maintenance, and facilitate cooperation between Members. Administrations participating in this programme will have: network planning unit(s) established and work procedures organized; network planning software installed; and staff trained in traffic engineering and network planning activities.

2. Proposed actions:

The following actions are recommended and shall be reviewed by Study Group 2.

1. Software development
2. Development of training material
3. Training courses
4. Software support
5. Equipment procurement.

f) Programme No. 6: FREQUENCY MANAGEMENT

1. Programme goals, objectives and strategies

The objective is to assist developing countries in this field in computerizing their spectrum management. A Basic Automated Spectrum Management System (BASMS) is to be developed. Furthermore, it is envisaged to develop in the near future an Advanced Spectrum Management System (ASMS) based on the BASMS' functional requirements, to provide increased flexibility and networking capabilities in a multi-user environment. Training programmes on both systems in all ITU official languages will be organized for developing countries. Expected outcomes include: the establishment of national spectrum management units in administrations; the installation of software for national computerized spectrum management; and the training of staff in computerized spectrum management.

2. Proposed actions:

The following actions are recommended and shall be reviewed by Study Group 2[5].

1. Development of national spectrum management software
2. Development of guidelines for radio spectrum management
3. Development of basic spectrum management specifications
4. Training programmes.

5 The Radiocommunication Sector is requested to study appropriate spectrum pricing strategies for effective utilization and management of this natural resource.

g) Programme No. 7: IMPROVEMENT OF MAINTENANCE

1. Programme goals, objectives and strategies

The objectives of this programme are to improve the maintenance organization, including the Management Information System (MIS) designed to monitor quality of service, handling of customers' complaints and fault repair, and to improve material and spare-parts management in developing countries, as required to reach the quality of service (e.g., call completion rates, fault repair time) presently achieved in developed countries. This is expected to increase considerably the return on investment in the countries concerned. It is also planned to develop maintenance guidelines, support software and pilot maintenance organizations and centres in some 10-20 countries in developing regions, with priority given to the LDCs. The experience gained would be shared through regionally organized seminars and through the mechanism of study groups. BDT experts and consultants would assist in the introduction of guidelines and support tools in the participating countries and later in other countries. The participation of telecommunication entities in advanced countries in the development of handbooks and support software will be necessary to achieve these goals initially. BDT experts, particularly those based in the regions, and in some cases consultants employed by the BDT, would provide assistance to individual countries.

2. Proposed actions:

The following actions are recommended and shall be reviewed by Study Group 2.

1. Develop guidelines and handbooks (refer to Question 3/2)
2. Development of a MIS for maintenance
3. Planning of maintenance organization
4. Implementation of maintenance organization (measuring equipment, etc.)
5. Training of staff (see also Programme No. 2).

h) Programme No. 8: MOBILE CELLULAR RADIO TELEPHONE SYSTEMS

1. Programme goals, objectives and strategies

The programme will: prepare manuals through Study Group 2 that would assist in planning and engineering of mobile cellular radio telephone systems; using manuals and handbooks, train engineers from developing countries in the planning and engineering aspects; compile software tools for planning and engineering and provide training programmes on such software tools; assist administrations in the development of mobile cellular radio telephone systems infrastructure and in the transfer of related know-how. Manuals and handbooks will be drafted by Study Group 2, external experts and BDT staff. Pilot training programmes will be implemented by BDT staff and consultants at the regional level, with fellowships given to LDCs from the BDT budget and possibly from external sources. Training and dissemination of manuals and handbooks will then be ensured at country level by national entities.

2. Proposed actions:

The following actions are recommended and shall be reviewed by Study Group 2.

1. Development of planning methodology (refer to Questions 1/2 and 2/2)
2. Development of manuals and training material on planning and engineering
3. Training seminars.

i) Programme No. 9: INTEGRATED RURAL DEVELOPMENT

1. Programme goals, objectives and strategies

In the long term, the goal is to provide 'community telecentres', equipped to offer telematic services and support, and public phone booths for all rural communities in developing and, where needed, in developed countries, serving approximately 10,000 inhabitants. This will be piloted during the next cycle (1994-1998) by the establishment of community telecentres in some 20 countries in developing regions, priority being given to the LDCs. The experience gained, including an evaluation of the telecentres' contribution to sustainable development, will be shared through the study groups, seminars, etc. Policy guidelines for integrated rural development will also be produced in conjunction with Programme No. 1. Bearing in mind the importance of trade and international cooperation, regional programmes will create the critical mass required to bring about and demonstrate the benefits of this concept which are so difficult to realize in isolated country programmes. Networking rural community telecentres, not only among themselves but also with telecommunication networks in developed countries, will contribute significantly to sustain this development (see also Programme No. 12 - Development of Telematics and Computer Networks).

2. Proposed actions:

The following actions are recommended and shall be reviewed by Study Groups 1 and 2.

1. Develop appropriate national policy guidelines [6]
2. Coordination with other UN specialized agencies at international level in the promotion of integrated rural development
3. Participate in long-term planning of integrated rural development at regional and national levels
4. Planning of rural networks[7] (e.g. satellite, cellular radio, fibre optics)
5. Implementation of networks (providing access to global networks)
6. Provision of terminal equipment
7. Training of community telecentre staff[8]
8. Evaluation of pilot project
9. Promotion of the community telecentre concept and services.

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6 To be integrated into Programme No. 1 (Policies, Strategies and Financing).

7 In coordination with Programmes Nos. 5 and 12 (Computer-Aided Network Planning and Development of Telematics and Computer Networks).

8 In cooperation with Programme No. 12 (Development of Telematics and Computer Networks). As the Community Telecentre obtains equipment for distance learning and technology-based training (TBT), and after initiation in the use of multimedia, the continuous training of Community Telecentre staff will increasingly be carried out through distance learning and electronic networking.

j) Programme No. 10: BROADCASTING INFRASTRUCTURE

1. *Programme goals, objectives and strategies*

The long-term objective is to develop the planning, management and operational capabilities of those broadcasting organizations and independent broadcasting service providers, particularly from the developing countries, that are willing to increase their self-reliance and efficiency.
The immediate objective is to produce guidelines that serve both the nationwide service providers and the independent broadcasters and, in particular, to develop and test in a real environment, software, manuals and procedures to improve the planning of the sound and television broadcasting services.
The experience gained would be shared by means of regionally-held seminars/workshops organized specifically to ensure a transfer of know-how and to enable an exchange of experience at the national level.

2. *Proposed actions:*

The following actions are recommended and shall be reviewed by Study Group 2.

1. Elaboration of guides and preparation of development master plans for broadcasting infrastructure (related to the business-oriented development plans)
2. Preparation of a planning manual for broadcasting technologies
3. Development of PC user-friendly software for the FM/TV planning of a broadcasting transmitter coverage area with adjacent and co-channel interference calculations within a transmitter service area applicable at the national level
4. Regular organization of regional seminars on new technologies in sound and TV broadcasting
5. VHF/UHF propagation measurement campaign for tropical areas.

k) Programme No. 11: INFORMATION SERVICES

1. Programme goals, objectives and strategies

The long-term goal of the programme is the establishment of a comprehensive databank of information including broad coverage of the communication sector, organizational profiles, responsibilities and activities; regulatory environments; multilateral and bilateral project assistance; private sector activities and financing indicators, to benefit the worldwide telecommunication community. This will allow the BDT to provide a better range of services and to be more responsive to requests for information from its members and its information services customers. The short-term objectives are to:

- establish a Working Group on telecommunication indicators to identify and define required information and to serve as a forum for presenting research on the impact of telecommunications, and for reviewing draft documents before publication; Study Groups 1 and 2 will coordinate the work of this Working Group;
- increase the frequency of publication and expand the coverage of the BDT indicators to include projections and more detailed regional and global telecommunication outlooks.
- increase resources to expand the database and to collect, harmonize, verify, analyse and disseminate information.

2. Proposed actions:

The following actions are recommended and shall be reviewed by Study Groups 1 and 2.

1. To extend and enhance the database and electronic information dissemination
2. To produce indicator series and analytical reports
3. To create a Working Group on Telecommunication Indicators
4. To develop national MISs and to develop training for use of MISs
5. To continuously respond to requests for information and analysis
6. To explore the use of telecommunication and information services to create a global library, linking the developed and developing countries alike, in collaboration with other organizations dealing with these matters.

I) Programme No. 12: DEVELOPMENT OF TELEMATICS AND COMPUTER NETWORKS

1. Programme goals, objectives and strategies

The long-term goal is to facilitate access to information resources available in many countries by establishing connections to computer networks from many locations, including rural communities in countries that presently have little or no access to such resources. More specifically, to give decision makers at all levels, researchers and agents of change (and in the longer term, ordinary citizens), including those located in rural areas in developing countries, access to telematic services enabling them:

- to participate actively in global cooperative activities related to the UN Conference on Environment and Development, Agenda 21
- to exchange electronically stored and transmitted data, information, graphics, still pictures and video for the purpose of improving trade, transport, health-care, education and training, etc.
- to participate in conferences (telephone, on-line computer and video)

In the next cycle (1994-1998) the objectives are:

- to connect all BDT field offices in a network which enables communication via electronic mail, and through the exchange of electronically stored multi-media and participation in video conferences. The offices would then function as hubs and training centres for the countries in which they are located and for neighbouring ones
- to carry out a globally coordinated regional pilot project for the development of telematics and computer networks in conjunction with Programme No. 9
- to provide an electronic forum (i.e. list service or bulletin board) to allow community telecentres to exchange experiences.

2. *Proposed actions:*

The following actions are recommended and shall be reviewed by Study Groups 1 and 2:

1. Develop and promote appropriate national policy guidelines[9]
2. Planning of networks[10]
3. Implementation of networks (providing access to global networks)
4. Provision of terminal equipment
5. Training and capacity building
6. Evaluation of pilot project
7. Advise on and facilitate, through the BDT and the study groups, the means of establishing a global library, on an individual country basis, in collaboration with other organizations dealing with these matters.

II.3. Ad hoc assistance

Ad hoc assistance comprises assistance given to individual countries or groups of countries which is not directly related to Programmes Nos. 1-12 described above. It includes missions of BDT staff, for instance for needs identification, project formulation, monitoring and evaluation, tender specifications and evaluation, etc. It also includes ad hoc seminars, information meetings and advisory missions in response to urgent requests.

II.4 Execution of UNDP and Funds-in-Trust projects

This includes all the technical and administrative support provided for the implementation of projects, partly or fully financed by other development partners, and executed by the ITU.

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9 To be integrated into Programme No. 1 (Policies, Strategies and Financing).

10 In coordination with Programme No. 5 (Computer-Aided Network Planning).

CHAPTER III

Special Programme for the Least Developed Countries (LDCs)

The LDCs should, as with the other developing countries, benefit from the programmes and the ad hoc assistance described in Chapter II. A special programme for the LDCs financed from the ITU resources is contained in Resolution No. 1 (Special Programme of Assistance for the Least Developed Countries (LDCs)).

As a general target, at least 70% of the resources allocated for Programmes Nos. 1 to 12 will directly support the LDC activities, in the following order of priority:

1) development of rural telecommunications
2) human resources development
3) management
4) maintenance
5) planning.

Taking into account the exceptional situation of the LDCs, the Conference decided to request the Secretary-General of the ITU and the Director of the BDT to use untied voluntary contributions as well as any excess income from world and regional telecommunication exhibitions and forums (Recommendation No. 1, Nice, 1989) for the benefit of the LDCs.

In order to mobilize additional resources (see Resolution No. 1 on Special Programme oof Assistance for the LDCs), Council is requested to set up a group of experts to study the way in which these resources would be used.

PROGRAMMES

Strategy

The overall strategy of the LDC programme is to implement augmented ITU assistance as a catalytic input to generate sustained investment in telecommunications in the LDCs. The LDC programme primarily seeks to eliminate bottlenecks in the five key areas of critical weakness which have been identified above in order to enhance the capacity of the LDCs to absorb such investments.

Targets

The ITU LDC programme has not set particularly ambitious objectives and/or targets. For the year 2000 the programme is targeted at:

(a) fully meeting the demand for telecommunication services in urban areas. This means virtually eliminating the waiting list for services by that year, which translates into an average urban main line (ML) density of 5 per 100 population;

(b) achieving a rural ML density of 1 ML per 10,000 inhabitants. This density will not as yet amount to easy access to telecommunication services as suggested in the Missing Link report, but is a bold move in that direction.

The 1994-1998 Programme

The 1994-1998 Programme has been devised on the basis of:

- an expected rise of 25% in demand for ITU assistance as a result of an unfavourable international scenario in the provision of technical assistance
- an attempt to meet presently unmet, but deserving, demands in the order of 25% of the current budget
- inclusion of a new area of priority (rural telecommunications) and a new sub-area of priority (sector reform and restructuring)
- an increase in the number of LDCs from 42 in 1989 to 47 in 1991, a figure which is expected to rise to 52 by 1999.

Activities/Action Plan for the 1994-1998 Programme

1. **Development of rural telecommunications**
   - 1.1 Study of appropriate technologies for rural telecommunications
   - 1.2 Implementation of pilot projects on rural telecommunications
   - 1.3 Workshops/seminars on rural telecommunications
   - 1.4 Support for regional rural telecommunication activities
2. **Human resources development**
   - 2.1 Training of outside plant instructors
   - 2.2 Training of staff in modern methods of outside plant maintenance
   - 2.3 Training of senior telecommunication maintenance managers in modern management maintenance techniques
   - 2.4 Training managers of training centres in training management techniques
   - 2.5 Individual fellowships for instructors and training managers
   - 2.6 Miscellaneous fellowships
   - 2.7 Seminars/workshops
   - 2.8 Periodic training missions to training centres
   - 2.9 Support for regional training centres
3. **Management**
   - 3.1 Workshops/seminars for qualified senior and middle-level telecommunication managers to develop general management strategies and skills
   - 3.2 Workshops/seminars on financial management
   - 3.3 Assistance in telecommunication sector reform/restructuring
   - 3.4 Assistance in tariff studies and implementation
   - 3.5 Workshops/seminars in network management
   - 3.6 Introduction of MIS/Decision Support Systems (DSS)
   - 3.7 Assistance in telecommunication regulation and legislation
   - 3.8 Establishment of performance indicators

4. Maintenance

4.1 Identification of quality of service indicators

4.2 Identification of performance indicators (maintenance)

4.3 Development of a guide on the introduction of a Computerized Subscriber Maintenance System (CSMS)

4.4 Pilot project for the CSMS

4.5 Development/introduction of network management systems

4.6 Updating and implementation of the National Plan for the Improvement of Maintenance (NPIM) in Africa

4.7 Support for regional maintenance projects/activities

5. Planning

5.1 Development of a guide for the preparation of business-oriented development plans or comprehensive development programmes

5.2 Updating of business-oriented development plans

5.3 Sectoral studies and reviews

5.4 Assistance in the introduction of new technologies/services

5.5 Preparation and organization of roundtable/donor conferences

5.6 Support for regional planning projects/activities

5.7 Traffic study and analysis as a tool for network expansion

6. Individual unforeseen country requests

6.1 Development of rural telecommunications

6.2 Human resources development

6.3 Management

6.4 Maintenance

6.5 Planning.

TERMS OF REFERENCE OF THE STUDY GROUPS

TERMS OF REFERENCE OF STUDY GROUP 1

Telecommunication[11] development strategies and policies

1. Synthesize available information on the role of telecommunications in the social and economic development of countries and, in particular, quantifying the economic benefits of integrating the telecommunication sector in overall development plans.

2. Make a comparative analysis of national regulatory models and policies in the telecommunication sector currently enforced in various countries with a view to evaluating the economic and social implications of regulatory reforms and gathering and distributing existing information related to telecommunication regulation policy and financing (e.g., compiling bibliographies on various related topics).

3. Develop recommendations, guidelines and/or handbooks on methods and criteria for the evaluation and implementation of strategies and policies intended to promote the appropriate reforms of the telecommunication sector in the developing countries, including the development of industry, within the general framework of their national policies for economic, social and cultural development.

4. Prepare recommendations for optimal structures and appropriate resources for a regulatory entity to fulfil efficiently its functions in matters such as the availability and quality of service of telecommunications to the public, the introduction and use of new technologies, the interoperability of networks and services, the establishment and application of competition rules and the implementation of price regulation.

5. Develop in coordination with Study Group 2 means to assist developing countries in evaluating the impact of the introduction and use of new technologies and services, including multi-media, on the evolving commercial and regulatory environment in the telecommunication sector.

6. Prepare and maintain an inventory of financial strategies and the various sources of financing (development aid, development banks, private sector, etc.), including their conditions and requirements as well as an analysis of the applicability of the various financial strategies under different circumstances.

7. Prepare guidelines on the measures to be taken to ensure that operators enjoy the conditions necessary to generate revenue, including cost-oriented tariff policies, legal mechanisms designed to foster the reinvestment of profits, and improvements in business management.

8. Examine the criteria which would enable developing countries to establish tariff policies that take into account the evolution of the telecommunication sector.

[11] Includes sound and TV broadcasting.

9. Study forms of cooperation, plans, programmes, etc., in the field of rural telecommunications, in which developed countries with experience in the field participate together with developing countries.

10. Coordinate, through the Director of the BDT and where appropriate through the Secretary-General of the ITU, with other relevant international organizations, regional organizations and working groups with related goals and functions for the establishment of joint meetings and/or the development of projects, when feasible, to maximize available resources and avoid duplication of work.

11. Consistent with the functions assigned to the Sector by the Convention (Geneva, 1992), specify the directives on the basis of which the BDT shall prepare, maintain in data banks and publish in accordance with the Convention the following: a) information on the sales prices of the equipment and services required for developing a telecommunication network, including whatever data are required to enable regulatory entities, State administrations and operating companies to have a reference basis for their decisions; b) internationally comparable indicators on network development, new services, quality of service, staff, tariffs, financial and investment data, etc.; c) updated versions of the World and Regional Plans developed by the former World and Regional Plan Committees; d) other statistical information that may be needed by the Study Group.

12. Extend assistance to the Director of the BDT to arrange seminars and workshops devoted to:

- telecommunication policy and technical development;
- the development of a local and regional telecommunication industry in developing countries.

TERMS OF REFERENCE OF STUDY GROUP 2

Development, harmonization, management and maintenance of telecommunication[12] networks and services, including spectrum management

1. Study and analyse the implications of introducing new technologies for developing countries, specifically how they affect planning, harmonization, tariff setting and commercialization, management and maintenance of telecommunication networks and services, and including human resources, taking into account the economic and social environment of each region or country.

2. Analyse the evolution of networks and services, including spectrum management, in order to identify those applications that may be particularly relevant to developing countries.

3. Propose technical solutions to improve access to basic telecommunication services in rural and remote areas in developing countries.

4. Develop manuals and practical guidelines for planning, management, operation and maintenance of telecommunication networks and services, based on new technologies.

5. Taking into account the results of the activities listed above, identify the basic criteria for developing business-oriented development plans.

6. Prepare recommendations within its areas of competence.

The Study Group may consider establishing working parties on technology modernization and harmonization and on human resources development.

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12 Includes sound and TV broadcasting.

MASTER PLANS CARRIED OUT IN AFRICA WITH ITU ASSISTANCE*

COUNTRY	PUBLICATION YEAR**
SUB-SAHARAN	
ANGOLA	1984
BENIN	1985
BOTSWANA	1984
BURKINA FASO	1989
BURUNDI	1992
CAMEROON	1989
CAP VERDE	1989
CENTRAL AFRICAN	1984
CHAD	1993
CONGO	1983
COTE D'IVOIRE	1985
GUINEA	1991
GUINEA-BISSAU	1976
MADAGASCAR	1989
MALAWI	1987
MALI	1989
MAURITANIA	1992
MAURITIUS	1987
MOZAMBIQUE	1992
NIGER	1993
NIGERIA	1973
RWANDA	1982
SAO TOME AND PRINCIPE	1989
SENEGAL	1980
SOMALIA	1983
SUDAN	1993
TOGO	1986
ZAIRE	1982
ZIMBABWE	1986

* No master plans were carried out in North Africa except Libya.

** All master plans cover a period of about 20 years.

Basic indicators / Indicateurs de base

		Population		GDP		Main telephone lines	
		Total (M) 1994	Density (per km²) 1994	Total (B US$) 1993	per capita (US$) 1993	Total (k) 1994	per 100 inhabitants 1994
1	Algeria	27.33	11	46.8	1'742	1'122.4	4.11
2	Egypt	57.56	58	35.5	638	2'456.2	4.27
3	Libya	5.22	3	21.9 [89]	4'975	240.0 [93]	4.76
4	Morocco	26.49	40	27.4	1'027	992.8	3.75
5	Tunisia	8.82	54	13.1	1'526	474.3	5.38
	North	**125.41**	**21**	**144.8**	**1'183**	**5'285.6**	**4.22**
6	South Africa	40.56	34	111.9	2'751	3'844.5	9.48
	South Africa	**40.56**	**34**	**111.9**	**2'751**	**3'844.5**	**9.48**
7	Angola	10.67	9	9.2 [90]	997	53.3 [93]	0.53
8	Benin	5.25	47	2.2	416	23.9	0.46
9	Botswana	1.44	3	3.7	2'636	43.5 [93]	3.10
10	Burkina Faso	10.05	37	2.8	286	26.3	0.26
11	Burundi	6.21	223	1.0	164	15.8	0.25
12	Cameroon	12.87	27	9.4	746	57.2 [93]	0.45
13	Cape Verde	0.38	94	0.3	815	18.6	4.87
14	Central African Rep.	3.24	5	1.2	380	7.4	0.23
15	Chad	6.18	5	1.2	195	4.7	0.08
16	Comoros	0.49	260	0.2	470	4.3	0.88
17	Congo	2.52	7	2.4	951	20.6	0.82
18	Côte d'Ivoire	13.78	43	9.3	696	108.4	0.79
19	Djibouti	0.57	26	0.4 [91]	855	7.5	1.33
20	Equatorial Guinea	0.39	14	0.2	350	2.5	0.65
21	Eritrea	3.44	37	...	...	15.2	0.44
22	Ethiopia	53.44	44	3.5	66	137.7	0.26
23	Gabon	1.04	4	5.5	4'422	31.4	3.03
24	Gambia	1.08	101	0.4	350	18.3	1.69
25	Ghana	16.94	71	6.2	378	50.0	0.30
26	Guinea	6.50	26	3.1	494	9.3	0.14
27	Guinea-Bissau	1.05	29	0.2	228	8.6 [93]	0.82
28	Kenya	26.02	45	5.5	218	228.5	0.88
29	Lesotho	2.00	66	0.8	399	12.2 [93]	0.64
30	Liberia	2.94	26	1.2 [89]	509	4.5 [93]	0.19
31	Madagascar	14.30	24	3.4	265	34.8 [93]	0.27
32	Malawi	10.84	115	2.0	218	33.1	0.31
33	Mali	10.46	8	2.7	288	13.8 [93]	0.15
34	Mauritania	2.22	2	1.0	452	8.4	0.38
35	Mauritius	1.10	592	3.1	2'799	129.4	11.72
36	Mayotte	0.10	278	...	...	4.0 [93]	4.02
37	Mozambique	15.53	20	1.5	87	57.2	0.37
38	Namibia	1.50	2	2.5	1'621	69.8 [93]	4.46
39	Niger	8.85	7	2.2	263	10.5 [93]	0.12
40	Nigeria	108.47	117	34.9	333	368.7	0.34
41	Réunion	0.64	256	4.0 [88]	6'878	198.5 [93]	31.98
42	Rwanda	7.75	294	1.6 [92]	212	15.0	0.19
43	S. Tomé & Principe	0.13	130	-	318	2.5	1.97
44	Senegal	8.10	41	5.8	717	72.0	0.89
45	Seychelles	0.07	181	0.4	6'366	12.5	17.08
46	Sierra Leone	4.59	63	0.7	164	14.5 [93]	0.32
47	Somalia	9.08	14	0.9 [90]	113	15.0 [93]	0.18
48	Sudan	27.36	11	4.3 [92]	161	64.0	0.23
49	Swaziland	0.91	52	0.9	1'013	18.6	2.05
50	Tanzania	28.85	31	2.7 [92]	106	88.3	0.31
51	Togo	4.01	71	1.3	314	21.4	0.53
52	Uganda	18.59	79	4.0	223	34.9	0.19
53	Zaire	42.55	18	7.5 [90]	202	36.0 [93]	0.09
54	Zambia	9.20	12	3.3	389	79.7	0.87
55	Zimbabwe	11.00	28	4.9	463	134.8	1.23
	Sub-Saharan	**534.66**	**23**	**165.5**	**327**	**2'447.2**	**0.46**
	AFRICA	**700.62**	**23**	**422.2**	**630**	**11'577.3**	**1.67**

Note: For data comparability and coverage, see the technical notes.
Source: ITU, UN, IMF, World Bank, OECD.

GLOSSARY
(English alphabetical order)

Bearer Service

Bearer Service means the commercial provision to the public of a simple data transmission, meaning a service including either the transmission, or the transmission and routing, of signals between telecommunications network terminals without these data being subject to any processing other than that required to ensure their transmission and the routing and processing associated with the control of these functions.

Deregulation

Reducing the level of regulation and replacing regulation with competition and market forces.

Essential requirements

Essential requirements are those specifications which must be met, in the general interest, to ensure the safety of users and telecommunications network personnel, network security and protection, and notably the exchange of the associated control and operational information as well as, when relevant, the proper use of the radio spectrum and, in certain cases, the interoperability of services and terminal equipment, and data protection.

The interoperability of terminal equipment means the ability of this equipment on the one hand, to operate within a network and, on the other hand, to operate with other forms of terminal equipment which allow access to the same service.

Independent Network Infrastructure

Independent Network Infrastructure means a telecommunications network designed for private or shared use.

An Independent Network Infrastructure is "Privately used" when it is reserved for use by the private individual or corporate entity who established it.

An Independent Network Infrastructure is "Shared" when it is reserved for use by several private individuals or corporate entities who are members of one or more closed user groups in order to exchange internal communications within the same group.

Internal Network Infrastructure

Internal Network Infrastructure means an independent network infrastructure installed inside the user's premises without using either the public domain - including radio frequencies - or any third party premises.

Liberalization

The opening up of a service or product to more than one supplier under the control of a regulator.

Privatization

Removing a company from ownership by the State.

Public network

Public network means all the telecommunication networks established or used by the PTO to meet the needs of the public in general (Service Providers and other users).

PTO - Public Telecommunication [Organization] [Operator]

PTO means the telecommunication corporate body providing public telecommunication services under exclusive and special rights (reserved services).

The use of the term "public" refers to the services and in no way implies the ownership of the corporate body. The PTO may be in public or private ownership.

All other telecommunication operators are referred to as telecommunication Service Providers.

Radio network infrastructures and terminal equipment

Network infrastructures and terminal equipment are described as radioelectric when they use radio frequencies for the transmission of radio waves in open space.

Notably, networks which use satellite capacity are defined as radio networks.

(Service Provider - see PTO)

Telecommunications

Telecommunications means any form of transmission, broadcast or reception of signs, signals, texts, images, sounds or data by wire, by optical means, microwave or other electromagnetic means.

Telecommunications Network Infrastructure

Telecommunications Network Infrastructure means any form of installation or group of installations which ensure either the transmission or the transmission and routing of telecommunication signals and the associated exchange of the control and operational information, between network termination points.

Telecommunication Services

Telecommunication Service means any service, including the transmission or routing of signals or a combination of these functions, using telecommunications process.

Telephone Service

Telephone Service means the commercial provision to the public of a system of direct, real-time voice transmissions between users connected to termination points of a telecommunications network.

Telex Service

Telex Service means the commercial provision to the public of a system of direct, real-time typed message transmissions, in the form of telegraphic signals, between users connected to termination points of a telecommunications network.

Termination Points

Termination Point means the physical point of connection which meets the specifications needed for access to the network and to transmit and receive data through this connection. These points form an integral part of this network.

When a telecommunications network is connected to a foreign network, the points of connection to this network are considered to be termination points.

Terminal equipment

Terminal equipment means any equipment designed to be connected directly or indirectly to a network termination point for the transmission, processing or reception of data.

ABBREVIATIONS / ACRONYMS

AFRALTI	African Advanced Level Telecommunication Institut
ADB	African Development Bank
ADF	African Development Fund
AMU	Arab Maghrebian Union
BOT	Build, Operate and Turnover
CAPTAC	(Conférence des administrations des postes et télécommunications de l'Afrique centrale) - Conference of Central African Post and Telecommunication Administrations
COMESA	Common Market for Eastern and Southern Africa (ex PTA)
DANIDA	Danish International Development Agency
ECA	Economic Community for Africa
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community for West African States
~~EC~~	~~European Commission~~
ESMT	Advanced Multinational Telecommunication Institute (Dakar, Senegal)
EU	European Union
FAO	Food and Agricultural Organization of the United Nations
~~GATT~~	~~General Agreement on Tariffs and Trade~~
IBRD	International Bank for Reconstruction and Development
ILO	International Labour Organization
IMF	International Monetary Fund
MIGA	Multilateral Investment Guarantee Agency
NRA	National Regulatory Authority
OAU	Organization of African Unity
ONA	Open Network Architecture
ONP	Open Network Provision
OSI	Open Systems Interconnection.
PATU	Panafrican Telecommunication Union
~~PTA~~	~~Preferential Trade Area~~
SADC	The Southern Africa Development Community: a political and economic gouping of the Southern African States
SATCC	The Southern Africa Transport and Communications Commission: the specialized branch of the SADC for the transport and communication sector
SIDA	Swedish International Development Agency
SNA	System Network Architecture

~~UAPT~~	~~(Union africaine des postes et télécommunications) - African Posts and Telecommunication Union~~
UDEAC	(Union douanière et économique de l'Afrique centrale) - Central African Customs and Economic Union
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organization
VSAT	Very small aperture terminal.
WAEC	West African Economic Community
WTO	World Trade Organisation

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 3-E
14 March 1996
Original: French

For Information/Support

Agenda item: 0.2

PLENARY MEETING

SOURCE: BURUNDI

TITLE: CONTRIBUTION TO AF-RTDC-96

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1 Introduction

Today's telecommunication sector is the outcome of various transformations resulting from technological progress, including network digitization, which, aided by the worldwide trend towards liberalization, has ushered in a multiplicity of services.

As of early 1980, Burundi, not wishing to be left out of this process, characterized by profound changes in the sector throughout the world, resolutely joined in, removing its telecommunication service from the general framework of administrative services and making it autonomous in terms of its operation and financial management.

2 Current situation

The *Office National des Télécommunications* (ONATEL), established by Decree No. 100/146 of 8 November 1979, is a financially independent commercial and industrial public corporation under the administrative supervision of the Ministry of Transport, Posts and Telecommunications. Its purpose is to manage telecommunications. It holds the monopoly for the construction and operation of public networks.

Since its establishment, ONATEL has concentrated in particular on developing national and international telecommunications to provide effective support to the country's economic activities.

The network development stages have been as follows:

1980: Entry into service of earth station (48 circuits).

1984: Entry into service of national and international transit centre and automation of main international relations.

1985: Modernization of primary exchanges and establishment of second telephone exchange at Bujumbura.

1987:
- Modernization of radio-relay links serving the primary exchanges and establishment of three new telephone exchanges.
- Refurbishment of local networks.

1990: Replacement of Bujumbura's analogue exchange by an E10B digital exchange and its 15 000-line sub-centre.

1993: Entry into service of the Kagera River Basin Organization (OBK) inter-regional link, covering Burundi, Rwanda, Tanzania and Uganda.

1994: Entry into service of second IDR earth station at Bujumbura (60 circuits), addition of 2 000 lines to the E10B exchange, and installation of international transit function in the E10B.

Throughout these stages in the development of Burundi's telecommunication services, the State has maintained its public authority monopoly.

3 Future situation

In order to improve and increase the productivity and competitiveness of this sector, which is of vital importance to the national economy, the Government has decided to fully restructure it.

This voluntaristic restructuring policy has been formulated and announced with a view to satisfying the manifold requirements of business telecommunications as well as those of urban and rural populations.

The following objectives have been set:

- to establish the Government's responsibility for sectoral policy and the establishment and regulation of strategy, as opposed to operation, which is left up to the service providers;
- to strengthen the public telecommunication operator's organization and management, as well as its autonomy in terms of responsibility and commercial competence;
- to digitize the network, upgrading and maintaining quality of service;
- to extend the geographical coverage of the telecommunication network in order to better satisfy the growing demand for services;
- to ensure easy access to leading-edge technology.

To achieve these objectives, it is recommended that the monopoly give way to liberalization, with participation by private investors and administrators on a competitive basis.

The restructuring plan foresees the gradual liberalization and privatization of the sector, with a view to bringing telecommunications to the entire country and to opening up the sector to private participation.

It goes without saying that caution and discernment are essential components of this process, the prime consideration being that telecommunications is a strategic sector with a public service mandate.

This move to open up the sector to private operator competition must take place within a fully developed and unambiguous legal and institutional framework.

The legal and regulatory framework adopted must as a minimum:

- establish the rules of the game for all players involved, including the State;
- allow competition within a formal regulatory framework;
- attract economic operators.

4 New legal and institutional framework

The above-mentioned legal framework comprises three sets of legal provisions governing all telecommunication activities.

They are as follows:

a) Provisions governing exclusive rights or licensing
   - network infrastructures open to the public;
   - basic telephone service;
   - telex service.

b) Provisions governing regulated competition or authorization
   - construction and operation of radio networks;
   - provision of radio services;
   - provision of back-up services.

c) Provisions governing free competition
   - terminal equipment;
   - value-added networks and services.

As to the new institutional framework that will govern telecommunications, management of the sector will be two-tiered:

a) the Government;

b) the telecommunication standardization and regulatory body, the functions of which will be specified at a later stage.

5 Network development

With a view to bringing telecommunications to all areas of the country, the intention is to establish a telephone-based integrated digital network (IDN). This is an evolving network meeting the requirement for a single structure accommodating all of the various components (such as switching, transmission, signalling, etc.).

To achieve this, ONATEL has recommended the following approaches:

1) Refurbishment of switching installations

   1.1 Local exchanges

   Owing to the insufficient number and saturation of circuit interfaces, it is proposed to re-equip the 15 local exchanges in the interior of the country, eleven of which will be replaced by digital concentrators, while the other four will be taken up on the TDMA systems set up for rural service purposes.

1.2 Primary exchanges in the interior

Installation of these subscriber access units requires the setting up of digital switching units to act as home exchanges and to extend the service of these locations, which are currently served by primary analogue exchanges. The exchanges will be linked to the Bujumbura E10B centre or, to the second server exchange at Gitega (in the centre of the country), as appropriate.

1.3 International

In the light of the installation of the IDR earth station, it was essential that the E10B exchange be equipped with international management software (CT3) to enable it to manage the international digital circuits connecting to France and Belgium.

2) Refurbishment of transmission equipment

The pressing need to establish local digital exchanges and to renew secondary routes dating back to 1969 and 1976 makes a good argument in favour of the rapid introduction of digital technology for transmission routes.

The strategy adopted to this end is to equip the main routes with a 34 Mbit/s system and the secondary routes with an 8 Mbit/s system with radio-relay equipment capable of routing, without major modification, either the 8 or 34 Mbit/s rates, thus making the network highly flexible.

3) Rural service

In Burundi, all main towns and secondary centres have an exchange. Rural service applies to the scattered settlements and many villages throughout the country, and is a priority for ONATEL.

At present 60 locations are targeted, for which time division multiple access (TDMA) radio link systems have been selected.

Part of the programme has already been initiated. Four digital exchanges and associated radio-relay links, purchased with ONATEL equity capital, are currently being installed.

The IDR earth station and the digital international and national transit CT3 function are already in operation and installation work at the 60 targeted locations has now begun. The programme was due to be completed in 1997, but difficulties in finding the necessary funds will make this impossible.

6 Possibilities for investment in the telecommunication sector

Given the way that restructuring of the telecommunication sector in Burundi is proceeding, the following investment scenarios may be contemplated:

1) funding by competitive donors;

2) privatization of the operating company's capital, thereby opening the way to the acquisition of shares by means of a procedure along the lines of calling for tenders;

3) joint venture involving foreign and/or national investors in a build/transfer/operate arrangement.

Participation by our usual donors in the funding of telecommunication projects has for some time been contingent upon ONATEL's reform. Steps have now been taken to initiate that reform; in November 1995, the Government approved the declaration of a sectoral policy for

telecommunications; a draft law on the organization of telecommunications will be put to Parliament in April; and ONATEL's restructuring will follow the law's enactment.

The Government therefore hopes that the donors will resume their participation.

A further recommended source of funding is to be found in regional or continental projects such as "Africa ONE".

These are the basic features of Burundi's new legal framework for the telecommunications sector.

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Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 4-E
20 March 1996
Original: English

For Information/Support

Agenda item: 1.1

PLENARY MEETING

SOURCE: SUDATEL, SUDAN

TITLE: SUDAN TELECOMMUNICATION SECTOR - RESTRUCTURING

Preamble

After long dependence on governments in developed countries for public enterprises to achieve their national goals and starting from the early 1980's, public enterprises role in national economies was always in focus. This was clear in papers from all parties concerned: policy makers, international monetary funds and agencies, the World Bank, Ministries of finance and national economy and consultants.

This situation and conclusions were due to the fact that public enterprises became a heavy burden on national budgets due to very poor performance. Also, in Sudan the situation was the same. The Ministry of Finance and national economy and after long reforming programmes complained about the lack of accountability of public enterprises. Then the government decided that privatization should be one of the options.

The Sudanese Telecom Sector (STPC) was relatively underdeveloped due to:

- lack of finance;
- unqualified management;
- overstaffing;
- lack of accountability;
- foreign currency allocation problems;
- poor networks, poor performance and poor services.

It was clear that to keep the telecom sector as a government monopoly was no longer an option. In 1990, steps towards reforming public enterprises started by issuing the 1990 Public Corporations Disposal Committee Act. In December 1992, a memorandum of association to establish the Sudan Telecommunication Company (Sudatel) was signed by promoters. Then the agreement between the

government and Sudatel was signed in April 1993. It was clear from the very beginning in the minds of Sudatel top management, the significance of how to make a business oriented company by making the best use of time, techniques and people. In the agreement, very important issues were touched upon:

- the capital was to be in hard currency;
- the company had the right to establish a bank A/C in $;
- the company was entitled to look for finance from the international market, world Arab funds, Islamic bank, African bank for development etc.;
- concessions from taxes and custom duties in accordance with the Investment Encouraging Act 1990.

For Sudatel, shaping of the core ideas was of critical importance. The tool for that was making a Business Plan. In the Sudatel Business Plan (1995-1999) the missions and objectives were clearly defined and Sudatel was ready to enter a challenging innovative phase.

In general, the Business Plan is to:

- help the management team to establish strategies;
- help clearly define action programmes;
- help clearly determine performance targets;
- help determine continued financial stability by maximizing and optimizing efficiency of operations and minimizing costs.

Constraints

The weakness of the telecommunication sector in developing countries lies in policies, investment and organization and management. These factors are partly interrelated. In order to improve telecommunication performance, these three main constraints should be resolved.

Policies are always inadequate. The vision of the sector's contribution to development is always missed. Also, the vision is highly distorted by political interference. Enterprises are usually viewed as traditional public sector utilities without regard to their business character and resources mobilization potential. In particular, low incentive is offered to promote staff, to attract and retain competent telecommunication engineers. Operations and services are not based on market principles. The tariffs that reflect costs suffer from government interference in management. This situation is governed by old laws. Telecommunications investment requires foreign currency, but all developing countries have limited resources. The situation for foreign capital market to invest is not attractive, because the telecommunication sector is operated in a non-profitable manner.

On average, about $US 1 500 is needed to provide one additional telephone line, of which 50-80% is in foreign exchange in most countries. Also, telecommunications enterprises are subject to investment ceilings.

Organization and management is one of the main difficulties in the telecommunication sector, which results in high expansion and operating costs, poor maintenance, poor planning and marketing, lack of technical vision and limited capability for project preparation and implementation. The telecommunication wheel cannot be accelerated even where more funds are made available.

Management information system (MIS)

The challenge now is to find effective and efficient methods and procedures to run the business using people, techniques and time.

Sudatel is hoping to introduce MIS by the end of 1996. The system should be implemented to make it possible to use the force of information for decision making to achieve an improved maintenance system for networks, to help to translate the feature need and development programmes and to achieve a total management network at the end.

Human resources

The Sudanese governmental telecom sector suffers from overstaffing and unqualified management problems. Also, customer satisfaction and services performance are very poor. Hence, Sudatel must concentrate on manpower development so as to be a competent operator in Africa.

The Sudatel strategy is to develop a plan to achieve the manpower demand, to attract competent engineers, qualified and experienced managers. These objectives are changing the company culture towards a culture which is based on the following values:

- All the efforts and activities should ultimately contribute to a more satisfied customer and an efficient performance of the company.
- A high focus on the quality of the output of all activities in terms of requirements, money and time.
- A systematic way of working, based on clear plans and control of the realization of these plans.
- Employees are a crucial factor in the performance of the company; this means good working conditions, adequate salaries, proper training and tools and close supervision and coaching.
- Initiative, creativity, stamina and cooperation are essential for everybody to overcome the problems which the environment is presenting.
- Awareness of employees and managers of these values and the willingness and ability to behave accordingly within the context of Sudanese social values.

A company-wide programme should be developed and implemented to translate these valued tangible objectives, to communicate these objectives to train and coach the employees and to set up proper conditions.

Financing policies

The revenues of Sudatel are mainly in local currency and the investments will be in hard currency. To meet the challenge of needed investment, it is necessary to:

- accelerate growth of international traffic to increase hard currency generated;
- attract manufactures who are intending to be paid in local currency;
- use available own capital;
- attract the World Bank and Development Bank to finance Sudatel projects.

Also there are other alternatives which could be considered carefully:

- strategic alliance with a comparable telecom operator;
- feasible joint ventures with local and foreign investors.

An overall cost based tariffing policy for all services is one of the important issues of marketing strategies. Sudatel is monopolizing international traffic in Sudan. So, we are really thinking of introducing the best service and that cost tariff orienting is very important.

Still we have to look to the international market and rules applied there in accordance with international telecommunications regulations and must always consider the exchange rate of our currency. We are also hoping to generate hard currency from the international administrations and to use the money in our investment programmes.

Technology transfer

The technology changes are due to accidental failures in engineering construction or new scientific discoveries. The main mentality of change leads to progress and development of technologies. In Sudan, technology transfer is at levels of using, operating and maintaining. Operation and maintenance have not reached their maximum standard. For example, people are familiar with computers, but they are still used for very limited purposes.

A competent telecommunication engineer is highly considered as having experience, not only in Sudan but also regionally and internationally. Also, this will be a seed for the telecommunication industry in Sudan. Policies have been decided to develop training. This includes self training by supplying the library with new books, video tapes and group discussions. Training can be outside Sudan so as to know the new techniques and to exchange ideas with foreign experts. Consultancy is a kind of technology transfer. Also, hosting seminars, workshops and conferences is welcomed so as to develop the Sudanese technical system. All these things will enhance the engineers at the research and development stage. A high effort is expected to push the technological wheel in Sudan.

Regulatory body

In Sudan, there is a need for an enormous infusion of expertise and venture capital to increase the nations telephone density which is one of the lowest in the world, reduce time for telephone installation and service delivery, advance in technology diversification and complexity of user needs, and also improve call completion rates generally. The only way to speed up improvement in the Sudan telecommunications facilities is by deregulation.

The idea of privitization in Sudan started in 1992. Hence, the authority took a decision to form a regulatory body. The regulatory body law was approved by the authority. Now the council structure is under processing. The council may be formed before the end of this year. It may be headed by the sector minister. The budget of the council will be of governmental responsibility. The telecommunication law, which was written in 1974, may be revised so as to accommodate the changes occurred during this period. The council will be fully independent and its decisions will be coherent with the Sudanese telecommunications law.

Conclusions

Telecommunication reforms have no doubt their potentialities in improving telecommunication infrastructure and lead to the enhancement of socio-economic development.

As a result of telecommunication sector restructuring, the Sudan telecommunications company (Sudatel) was established, which is a private company.

Sudatel has made great changes to date. It implemented a new standard, an earth station, international exchange, optical fibre transmission system for greater Khartoum. Also, contracts have been signed for a GSM with ten thousand subscribers, a domestic satellite communications network, a copper cable network and digital exchanges with a capacity of 125 thousand lines. Before the end of the first half of 1996, the Khartoum area will be digitalized. Also, the digitalization process has started in the main cities, e.g. Port Sudan, Wad Medani, Kosti and Gedarif. The backbone will be replaced very soon by a digital one.

There are projects under process for new services such as Internet, data communication and paging.

The peripherals of telecommunications have been released to the private market. This will give the operator time to concentrate mainly on the network structure. The Sudan Telecommunications Public Corporation (STPC) was resolved by the end of 1995. New operators are expected in the future.

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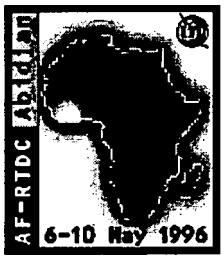

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 5-E
14 March 1996
Original: English

For Information/Support

Agenda item: 0.2 **PLENARY MEETING**

SOURCE: MOZAMBIQUE

TITLE: LEGISLATIVE, STRUCTURAL AND REGULATORY REFORM - THE CASE OF MOZAMBIQUE 1981-1993

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1 Introduction

1.1 Situation at independence (1975)

When Mozambique achieved its national independence in 1975, it inherited from the colonial administration the traditional set-up of a postal and telecommunications structure integrated in the state apparatus (Direcção dos Serviços dos Correios, Telégrafos e Telefones - CTT), without a clear distinction between legislative, regulatory and operational functions.

1.2 Separation of posts and telecommunications (1981)

The first major reform was carried through already in 1981 with the extinction of CTT and the creation of two distinct parastatals, one for telecommunications (Telecomunicações de Moçambique, EE -TDM) and one for the postal services (Correios de Moçambique, EE - CDM). Although this brought about a clear division of responsibilities at operational level, it did not yet lead to a well defined separation of policy-making, regulatory and operational functions.

1.3 Preparation of subsequent reforms

Ten years later, during 1991 and 1992, subsequent major reforms were prepared and implemented as from 1993 onwards. These covered all three levels of activity and resulted in the promulgation of a new telecommunications law, the creation of a regulatory body and the transformation of the two parastatals into government-owned public companies with a much higher degree of autonomy.

2 The telecommunications law of 1992 (Law 22/92)

2.1 Background

In recent years, rapid innovation in telecommunications technologies and their respective applications have brought about fundamental changes in the telecommunications market. The telecommunications law, promulgated in 1992, constituted a first response of substance to these changes and a first step in a process of legislative reform. The law defines the fundamental principles to be observed in the establishment, management and exploitation of telecommunications infrastructures and services.

2.2 Public and private telecommunications

The law distinguishes between private and public telecommunications, depending on the type of user.

Public telecommunications are defined as those aimed at satisfying the general collective need to transmit and receive messages and information. These may be either for public use (implying a specific destination) or broadcast telecommunications (radio and television).

Private telecommunications may be used by the State, by the defence and security forces, by rail and port companies, when dedicated exclusively to company activities or by other entities.

2.3 Management of the national radioelectric frequency spectrum

The national radioelectrical frequency spectrum forms an integral part of the public domain of the State and the space through which radioelectrical waves can be propagated is the public radioelectrical domain. The State is responsible for the management, administration and inspection of this domain, in compliance with special legislation related to the relevant international treaties and agreements to which the country adheres.

2.4 Jurisdiction of the State in the telecommunications field

The State has superintendence and inspection prerogatives in relation to telecommunications and the activities of telecommunications operating companies, in accordance with the applicable laws and regulations. It lays down the strategic guidelines for the development of the national telecommunications system.

2.5 The planning and coordination of the national telecommunications network

The modernization and development of the network of infrastructures for the various civil communications systems, including those for radio and television broadcasting, must be adequately coordinated, so as to ensure the rational use of these systems and thus better satisfy the needs of socio-economic development, national defence, internal security and civil protection.

Thus the law states that the government must take the necessary measures to comply with these requirements, articulating them with policies on national defence, internal security, civil protection, industry, scientific research, technological development, the regional development of the country and the correction of regional imbalances.

2.6 Telecommunications for public use

The law defines that the state must guarantee the existence and availability of a basic telecommunications service for public use, termed the public telecommunications service, which covers the communications needs of citizens and of economic and social activities throughout the country and ensures international connections, taking into consideration the requirements of harmonious and balanced economic and social development.

The public telecommunications service assured by the State comprises the public telephone service and the public telex service and is provided exclusively by the public telecommunications operator through the public telecommunications network.

The public telecommunications network must operate as an open network, providing support for the transmission of all telecommunications services, irrespective of whether or not the services are being provided by the public telecommunications operator.

The infrastructures comprising the public telecommunications network are the property of the State public domain and are assigned by law to the public telecommunications operator.

2.7 Complementary telecommunications infrastructures and services

The law defines the complementary telecommunications infrastructures as all those for public use which do not form part of the public telecommunications network.

The establishment, exploitation and management of the complementary telecommunications infrastructures is the responsibility of the licensed operators.

The exploitation of telecommunications services involving the use of complementary telecommunications infrastructures can be undertaken by the public telecommunications operator or by complementary telecommunications companies duly licensed to this effect.

2.8 Value added services

The law defines value added services as those which, using the public service or the complementary services, do not require their own telecommunications infrastructures, and which can be differentiated from the particular services which support them.

Value added services can be provided by any individual or collective body authorized to do so in accordance with the regulations governing admission to the activity, as well as the public telecommunications operator and complementary telecommunications companies.

2.9 Independence of functions

The law stipulates that the government will take the legislative measures it considers necessary in order to ensure the independence of the regulatory functions of telecommunications sector activities, from the functions of the public telecommunications and complementary telecommunications network operators and the value added telecommunications operators.

2.10 Protection of competition

The law states that the public telecommunications operator must ensure that all telecommunications operators use the public telecommunications network under equal conditions of competition. When

the public telecommunications operator provides complementary telecommunications services or value added services, any unfair competition or abuse of its predominant position is forbidden.

The use of circuits rented from the public telecommunications operator is limited to the user himself or to the provision of complementary services, and value added services. Their re-sale is forbidden.

2.11 Public use of telecommunications services

The law defines that access to the telecommunications network for public use must be guaranteed through non-discriminatory, objective and transparent conditions.

The public telecommunications operator and the suppliers of complementary telecommunications services and value added services must respect the principle of equal treatment of users, irrespective of the content of the message to be transmitted.

2.12 Terminal equipment

Under the law the acquisition, installation and conservation of subscribers' terminal equipment is unrestricted, but manufacturers, importers, sellers and renters of terminal equipment destined to be connected to the telecommunications network for public use, must request approval of the same by the Government, in order to ensure that the network functions properly.

Terminal equipment installation and maintenance services for subscribers to the telecommunications network for public use can only be provided by appropriately technically qualified and duly authorized individuals or collective bodies.

The operators of telecommunications for public use must ensure adequate connections to the terminals of their networks irrespective of whether or not the subscriber's terminal equipment is the user's property.

2.13 General principles on the establishment of tariffs and prices

The tariffs and prices for telecommunications for public use provided on an exclusive basis are subject to Government approval in accordance with applicable legislation, while the prices of the remaining services are fixed by the operators, without prejudice to the rules laid down in their respective licences.

2.14 Foreign capital

Direct or indirect participation by foreign individuals or collective bodies in the share capital of complementary telecommunications or value added operators cannot be more than 50%, although the Government can fix other percentages by decree, on a case-by-case basis.

3 The establishment of a regulatory body (INCM)

3.1 Character

A regulatory body for the communications sector was created through a decree approved by the Council of Ministers in September 1992 (Decree 22/92) with the designation Instituto Nacional das Comunicações de Moçambique - INCM (National Communications Institute of Mozambique).

The INCM is a public institute, a corporate entity with administrative and financial autonomy, subordinated to the Ministry of Transport and Communications, with the aim of assisting the Government in coordinating supervising and planning the sector concerned with communications for public use, and in managing the radioelectric frequency spectrum.

The institute thus is responsible for the postal and telecommunications sector, but only deals with social communications, when the use of the frequency spectrum is involved.

3.2 Functions

The functions of the institute are the following:

a) To actively collaborate in the definition of communications policy measures in Mozambique.

b) To advise the Government in the exercise of its supervisory functions.

c) To coordinate, nationwide, everything to do with the implementation of international treaties, conventions and agreements related to communications, as well as the representation of the Mozambican State in corresponding international bodies, when not otherwise determined.

d) To approve materials and equipment (including radiocommunications transmitters and receivers) and, in collaboration with other bodies, to define standards and technical specifications.

e) To mange the radioelectric frequency spectrum.

f) To licence operators of communications for public use, and those providing value added services.

g) To prepare the necessary studies for coordination between civil communications and those of the defence and security forces, and between the operators of communications for public use and the operators of social communications.

h) To undertake the necessary studies for the coordination of the infrastructures of the various civilian telecommunications systems, including radio and television broadcasting.

3.3 Management and organic structure

The management of the institute, with full executive powers, comprises a director, a deputy director (equivalent to a national director and deputy national director respectively), and the department heads. All members of the management are appointed by the Minister of Transport and Communications.

There are four departments in the institute:

a) studies, planning regulation and international relations;

b) management of the spectrum and radioelectric inspection;

c) standardization and approvals;

d) administration and finance.

3.4 Revenues

INCM revenues mainly come from the following sources:

a) fees and other revenues collected within the context of the management of the radioelectric frequency spectrum;

b) fees and other revenues collected within the context of licensing and inspecting the suppliers of communications services;

c) fixed contributions by operators of telecommunication for public use.

The contributions by operators of telecommunications for public use are determined annually and in advance by the Minister of Transport and Communications, on the basis of the budget proposal submitted by the management.

3.5 Staffing

The institute's staff mainly comes from two sources:

a) the transfer of some staff from the Ministry of Transport and Communications;

b) the transfer of some staff from companies Telecomunicações de Moçambique and Correios de Moçambique.

The integration of these workers has taken place without prejudice to their previously acquired rights and without impairing the obligations imposed by their new status.

4 The transformation of TDM into a public company

4.1 Background

The transformation of the national telecommunications operator was carried out on the basis of Law 15/91 which established the norms for restructuring, transforming and rescaling the parastatal sector, establishing that the current state enterprises in sectors or with activities of a strategic nature, the provision of essential public services for the community being considered as such, should remain in the state enterprise sector.

In addition, Law 17/91 introduced a new legal system for enterprises owned by the State, thus originating profound alterations in the management of companies with state capital, and requiring the modification of the articles of association of state enterprises, which were to be transformed into public companies.

Thus the Empresa Nacional de Telecomunicações de Moçambique created in 1981 as a parastatal, was one of the first enterprises to be converted into a public company, with the designation Empresa Nacional de Telecomunicações de Moçambique, E.P., abbreviated Telecomunicações de Moçambique, E.P. (TDM).

4.2 Nature and objective

TDM is a public company, a corporate entity with administrative and financial autonomy, carrying out its activity under the Ministry of Transport and Communications.

The main objective of TDM is the planning, installation and operation of the national and international public telecommunications service, which includes the public telephone and telex services, provided exclusively by the company.

4.3 Management bodies

The management organs of TDM are the Board of Directors and the Audit Council.

The Board of Directors comprises seven members, one of whom is the Chairman. The Chairman of the Board of Directors is appointed by the Council of Ministers, while the remaining members are appointed by the Minister of Transport and Communications. One of the members of the Board of Directors is proposed by the Minister of Finance and represents the Ministry of Finance, while another member of the Board of Directors is a representative elected by the workers. The Chairman of the Board of Directors proposes to the Minister of Transport and Communications the appointment of the remaining four members.

The members of the Board of Directors have a mandate of three years, renewable for equal periods.

4.4 Programme contract

The activities of TDM are written into a programme contract, signed for a period of three years between the Minister of Planning and Finance, the Minister of Transport and Communications and the Chairman of the Board of Directors of the company.

The programme contract defines:

a) The strategic guidelines for the company.

b) The global objectives of tariff developments for public services provided exclusively by the company.

c) The main social, economic and financial guidelines for the company, in particular total salary commitments, investments and financing requirements.

d) The principles underlying the application of profits.

e) The criteria for assessing expected profits and the nature of the respective indicators.

The programme contract is prepared on the basis of projected economic parameters outside the company's activity and the difference between the real evolution of these parameters and their projected evolution in the programme contract results in annual adjustments.

4.5 Tariffs

The tariffs for national services provided exclusively by TDM are fixed by the government in accordance with the law, on the basis of a proposal by the company.

The tariffs for international services are fixed by the company, taking into account the recommendations of the competent international bodies, competition in the international market and agreements signed with similar companies abroad.

The tariffs for the services provided by the company under competition are freely established by the company.

4.6 Financial autonomy

TDM has the exclusive competence to collect the revenue from its activity and to undertake all the expenditure inherent in the pursuance of its objective.

TDM may obtain short-, medium- and long-term loans in national or foreign currency, in accordance with applicable legislation. It can also issue shares, when duly authorized by the Minister of Finance.

The state or other public entities may provide TDM with subsidies or interest-free loans. The subsidies provided to the company by the state are the counterpart of the special obligations imposed by the state.

4.7 Instruments of projection management

The economic and financial management of TDM is controlled by the following projection management tools:

a) Pluri-annual activity and financial plans.

b) Separate annual activity plans and budgets, including at least operations, investment, finance and foreign exchange activities and their updating.

c) Quarterly control reports on operating, investment, finance and foreign exchange activities and their respective budgets.

5 Situation in 1996 and perspectives

5.1 At legislative level

Following the publication of the telecommunications law of 1992, specific legislation has been published for radiocommunications and value-added services. Other specific legislation is under preparation.

Meanwhile, considering the ongoing structural changes in the Mozambican economy, including new legislation on foreign investment, and the rapid changes in the telecommunications sector worldwide, the basic telecommunications law itself will soon have to be updated.

5.2 At regulatory level

The creation of the National Communications Institute of Mozambique will contribute to the clarification of the specific roles of different players in the communications field. It is expected that only a clear separation of regulatory and operators functions will open up the road for the entrance of new partners, be it private companies that enter into joint-ventures with the Government-owned public companies or be it companies that enter into the market as competitors. Thus the existence of the Regulatory Body as a separate entity will contribute to the diversification and development of the communications services in Mozambique.

5.3 At operator's level

The institutional changes carried through in 1981 and 1992/93 were timely ones and permitted an ongoing modernization and development of the telecommunication network and services provided.

In January 1996 a major organizational change was started in TDM reinforcing the financial and commercial functions and reducing the number of hierarchical levels from seven to five.

However, considering the continuing rapid changes in technology, services available and market structure, further steps will soon have to be taken. Various scenarios are being drawn up and under consideration, in order to define the best road to follow and the next steps to be taken.

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AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 6-E
14 March 1996
Original: French

For Action

Agenda items: 2.4 and 3.1 **PLENARY MEETING**

SOURCE: ZAIRE

TITLE: PART I - MECHANISMS FOR FINANCING TELECOMMUNICATION DEVELOPMENT: REGIONAL AND SUBREGIONAL COOPERATION
PART II - REVITALIZATION OF PANAFTEL PROJECT

PART I - MECHANISM FOR FINANCING TELECOMMUNICATION DEVELOPMENT: REGIONAL AND SUBREGIONAL COOPERATION (AGENDA ITEM 3.1)

1 General

No one will deny that telecommunications play a fundamental role in the social and economic development of African countries, facilitating the integration of the region. The inadequate nature of the existing telecommunication infrastructure and the need to speed up the development of telecommunication networks should be a matter of concern for everyone. However, African telecommunication administrations come up against one major problem, namely, the difficulty of obtaining adequate loans to finance their telecommunication projects.

Despite the adoption of numerous resolutions on the subject requesting countries that are members of OAU to give the highest priority to the funding of telecommunication projects, with preference for multilateral financing rather than other arrangements, investment in telecommunications represents no more than some 0.3% of gross national product (GNP). This relatively low level of investment is not due to lack of demand for telecommunication services, as the supply of telephone and telex services has always lagged considerably behind the demand. There are, however, many other reasons for the low investment in telecommunications in our developing countries.

These reasons include:

- lack of interest in financing the telecommunication sector on the part of sources of funds;
- lengthy procedures for granting loans;

- Governments' lack of funds and borrowing capacity;
- poor performance of telecommunication operating agencies;
- poor management of structures and frameworks for cooperation.

2 Current situation

2.1 Lack of interest in financing investment in the telecommunication sector on the part of sources of funds

It has always been assumed that the reason why the sources of funds are showing less and less interest in financing the telecommunication sector is the monopoly system that has hitherto applied in our developing countries, making telecommunications a government sector.

For example, one major funding institute, the World Bank, has restricted its role in the telecommunication sector to that of lender of last resort. In other words, it only involves itself in the sector directly when appropriate financial assistance cannot be obtained from other sources and when lack of investment or other problems in this sector are identified as reasons why a country's social and economic development has fallen behind.

There is indeed no denying that the World Bank's current role is somewhat more restricted in the field of telecommunications than in various other sectors. This is due in particular to the fact that the Bank is channelling its loans more towards projects with a significant direct and demonstrable impact on the 40% of countries in the lower income group, i.e. projects for rural development, agricultural engineering, nutrition or water supplies.

It may be noted that the World Bank's loans for telecommunication investment projects have reached the record level of $5 billion. However, this amount represents no more than 2% of the Bank's total loans.

The regional development banks, for their part, allocate less than 3% of their total loans to the telecommunication sector.

UNDP is calling back on its allocations for telecommunications and looking more towards new priority areas.

All these elements are a handicap to the telecommunication sector.

2.2 Lengthy procedures for granting loans

A further and no less important cause of underinvestment in the telecommunication sector is the procedure for granting loans. To take just one example, access to World Bank loans for telecommunications normally begins with a request submitted by a member country's Government. If the Bank decides that it should concern itself with the sector in that country, the request is examined by the Bank staff and a mission is sent to the country to carry out a sectoral study, covering access to and quality of telecommunication services, policy, financing, organization and institutions. If the Bank then decides to allocate credits for telecommunications in the country in question, a project is prepared and the Bank staff assigned to the project revisit the country, usually for project identification and pre-assessment. Five to six months after this assessment mission, the project will have been fully prepared and negotiated with the officials of the country concerned and will be ready for submission to the Bank's Board of Governors.

This entire process usually takes one to three years depending on how much work is required to prepare the project. If the Board of Governors approves the loans under the project, over the next few years the Bank staff assigned to the project will remain in close contact with the telecommunication organization concerned, to monitor the project's implementation, the organization's profitability, and compliance with the loan conditions.

Over this period, several monitoring missions will be undertaken, along with a final mission on the completion of this project.

This is a very lengthy process, and it should be borne in mind that the World Bank is the main source of multilateral funding for telecommunications in developing countries.

Under investment in telecommunications may be further explained by the fact that in our developing countries, the sector is not well structured and regulated, and in particular the operating agencies are not properly managed and supervised. This does nothing to encourage investors.

2.3 Governments' lack of funds and borrowing capacity

Investment requirements in the telecommunication sector are increasing considerably, the objective being to realise the potential profits. To achieve that end, it is necessary to create conditions to encourage investment, which should be regarded as a key element and integral part of each country's telecommunication policy.

In the countries in the African region, apart from a few exceptions that have emerged recently here and there, the telecommunication operators belong to the public sector. Hence a Governments' lack of funds or borrowing capacity often means low investment in telecommunications.

A new phenomenon has been observed in those developing countries with well-planned economies: certain social groups are prospering and thus have savings to invest.

Generally speaking, telecommunications is still regarded as a very good sector in which to invest. It is an additional channel for private sector funding, whether national or foreign. This nevertheless presupposes major modification of the sector's structure, to allow private investment in telecommunications.

It is obvious that a great deal of capital will have to be mobilized in order to meet the requirements of telecommunication development. As we have said, most of our countries operate their telecommunications through State enterprises, whose management is under the control of the authorities. Sources of funds which would otherwise view the sector as a good investment opportunity find this unsatisfactory management situation an obstacle, so that national officials are obliged to seek other means of mobilizing capital.

2.4 Poor performance of telecommunication operating agencies

It may be noted that many telecommunication operators are capable of operating efficiently, but are handicapped by a lack of qualified technical staff, managers and planners.

In addition, institutional problems, lack of respect for commercial users, excessive political intervention in everyday management and bureaucratic insertia all reduce operating efficiency and remove the incentive for outside providers of capital to invest in or finance telecommunications.

If the problem of inefficient operation can be resolved, investment can usually be found for development of the telecommunication sector. In other words, the more the telecommunication

operating agencies are independent from the general civil service administration, the more likely they are to be regarded by potential investors as sound commercial enterprises.

It can be seen, therefore, that the best way of dealing with the situation today is to take steps that will allow capital to be secured from private and even public national sources and enable more appropriate funding agreements to be concluded with investors, manufacturers and/or service providers.

2.5 Poor management of regional and subregional structures and frameworks for cooperation

It should be borne in mind that cooperation is both an obligation and a necessity in telecommunications, regardless of the development level of the parties concerned. It is essential that the African countries should come to realize that since their objectives are similar and their requirements complementary they ought to combine their resources in order to optimize results and, collectively, make the best use of the region's resources.

Cooperation structures and frameworks exist both at the regional and the international level, but it is their rational management that poses problems.

At all events, it should be stressed that cooperation will benefit the region only if it reinforces or complements local initiatives. Otherwise, it will be quite pointless.

We can only agree with ideas already put forward by other telecommunication experts regarding the existence in Africa of a multitude of organizations wholly or partially involved in telecommunications such as PATU, CAPTAC, ECA, ECOWAS, RASCOM, or the Economic Community of Central African States. Some countries contribute financially to at least ten such bodies, but unfortunately do not seem to reap all the benefits promised by this wealth of machinery.

In practice, many of these organizations suffer from serious shortcomings, both in the definition of their mandates and in the resources available to them.

This plethora of structures at the subregional, regional and international levels, for cooperation and even assistance in telecommunication development, results in a dispersal of efforts and resources when different activities undertaken in one place or another for the same objective and same beneficiary are not properly coordinated, despite the existence of organizations responsible for coordinating regional development.

3 Recommendations at the regional and subregional level

3.1 Restructuring of organizations

Regional and subregional organizations should perform the function of helping to formulate general policy for the sector. Given their number and the fact that they have the same objectives, it is essential to streamline and rationalize them so as to make them more effective and better coordinated. This will provide them with the structure and resources they need in order to respond to the region's investment requirements.

If, for example, there was a single, effective, properly-funded regional telecommunication organization, it could be very useful in organizing the telecommunication sector.

The regional organization could whenever appropriate cooperate with the United Nations regional economic commissions (ECA, etc.) and regional development banks (ADB, etc.) in the examination

and evaluation of different development strategies for individual countries or groups of countries in the region, or for the region as a whole.

3.2 Regional planning

It would be preferable to organize regional planning for telecommunication networks. The major investment involved in the purchase and installation of equipment would be more economic and profitable if it were undertaken at the regional level, as the same equipment could be held collectively and used by more than one country. Funding would be facilitated by regional agreements.

3.3 Regional programme

Organization at the regional level would make it easier to respond to the ITU's initiatives with regard to the BDT's action plan to assist developing countries.

The ITU's main concern is to make effective use of the limited resources available under the Development Sector's budget. The action plan basically deals with coordinated activities of regional importance. The strategy of having a single, effective, regional organization, simply to plan the region's telecommunication requirements in the light of the specific needs of individual countries or groups of countries, would provide the best means of furthering the aims of the ITU, which, in association with its development partners, will provide every possible support for the region's programme.

- **Recommendation 1**

The member States of the OAU should adopt a resolution under which Africa would keep only one regional telecommunication organization, namely, the Pan African Telecommunication Union (PATU), and to abolish all other organizations having the same objectives.

At the subregional level, those organizations would become bureaux, supervised by PATU, and would have on their staff a number of experts in the specific field of telecommunications. Financial contributions by member States would go to the single organization, which would provide the budgets for the subregional bureaux to operate.

Regional cooperation for telecommunications would thus be conducted by PATU alongside other United Nations regional organizations (ITU through the Telecommunication Development Bureau (BDT), ECS, ADB, UNDP, etc.)

- **Recommendation 2**

The United Nations system draws a distinction in Africa between developing countries and least developed countries (LDCs). It is time that, given this distinction, the ITU can help to improve the existing network and service quality of the LDCs.

However, one peculiarity of telecommunications is that some LDCs have now developed (reliable) telecommunication networks, while some developing countries have virtually no network at all.

We recommend that the BDT/ITU, on the basis of a case-by-case assessment undertaken in cooperation with PATU in the various countries, should assist such countries to improve their telecommunication networks, and thus extend its contribution to cover all countries which are in need of it.

- **Recommendation 3**

Difficulties in gaining access to funds under the traditional market system should encourage our countries to look towards private-sector markets, which are showing increasing interest in investing in the telecommunication sector.

To this end, our countries' Governments will have to give high priority to telecommunications, and State enterprises will have to enjoy the political backing of their Governments, along with a high degree of administrative, managerial and organizational autonomy.

Zaire favours a flexible monopoly system allowing the involvement of new players in the telecommunication sector.

Recommendation 4

The ITU has constantly pointed to the existence of a number of bilateral and multilateral regional and subregional organizations which help to fund particular telecommunication projects in the developing countries. In addition, the ITU has always insisted on the need for regular meetings to facilitate the integration of activities in the telecommunication sector.

We should like to recommend that, as the century draws to a close, the ITU should no longer restrict itself to a mere statement of the facts in the field of funding. It should strive to ensure that in our region the BDT organizes regular meetings with sources of funds, in cooperation with other national, regional and international organizations, for the collective study of more flexible and reliable mechanisms which will give them confidence to go ahead with the financing of telecommunication projects in the region.

PART II - REVITALIZATION OF PANAFTEL PROJECT (AGENDA ITEM 2.4)

1 Introduction

When in 1962 the African Governments decided, with ITU assistance, to launch the PANAFTEL project, the overall objective was to provide the continent with a high-quality and reliable telecommunication network allowing all African countries to communicate with one another without having to go through outside countries.

The project made it possible to establish direct telephone circuits between African countries, and interconnections have been set up between different countries' international telephone switching centres.

PANAFTEL's initial concept gave priority to terrestrial cable and radio-relay links. With time and technological progress, however, many satellite links have been established between different African countries.

Particular stress was subsequently placed on improving national networks, most of which were not of good enough quality to accommodate international communications. For the purpose, the project's initial plan for the introduction of interconnection links was followed up by two further components relating to rehabilitation and maintenance of national networks.

Throughout its development, the PANAFTEL project received immense financial and/or technical support from African regional (OAU, ADB, ECA and PATU) and subregional organizations (the Economic Community of Central African States, CACEU, CAPTAC, ECOWAS, etc.) and from international organizations like UNDP and ITU.

The PANAFTEL project came to an end five years ago; however, the basic objectives set by the African Governments have not been fully achieved. A considerable proportion of traffic between African countries continues to transit via non-African countries, and there are still countries with relatively underdeveloped networks.

2 Reasons for which the PANAFTEL project's basic objectives have not been fully achieved

The PANAFTEL project undeniably contributed to some extent to the development and modernization of many African countries' national telecommunication networks.

Unfortunately, and this is one of the most serious problems, virtually all countries have focused their efforts on their domestic requirements, and their investments and equipment specifications have mostly taken no account of neighbouring countries' planning or equipment.

This situation has inevitably produced problems with regard to the integration of national networks to form homogeneous subregional networks, despite many cases of satellite or terrestrial transmission routes brought into service between countries.

The reason for this may lie in the fact that the recommendations on the implementation of the PANAFTEL network were not publicized widely enough, and that there were virtually no binding clauses on the development of national networks obliging all countries to ensure that their respective projects took due account of the requirements of interconnection with other countries within the same subregion, whether neighbours or not.

The above-mentioned problems with the integration of national networks have thus made it difficult to implement the routing plans proposed for each subregion.

Over and above the technical problems generally encountered with regard to the interconnection of national networks, the routes that do exist are underused, often because there are no operating and maintenance agreements between interconnected countries and because the tariffs applied between African countries are extremely high, even for cross-border communications, and especially for transit to other countries of the continent.

The above factors can only discourage many countries, persuading them to continue routing the bulk of their traffic to other African countries via western countries.

In addition, not all African countries have had the same opportunities with regard to access to funds for ventures in the field of telecommunications. Some countries have enjoyed more support from providers of funds than others, making it relatively easy for them to develop and modernize their telecommunication networks.

This inequality with regard to access to funding has produced large gaps between many countries, as the very different levels of development of their telecommunication networks have not facilitated interconnection. Compatibility problems have often arisen because the quality and technology of equipment has differed.

3 Need to revitalize the PANAFTEL project

Some African countries now have telecommunication networks whose quality is virtually on a par with that of more developed countries in other continents. Nevertheless, an overall view of African telecommunications shows that the good performance of those countries is outweighed by the poor performance of many others.

Much remains to be done before the continent's telecommunication network can become truly competitive. Equipment must be fully digitized, new services introduced and rural telecommunications developed, more attractive tariffs must be adopted, allowing for the relatively low average income levels in African countries, managers as well as technicians must be trained, etc.

In addition, more technical assistance will be required for the countries whose telecommunication networks are least developed, to allow them to catch up quickly with other, more advanced countries.

This all calls for coordination at both the regional and the subregional level. Since resources available for telecommunication development are inevitably limited, it is important to integrate projects initiated in countries which share a common interest, thereby making the projects more attractive to sources of funds than if put forward by individual countries. Hitherto, African countries have shown no great capacity for common action in the field of telecommunications under bilateral agreements.

Revitalization of the PANAFTEL project, with re-establishment of the regional and subregional coordination committees, will, as in the past, provide the African countries with the competent bodies and expertise they require to supervise any action taken, and to identify and mobilize whatever resources are required to carry out that action.

Revitalization of the PANAFTEL project will also allow African countries to take better advantage of other continental-scale projects such as RASCOM and Africa One, whose objective is to provide the continent with highly reliable transmission networks and the possibility of extensive interconnection between all countries.

As the African countries have often shown a certain weakness with regard to telecommunication network maintenance, there is a need for greater assistance in this area so that the investments made can be of true benefit to the countries concerned for as long as possible. Revitalization of PANAFTEL will make it possible to place new stress on this aspect, which is of fundamental importance if telecommunications are to function as they should. In particular, it should be possible to update the many countries' national plans for the improvement of maintenance and provide assistance with their application. It should also be possible to finalize the regional distribution centre projects.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 7-E
14 March 1996
Original: French

For Information/Support

Agenda items: 0.2 and 1.1

PLENARY MEETING

SOURCE: ZAIRE

TITLE: PART I - CHANGES IN THE POLICY AND REGULATORY SPHERES
PART II - IMPORTANCE OF THE LICENSING SYSTEM IN ZAIRE

PART I - CHANGES IN THE POLICY AND REGULATORY SPHERES

1 Introduction

This document, which is for the information of the Assembly, examines the development of telecommunication policy and regulation in Zaire.

As will become clear, the operation of telecommunications in Zaire is governed by somewhat dated legislation which, while establishing the State monopoly, nonetheless envisages the possibility of participation by third parties in the public telecommunication service.

This explains why, in Zaire, private operators have not had to await new legislation in order to enter the public telecommunication sector.

However, with the private sector's growing interest in the operation of public telecommunications, it has become necessary, and work is now in hand, to update the existing legislation to take account of certain demands that have arisen as political and economic options have evolved.

2 Development of telecommunication policy and regulation in Zaire

There have been two key dates in the development of telecommunication policy and regulation in Zaire, the first marking the appearance of telecommunication legislation, and the second, the establishment of a public operator.

2.1 23 August 1940

The Governor-General of the Belgian Congo issued Legislative Ordinance No. 254/TELEC of 23 August 1940 on telecommunications, thereby creating the State monopoly with the exclusive right to establish and operate telecommunication channels and installations, whatever their nature, for public correspondence.

But in view of the size of the country, 2 345 000 km^2, the State provided from the outset for the possibility of making this right available by means of licences or special authorizations, and for fully or partly entrusting to third parties the establishment, operation or management telecommunication channels and installations.

Accordingly, the legislation allows the State to conclude with owners of private telecommunication installations agreements setting out the conditions for the establishment and operation of the installations with a view to their participation in the public telecommunication service.

Thus, the State monopoly has been flexible rather than rigid right from the start. This has enabled private enterprises such as the large mining companies l'Union Minière du Haut-Katanga (now Gécamines) and la Forminière (now MIBA) to develop their own highly efficient telecommunication networks.

To date there have been no significant changes in this basic legal framework, other than the transfer in 1968 of the monopoly for operation of the public telecommunication service to the Office Congolais des Postes et Télécommunications (now the Office National des Postes et Télécommunications du Zaïre (ONPTZ)), which is dealt with in Part II.

Private telecommunication operators such as TELECEL, COMCELL and others, whose activities concern cellular telephony, have entered the telecommunication market without the relevant legislation or regulations having to be revised or adapted.

2.2 13 December 1968

The President of the Republic issued Ordinance-Law No. 68/475 of 13 December 1968 establishing the Office Congolais des Postes et Télécommunications - now the Office National des Postes et Télécommunications du Zaïre (ONPTZ) - which was granted the monopoly for operating, among other things, the public telecommunication service.

The ONPTZ has its own legal personality separate from that of the State, and therefore maintains separate accounts.

Governed by its own statutory bodies, it operates under the supervision of the Minister of Posts and Telecommunications, who is empowered to authorize, approve and oversee the ONPTZ's management activities.

Later, on 5 May 1978, as part of the reorganization of all public enterprises, the President of the Republic promulgated Act No. 78/002 establishing general provisions governing public enterprises.

As a public enterprise, the ONPTZ falls within the scope of this Act.

The Act provides *inter alia* that the authority within a public enterprise which has full powers in respect of the enterprise's activities, in this case the Board of Directors, may sell shares in the enterprise to third parties or acquire shares in other companies.

In legal terms, there is nothing to prevent the ONPTZ from opening up its capital to natural or legal persons, public or private, who may wish to cooperate with it in the area of telecommunications by contributing capital in its own right or by creating a new entity.

To sum up, it can be said that right from the start, in 1940, Zaire's telecommunication policy and regulatory framework, while establishing a State monopoly, have kept it open to allow third parties, either public or private, to operate in the field of telecommunications.

The creation of the ONPTZ as the public operator and the framework act on public enterprises have not altered this principle.

3 Updating the regulations

Although the existing regulations are fairly adequate for those involved in the operation of public telecommunications, it has become necessary to update them, in particular to facilitate interpretation and understanding of the texts and to take account of the fact that Zaire's telecommunications policy is shifting towards a greater focus on the private sector's contribution to telecommunications development, although without calling into question the prerogatives of the State and the public operator.

The Ministry of Posts and Telecommunications has accordingly set up a National Committee to reform the regulations, and has assigned it the following tasks:

- to gather together all of the legal and regulatory texts governing telecommunications currently in force;
- to examine them in the light of the changing technological, socio-economic and cultural environments, and with reference to the national and international contexts;
- to propose appropriate changes to the existing legal framework governing telecommunications;
- to update the national master plan for telecommunications.

PART II - IMPORTANCE OF THE LICENSING SYSTEM IN ZAIRE

Zaire's legal system uses the terms "concession" or "special authorization" (autorisation particulière) to define what it is covered by the licensing regime examined below.

Within the context of Zaire's telecommunication legislation, the concession has to be seen in relation to the monopoly conferred on the State by Legislation Ordinance No. 254/TELEC of 23 August 1940 on telecommunications.

Because of country's size, 2 345 000 km^2, and the limited means available to it, the State was unable to exercise its monopoly throughout the national territory. Participation by third parties, in the form of owners of private telecommunication networks or facilities, in public correspondence was therefore provided for right from the start.

Third parties participate in the public telecommunication service by concession and special authorization, for which contracts are concluded.

The subsequent creation, in 1968, of the Office Congolais des Postes et Télécommunications (OCPT) (later to become the Office National des Postes et Télécommunications du Zaïre (ONPTZ) when the name of the country changed in 1978) in no way altered this principle, except in so far as those granted a concession or special authorization now sign contracts with the public operator (PTO) instead of the State.

The reasons underlying the concession and special authorization system in Zaire are universal. Thus, apart from the size of the country and the State's limited resources, which prompted it to invite third parties to participate in the establishment of telecommunication channels and installations, the reasons which brought the concession and special authorization system into being are the following:

1) the radio-frequency spectrum and the geostationary-satellite orbit are limited natural resources;

2) it is impossible to meet all requests for the allocation of radiocommunication channels;

3) to be efficient, radiocommunications must be free from harmful interference;

4) even for wired telecommunications, reasons of public interest may make the concession and special authorization system essential when it comes to the construction and operation of a station, system or network.

It should be noted that a concession is required for the construction and/or operation of a network, whereas a special authorization is required for the establishment or operation of a facility such as an earth station.

The universally accepted methods for granting a concession or special authorization are:

- comparative analysis;
- the drawing of lots;
- adjudication;
- first-come first-served;
- free application;
- a combination of several of the above.

Thus far Zaire has applied the free application method. The applicant submits an application dossier to the Chairman (Président Delegué général) of the ONPTZ.

The dossier includes:

- the letter of application;
- a feasibility study;
- a setting-up and development plan.

The dossier is submitted to the Concession Management Unit for a technical opinion before being approved by the Management Committee and Board of Directors of the ONPTZ.

The Minister of Posts and Telecommunications participates in the procedure within the scope of his supervisory authority.

Once the dossier has been approved at all the above levels, the concession contract is signed by both the public operator and the concessionaire.

However, before starting to operate, the concessionaire must pay the taxes that are due to the General Secretariat of the PTT, which acts as a regulatory body.

Signature of the concession contract is generally followed by signature of the "special arrangement" under which the technical, legal and financial conditions for implementation of the concession contract are established.

Thus, the concession and special authorization system is a means whereby the State, through the public operator - the ONPTZ - can both plan the establishment of the telecommunication network and ensure its harmonious implementation by public or private operators.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 8-E
14 March 1996
Original: French/ English

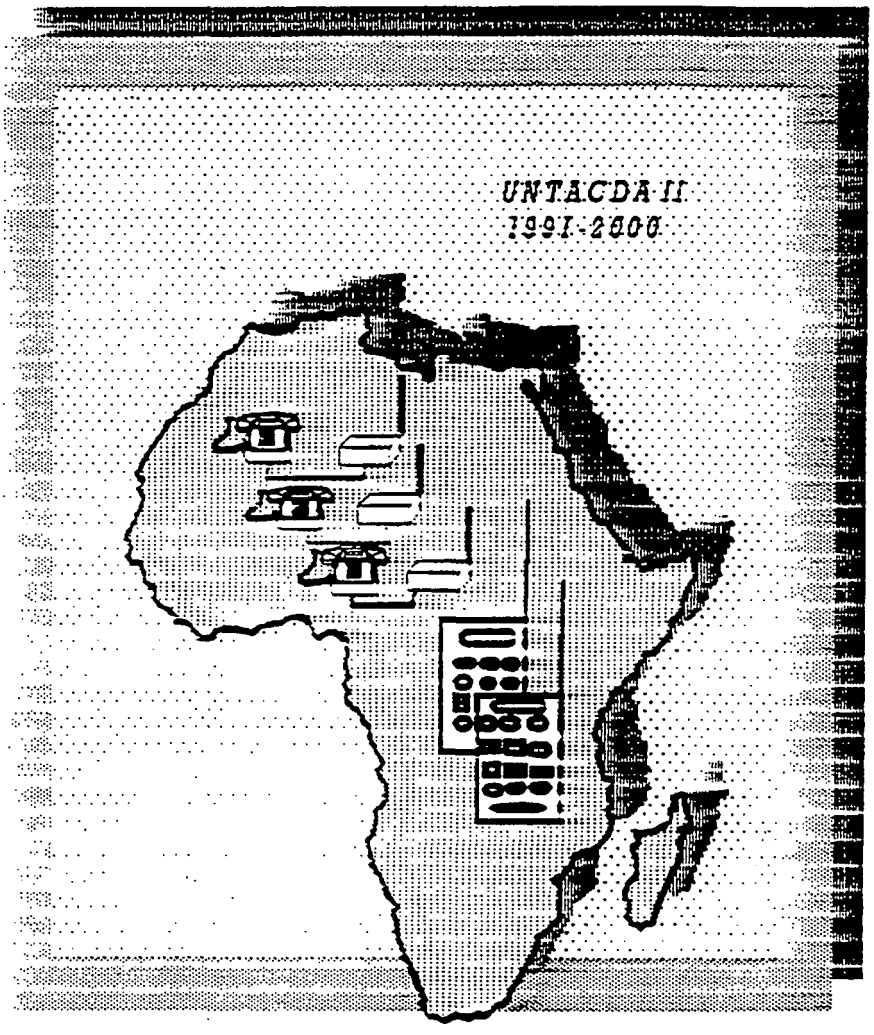
For Action

Agenda item: 2.4 **PLENARY MEETING**

SOURCE: ECONOMIC COMMISSION FOR AFRICA

TITLE: DEVELOPMENT AND APPLICATION OF MOBILE COMMUNICATION IN AFRICA

ECONOMIC COMMISSION FOR AFRICA



DEVELOPMENT AND APPLICATION OF MOBILE COMMUNICATION IN AFRICA

TABLE OF CONTENTS

Page

DEVELOPMENT AND APPLICATION OF MOBILE COMMUNICATIONS IN AFRICA

Foreword iii

Executive summary v

Acronyms vii

1 Introduction 1

1.1 Mobile communication 1

1.2 Objectives and scope of the study 1

2 Development of telecommunications in Africa 2

2.1 Role of telecommunications in socio-economic development 2

2.2 Current status of telecommunications in Africa 3

2.2.1 Development of basic telecommunication services 3

2.2.2 Introduction of new and value-added services 6

2.2.3 Appropriate choice and application of new technologies 6

3 General development of cellular mobile communications 7

3.1 History of cellular mobile telephone 7

3.2 Cellular mobile telephone systems technology 11

3.3 Comparison of major types of CMT systems 14

3 3.1 Advanced mobile phone system (AMPS) 14

3.3.2 Total access communication system (TACS) 14

3.3.3 Nordic mobile telephone (NMT) 14

3.4 Development of GSM 14

4 Introduction of cellular mobile telephone services in Africa 16

5 Application of cellular communication systems..... 19

5.1 General..... 19

5.2 Application as a cellular mobile communication system 19

5.3 Radio access system with cellular structure 22

6 Comparison of cost and performance of will and wired networks..... 27

6.1 Objective..... 27

6.2 Background of the areas selected..... 27

6.2.1 Cost of wired network 27

6.2.2 Cost of wireless local loop (WILL)..... 28

6.2.3 Cost comparisons 30

7 Conclusions and recommendations 30

References..... 33

Foreword

Conscious of the importance of transport and communications in the development of Africa, the African governments, supported by the United Nations and the international community at large, declared special decades for a concerted development of these sectors in Africa. The first such programme, the United Nations Transport and Communications Decade in Africa - UNTACDA - was implemented between 1978-1988. Given the encouraging results of and experience gained from this programme, UNTACDA II was declared to continue with this regional effort in the last decade of this millennium. The development of telecommunications forms a major part of these programmes.

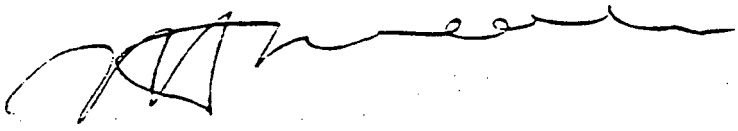
Telecommunications services in Africa are characterized by generally low access, large un-met demand, call-traffic congestion, poor service, limited territorial coverage, user willingness to pay more as well as user pressure to develop own facilities. While these persistent shortfalls may be viewed as weaknesses in the industry, the underdevelopment of the African markets offers exceptional opportunities. Large pent-up demands make attractive markets; major efficiency gains can be achieved quickly through restructuring, improved management and technological innovation.

The telecommunications industry the world over is undergoing major structural changes driven by rapid technological advances as well as market forces. Telecommunications is a fast growing industry by any measure. The cellular telephone, which began barely a decade ago, now has over 30 million customers worldwide. Africa is no exception to these pressures for change. The introduction and application of cellular mobile telecommunications technology amply illustrates the impact of such changes in Africa. It is therefore necessary that pro-active measures be taken by the telecommunications policy-makers in Africa to effectively manage these changes.

This report presents the findings of a study on the introduction and application of cellular mobile communications technology in Africa. It reveals that an increasing number of African countries are embracing this technology and some are adapting it to provide fixed telecommunications services. With more coordination of the type of systems introduced in neighbouring countries in a particular subregion, the African countries could exploit further the development potential provided by this new technology. Furthermore, cellular technology can be effectively deployed in areas where it is difficult or impossible to deliver services with wireline technologies because of prohibitive construction costs, difficult terrain, or other geographic barriers.

The Economic Commission for Africa is publishing this study with the expectation that its findings and recommendations will provide useful information to the operators and policy-makers in African telecommunications industry for the rapid development of this sector which is vital for Africa's economic and social development in the emerging information age. With the rapid technological

advances, Africa has the opportunity to leap-frog the development of its telecommunications from the current nineteenth century systems to those of the twenty-first century. Africa's ability to connect into the fast evolving Global Information Infrastructure (GII) - commonly referred to as the Information Super-Highway or Infobahn - will depend on the commensurate rapid development of its telecommunications infrastructure. Cellular communications technology offers an attractive possibility to Africa to speed up the development of its telecommunications systems. Our challenge is to establish the necessary framework for effective harnessing of technology so as to provide the services which Africa requires for social and economic development and meet the aspirations of our peoples as we enter the twenty-first century.



K.Y. Amoako
Executive Secretary
Economic Commission for Africa
Addis Ababa, Ethiopia
December 1995

Executive summary

The continuous growth in demand and the ever increasing list of subscribers waiting for services show the inadequacy of telecommunication services in many African countries. All possible technologies which could be cost-effective, appropriate and time saving deserve closer attention to identify possibilities for their applications in order to meet the growing demand for basic telecommunication service, especially in the remote and rural areas.

The objective of this report is to assess current developments in cellular mobile communications in the world in general and in Africa in particular, as a possible alternative approach to meet critical demands and to develop communications in the rural communities. The report presents an overview of the various technologies which could be employed in improving and expanding telecommunication infrastructure and services with particular emphasis on cellular communication as a possible means of meeting the urgent demand in the continent.

In 1994, there were 14 African countries operating cellular mobile telephone systems, with a total number of 278 299 subscribers. In addition, a number of countries including Ethiopia, Botswana, Mali and Malawi have already finalized their plans to introduce the service, while Zimbabwe and Uganda are reported to have introduced the service in 1995. While the planned usage of cellular technology varies from country to country, in most cases it is used to provide mobile communication services. However, there are cases where cellular systems are used as a fixed network in order to provide fast connection to basic telephone services.

The predominant systems in operation are the Advanced Mobile Phone System (AMPS) and the Total Access Communication System (TACS). AMPS, which is the standard adopted in North America, operates in the 800 MHz band while TACS is of European standard and operates in the 900 MHz spectrum. Some of the countries in North Africa have, however, introduced the Nordic Mobile Telephone system (NMT), which operates in the 450 MHz and 900 MHz bands.

Lately, however, several countries have introduced the Global System for Mobile Communication (GSM) system. For example, South Africa has installed GSM system and achieved an unprecedented success by connecting 220 000 subscribers within one year from the date the system was put into service. Similarly, Kenya Posts and Telecommunication Corporation (KPTC) has prepared plans to extend its mobile network using the new GSM technology, with a capacity to serve an additional 50 000 subscribers. Nigeria and Mauritius as well have decided for GSM system for their second CMT networks with capacities to serve 100 000 and 3 000 subscribers, respectively. Furthermore, Zimbabwe and Uganda are also planning to start operating GSM in late 1995, while Malawi and Namibia have committed themselves to GSM based CMT networks.

One characteristic of the cellular mobile telecommunications systems in Africa is that they are being introduced in a very uncoordinated manner, with different systems in adjacent countries. This approach will limit the exploitation of capabilities such as cross-border roaming. Although the data is far from comprehensive, the above examples indicate a trend away from the earlier and currently predominant analogue systems (AMPS and TACS), towards the newer digital GSM systems. In particular, the countries in Southern Africa have all committed to the GSM system and if it is standardized, the potential for cross-border roaming will be created. The migration to the digital CMT systems also have the advantage that the digital systems offer more value-added services, provide better quality of service and improved security.

Another development of significance in the mobile communication market in Africa is the participation of private sector. Out of the 14 countries included in the study private participation was found only in five, namely Ghana, Nigeria, Tanzania, Namibia, and Zaire. Private capital would certainly make important contribution to the development of telecommunications in Africa where demand outstrips capacity. However, effective participation of the private sector will entail, among other things, the establishment of clear private investment codes, and transparent regulatory regimes in the industry. Cellular technology can also be applied to provide fixed telecommunication services. The wireless local loop or radio access system with cellular structured networks are being considered by a number of African countries to meet demands in the suburban areas and the remote and rural communities. Still further, the phone shop concept which is under implementation in a cellular network environment in South Africa, is another important development for providing access to telecommunication services to rural communities.

In view of the above findings and development of cellular mobile communication network the following recommendations may be made:

Recommendation 1: African Administrations should seriously consider the technical and economic merits of radio access or wireless loop systems to reduce constraints faced in their existing network in meeting critical demands for telecommunication services in both the suburban and rural areas.

Recommendation 2: Necessary changes need to be made in the regulatory frame work to allow and encourage private sector participation in the of cellular mobile communication services in order to enhance fast development of cellular network and also the use of state-of-the-art technologies.

Recommendation 3: The phone shop concept deserves serious consideration by telecommunication organizations and all appropriate measures should be taken to encourage their implementation.

Recommendation 4: African countries should include in the terms of conditions and rules for operating value-added and advanced telecommunication services by competing private companies or business groups, a provision by which these companies commit themselves to play a part and contribute to the extent possible towards the development of rural telecommunication services.

Recommendation 5: Each subregion, through its appropriate meetings and conferences, should create a committee to discuss the economic and technical issues regarding the adoption of a single standard of cellular mobile communication system in Africa, and to monitor future development and application of the system.

Recommendation 6: A follow-up action should be taken to organize and establish at subregional levels a mechanism for common purchasing of equipment.

Recommendation 7: Each subregion should consider developing the capability for manufacturing components, parts, units and subsystems of cellular mobile communication systems for the countries of the subregion in order to adopt CMT systems to Africa's needs.

Recommendation 8: PATU should be given a major role in the coordination and implementation of the above recommendations.

ACRONYMS

1	ADC	American Digital Communication
2	AMPS	Advanced Mobile Phone System
3	CMT	Cellular Mobile Telephone
4	DMU	Display and Metering Unit
5	FAX	Facsimile
6	GSM	Global System for Mobile Communication
7	JDC	Japanese Digital Communication
8	MAHO	Mobile Assisted Hand-Over
9	MCHO	Mobile Controlled Hand-Over
10	MCU	Master Control Unit
11	MSC	Mobile Switching Centre
12	NCHO	Network Controlled Hand-Over
13	NMT	Nordic Mobile Telephone
14	PCM	Pulse Code Modulation
15	PCS	Personal Communication Service
16	RAS	Radio Access System
17	RBS	Radio Base Station
18	RSS	Remote Subscriber Stage
19	RST	Remote Subscriber Terminal
20	TACS	Total Access Communication System
21	TDM	Time Division Modulation
22	UHF	Ultra High Frequency
23	VHF	Very High Frequency

DEVELOPMENT AND APPLICATION OF MOBILE COMMUNICATIONS IN AFRICA

1 Introduction

1.1 Mobile communications

1 Mobile communications can broadly be divided into two categories. The first consists of systems which employ earthbound radio transmitting and receiving equipment, with their associated ancillary devices for the transmission and reception of radio signals over a specified coverage area. The system design permits the user to move around in this area and be able to exchange information (voice, FAX, data) on a continuous basis without interruption. The service coverage area is extended as required through the application of cellular structure and frequency reuse scheme. This system is referred to as **cellular mobile communication** network.

2 The second category is the **mobile-satellite service** which employs orbital satellites as relay stations for the transmission and reception of radio signals for global coverage. With the appropriate integration to ground station and wired public switched networks, customers are offered capability to communicate with anyone, anywhere in the world.

3 Both the cellular and satellite mobile communications systems have registered impressive progress since the early 1980s. The application of digital technology in the various subsystems provided the capability for high quality and dependable services with improved security and additional features.

4 As regards mobile satellite communications, the achievements by Inmarsat in developing mobile services for ships and aeronautics, and recently the suit-case portable terminal and the land vehicular mobile services, demonstrates the potential of satellites for global mobile communication. The low orbital satellite systems, which are expected to be fully operational in two to three years, will however mark a new era in global mobile communications. Iridium Corporation and Orbital Communication are, for example, pursuing their objectives to provide worldwide commercial services through a constellation of low orbit satellites. Iridium, with its 66 satellites orbiting around the earth at a height of 720 km, is well poised to offer global two-way satellite mobile communications. Orbital Communication will also place a similar constellation of 36 low orbiting satellites at a height of 960 km above the earth. Their design parameters, however, permit two-way data communications services to users worldwide.

1.2 Objectives and scope of the study

5 The continuous growth in demand and the ever increasing list of subscribers waiting for services show the lack of adequate telecommunication services in many African countries. Consequently, all possible technologies which could be cost-effective, appropriate and time saving deserve closer attention to identify possibilities for their applications in order to meet the growing demand for basic telecommunication service, especially in the remote and rural areas. The objective of this report is to assess current developments in cellular mobile communications in the world in general and in Africa in particular, with a view to providing an alternative approach to meet critical demands and to develop communications in the rural communities.

6 The report presents an overview of the various technologies which could be employed in improving and expanding telecommunication infrastructure and services. Among the available technical options, it concentrates on cellular communication as a possible means of meeting the urgent demand in the continent.

7 The report is organized into seven sections. Following the introduction, Section II briefly highlights the current status of the development of telecommunication services and outlines the new technologies being adopted in order to expand and improve networks and services in Africa. The overall world development of cellular mobile telephones, the technologies applied and the different systems used are elaborated under Section III. Section IV concentrates on the introduction of cellular mobile telephones (CMT) in Africa, and the level of private capital investment in the establishment of the systems and operating the networks. The flexibility provided in the cellular structure is explored in Section V, where areas of application of CMT with emphasis on the fixed cellular system are elaborated.

8 Comparative cost analysis has also been included under Section VI to illustrate the advantages of fixed cellular or wireless loop (WILL) in providing basic telecommunication services to areas which are difficult and even sometimes impossible to install wired network, as well as to the remote and rural communities. Finally, the report concludes with recommendations which are considered to be relevant and timely in view of the current level of development of telecommunication infrastructure and services in Africa.

2 Development of telecommunications in Africa

2.1 Role of telecommunications in socio-economic development

9 The valuable contributions of good quality telecommunication and telematic services to the socio-economic development have been demonstrated in a number of studies and researches that were undertaken in the 1980s and the early part of the 1990s. Trade, industrial production, agricultural outputs and various social service initiatives attribute their success, among other things, to the availability of efficient telecommunications services.

10 A case study on the use of agricultural machineries demonstrated the effective deployment of scarce resources to increase productivity by cutting down idle time and implementing improved scheduling and planning, thanks to good quality telephone and mobile radiocommunications[1]. Another study on livestock breeding illustrated how scarce services in the rural community such as that of veterinaries, could be maximized and addressed in a timely and effective manner in the treatment of cattle for various diseases and insect pests. Similarly, for physical transportation, the improvement that can be achieved in scheduling and coordination of pick-ups and deliveries through the use of mobile radiocommunication is quite significant and has contributed towards increasing productivity. A study carried out in the 1980s by Stanford Institute indicated that judicious application of mobile radiocommunications in fleet management resulted in increased output per vehicle in the order of 15-25 per cent[2]. A number of other cases, declarations and

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[1] Applications in Agriculture, Industry and Commerce, World Communication, 1983.

[2] IBID.

presentations made at international and regional fora could be cited to confirm that telecommunications services are important components in the implementation of economic and social development.

11 Cognisant of this impact towards enhancing socio-economic development, governments, policy makers and operators have taken special interest to invest in telecommunications in order to expand the infrastructure and improve services.

12 While the rest of the world, including those developing countries in Asia and Latin America, has achieved commendable results, Africa has, however, lagged behind in the development of its telecommunications networks and services. For example, in 1992 Africa accounted for only 2 per cent of the worlds' main telephone lines, with the average penetration still remaining below 1 per cent. There were only 13 countries in Sub-Sahara Africa with an average penetration of 1 per cent and above; the remaining 35 seem to have made no significant progress in the last decade.[3]

13 While this depicts the status in the development of basic telephone services, the value-added services are basically at the earliest stages of development. Data communication is at its infancy; only a few countries as of 1993 had introduced packet switching in their networks[4]. As for leased lines, Africa accounted for only 0.4 per cent of the world connections, while Integrated Services Digital Network (ISDN) services are offered in none of the African countries. FAX services, which seem to have grown at a faster rate as a result of the introduction of digital switching in the network, account for only 0.5 per cent of the world's subscribers.

14 Regarding mobile communications, however, the African countries seem to be in a race to introduce some sort of Cellular Mobile Communications system, probably to satisfy business communities, international organizations and those foreign users who may be in the country for business or pleasure. As of 1994 the number of countries which had introduced cellular communication systems had reached 12, with a total subscriber connection figure of 278 299, the lion's share being attributed to South Africa (233 000 lines).

2.2 Current status of telecommunications in Africa

2.2.1 Development of basic telecommunication services

15 The level of development of basic telecommunication infrastructure and services in Africa is still far behind the world average, and much lower than in the other developing countries in Asia and Latin America. The major contributing factors for such low level of development were capital shortage and the general absence of clear and dynamic policies to guide future development of telecommunications. As a result of delays in taking timely action on the above issues, the rate of development has been unable to match the demands for service which continues to grow at a rapid rate. As of 1992, the waiting lists of subscribers had reached an average of 35 per cent of the total demand in Sub-Sahara Africa, and was increasing at an annual rate of nearly 10 per cent. Although the rate of increase of wait-listed subscribers in North Africa was slightly lower at 7 per cent, the number of potential subscribers which could not be provided with service due to lack of facilities was equally alarming at 57 per cent of the total number of subscribers. On the other hand, it was

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[3] African Telecommunication Indicators, ITU, 1994.

[4] Towards an African Information Infrastructure, ITU, Communication Handbook, 1995.

observed that South Africa had been able to steadily reduce the number of wait-listed subscribers at the rate of nearly 7 per cent per year, thereby reducing its waiting list to only 3 per cent of the demand (Table 1).

16 The other area in which Africa has not shown significant improvement is the utilization of existing facilities. On average, the unused capacity of switching equipment in 1992 was 34 per cent in Sub-Sahara Africa, (Table 2). This demonstrates the uncoordinated development of the systems and inefficient investment.

17 In 1988 the African countries called for the continuation of a coordinated regional effort for the development of transport and communications up to the year 2000 within the framework of the programme of the Second United Nations Transport and Communications Decade in Africa - UNTACDA II. Specifically for the telecommunications sector, several targets have been established to be attained during the decade (1991-2000), including an average telephone penetration of 0.72 per cent by the year 2000. However, based on the recent growth trends in telecommunications development in Sub-Sahara Africa of an average of 4 per cent per year from 1983-1993 (Table 3), it would take another 13 years to attain the penetration targets set in the UNTACDA II programme.

TABLE 1

Waiting list for main telephone line connections

Countries	**Waiting list for line connection**		**Average growth rate %**	**Waiting list as % at total demand**	**Main telephone line (DEL) connected**	
	1983	1992	1983-1992	(1992)	1992	1993
Sub-Sahara Africa	339 584	111 887	9.6	34.8	2 155 229	2 288 300
North Africa	1 375 740	2 534 102	7	36.5	4 400 451	4 925 000
South Africa	225 321	120 365	-6.7	3.3	3 524 138	3 659 900
Total for Africa	1 940 645	3 766 354	6.5	27.3	10 079 818	10 873 200

Source: ITU: African Telecommunication Indictors, 1994.

TABLE 2

Status of switching capacity in Africa (1992)

Countries	Exchange capacity (K)	Connected line in % of capacity	Main lines (DEL)		
			Automatic %	Digital %	Residential %
Sub-Sahara Africa	2 756.9	66	89	42	56
North Africa	5 580.0	79	94	60	79
South Africa	4 406.8	80	97	56	65
Total Africa	12 743.7	76	94	55	70

Source: ITU: African Telecommunication Indictors, 1994.

18 In order to increase the rate of development of telecommunications, African Governments, planners and policy makers will have to take bold and concrete steps on certain key issues. These include the establishment of dynamic management which would respond to market demand for basic as well as advanced and value-added services; the creation of the necessary legal framework through which private participation could be encouraged in those areas where the incumbent telecommunication operator cannot adequately meet demands or offer the type of services required due to lack of sufficient capital, among other things. Such measures could have additional advantage of creating an incentive and drive for consideration of new and advanced technologies in order to cope with the urgent demand for basic and advanced telecommunication services, such as mobile communication for fixed network, or digital radio access system and satellite for rural application.

TABLE 3

Growth of main telephone lines (DEL) 1983-1992

Countries	Main telephone DEL in (k)			DEL Density		
	1983	1992	Annual growth rate (83-92)	1983	1992	Annual growth rate %
Sub-Sahara Africa	1 194.5	2 151.5	6.8	0.30	0.43	4
North Africa	1 494	4 400.5	12.8	1.56	3.65	9.9
South Africa	2 071.8	3 524.0	6.1	6.87	8.87	2.9
Total Africa	4 760.4	10 076	8.7	0.91	1.52	5.8

Source: ITU: African Telecommunication Indicators, 1994.

2.2.2 Introduction of new and value-added services

19 As concerns the modernization of the telecommunication infrastructures in Africa, it is observed that some countries in Africa have done relatively well in establishing new and modern facilities which enabled them to provide the information capability required for business, trade and industrial activities. Botswana for instance, has installed a fully digital switching network and has taken bold measures by laying fibre optic cables to support data communication as well as to strengthen backbone transmission system. Similarly, Gambia has taken the decision to install fibre optic transmission network to increase its capability to provide advanced telecommunication services, such as data transmission. Considering the Sub-Sahara Africa as a whole, however, there is a lot more still to be done. The digitalization percentage as of 1992 stood at only 42 per cent on the average (Table 2) with the exception of Cape Verde, Djibouti, Mauritius, and Rwanda which have achieved 100 per cent digitalization of their switching networks. The combined size of these networks, however, represents only 5.4 per cent of the total automatic exchange capacity in Sub-Sahara African region as a whole.

20 With regard to the cellular mobile telephone services, African countries have just begun to focus on this technology. While the planned usage of cellular technology varies from country to country, in most cases it is used to provide mobile communication services. However, there are cases where cellular systems are used as a fixed network in order to provide fast connection to basic telephone services. There will be further discussions in subsequent sections on the various mobile systems and applications of cellular mobile communication.

2.2.3 Appropriate choice and application of new technologies

21 Africa's greatest challenge has been and still remain to develop its telecommunications networks sufficiently to provide telephone services to the rural communities where the majority of the population live and most of the economic activities take place. This would create an environment for the people to increase their participation in the development process in their country and further enhance fair distribution of wealth and assist in curbing the migration of people to urban centres.

22 Single and multi-channel VHF and UHF transmission systems (both analogue and digital generations) have in the past provided valuable contributions to the connection of villages and rural communities to the national networks. Such systems include those with capacity ranging from a few channels, up to 24 and 48 channels covering a span of over 50 km, and with repeaters up to 80-100 km depending on the propagation condition. With the development of digital transmission system and the application of Time Division Multiplexing (TDM) technique, far reaching capability has been acquired for addressing the needs for telecommunication services in the rural and remote areas, with scope and quality of no less than those in the urban centres.

23 The point-to-multi-point digital access radio system is capable of providing remote subscriber connection for voice, FAX and low rate data transmission. With a capacity to serve up to 500 subscribers, depending on the traffic load by each subscriber, it can cover a distance of up to 300 km with the installation of suitable repeaters. As the system uses solar arrays for power generation, it makes it especially suitable for rural and remote area application. A number of countries in Eastern and Southern Africa, such as Ethiopia, Swaziland and Botswana, can be cited as examples of countries which have adopted the above system for improving their rural communication services.

24 To the above system one can add the application of satellites for providing domestic communication services. With relatively small dish antennae satellites are being increasingly applied in the rural and remote areas for transmission of programmes on community services, as well as to provide data on mining projects, agricultural undertakings and other infrastructural development activities. Vital information through voice, FAX and low rate data transmission can be conveyed at a relatively cheap price using satellite technology.

25 Another new technology contributing to the revolution in telecommunication is the digital switching technology. The associated distributed processing and the possibility for remote location of few subscriber stages of the switching equipment as well as the installation of simple concentrators have greatly simplified the process of establishing networks. One of the major contributions of the digital system is the saving that can be realized by reducing the extent of excavation of cable ditches for the installation of telephone cables by deploying remote subscriber stages (RSS) at strategically located sites. Fibre optics or digital radio links may then be used as junction lines between the parent exchange and the RSS. The last leg of connection from RSS and concentrators will have, however, to be completed through fixed wire network. However, through wireless communication media, such as cellular mobile telephone, even this last leg of wired network can be avoided. This technology is attracting planners as it offers a solution through which the burden of tearing down grounds and pavements and laying subscriber telephone cables can be avoided in order to provide, in most critical and urgent cases, the required connection in the telephone network. Thus cellular mobile communication systems offer an alternative method in the provision of telephone services. Its merit will therefore be treated in some detail in the subsequent sections.

3 General development of cellular mobile communications

3.1 History of cellular mobile telephone

26 The early types of land mobile communication systems were characterized by a high power transmitter to cover as much distance as possible, which normally ranges from 30-50 km, with allowable frequency band at 150 MHz and a capacity not exceeding 20 channels. It provided a mobile telephone service with duplex operation, making use of limited hand-held or portable terminal equipment, and in the majority of cases, the subscriber transceiver units were all vehicular types.

27 Demand for improved quality, greater capacity and additional service features led to the emergence of cellular technology, where efficient utilization of the available frequencies was possible. This is effected by limiting the power of the transmitter employed to radiate in a relatively small area, a cell, and by strategically arranging a number of these cells so as to enable the same frequencies to be used again as often as required depending on traffic and demand for service, i.e. reuse of frequencies.

28 The development of the above system took place in the early of 1980s, with North America, Nordic countries and some leading industrialized countries in Western Europe taking the lead[5]. The first commercial cellular mobile telephone service was introduced in the United States in 1983 with the installation of the Advanced Mobile Phone System (AMPS) in Chicago. Nordic countries, with

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[5] Nieminen, J.V. - The World Market in Mobile Communication, African Service Perspective, 1987.

their system NMT- 450, took the lead, however, to operate Cellular Mobile Telephone (CMT) in 1981. This was later followed by similar developments in the other European countries (the United Kingdom, France, Germany, etc.), where another system, Total Access Communication System (TACS) was introduced in the market in 1983. With the development of the above three major systems, the total connection figure by the end of 1989 reached 370 000 subscribers. In the two subsequent years, the demand increased so much that the number of cellular subscribers in the world more than doubled in 1985 and increased by 81 per cent in 1986. The fastest growing network was in North America increasing 3.5 times in one year (1984 to 1985) (Table 4).

29 The market continued to grow in the latter part of the 1980s and the early 1990s, mainly due to general acceptance by users of the increased role which cellular mobile telephone could play in business, and particularly in field activities, (i.e. services, engineering and construction, sales, etc.) and increased awareness by managers and supervisors of productivity gains which can be achieved through timely control and management of their activities. The development of portable and hand-held mobile sets with steady decrease in prices has also contributed to growth in demand. Regulatory changes which enabled a number of new service providers to offer their products and services also played a significant role in lowering equipment cost. The cost reduction enjoyed by consumers in this competitive market can best be explained by the cost analysis made by Herschel Shoslech Associates Ltd. as presented in their article, "Cellular Soars Through 1995". They defined the concept of "full effective cost", which is comprised of three elements:

a) monthly cost of the mobile telephone in terms of amortization of rental or lease charges;

b) monthly access charges to the network; and

c) monthly charges per minute of calls made.

On the assumption that 250 minutes of calls are made during a month, the trend in cost reductions from 1983 was as shown in (Table 5).

It is observed that 46 per cent of effective cost reduction was possible in just five years from 1983 to 1988.

TABLE 4

World cellular mobile communications market development: 1982-1986

Area	Subscribers connected in '000				
	1982	**1983**	**1984**	**1985**	**1986**
Nordic	120	140	210	280	370
Other Europe	-	-	5	70	200
N. America	-	20	95	340	680
Asia and Pacific	20	30	60	100	170
Africa	-	-	-	-	5
S. America	-	-	-	-	5
Total	140	190	370	790	1 430

Source: Nieminen, J.V., - World Market in M.C., African Service Perspective.

TABLE 5

Annual decline in full effective costs of cellular service (FECSC) adjusted for inflation, 1983-1988

Year	FECSC/month current dollar	Annual CPI deflator	FECCS/month 1983 dollars
1983	229	1.0	229
1984	192	0.962	185
1985	172	0.927	159
1986	163	0.917	149
1987	154	0.878	135
1988	146	0.846	124

Source: Cellular Soars Through 1995, TE & M, 1989.

30 The cost analysis referred to above concerns the cellular market in the United States. Liberalization and privatization of the market in Europe and other parts of the world have equally contributed in reducing the cost of cellular services. Thanks to the cost reduction, demand for cellular services was not restricted to the affluent society and business executives, nor to industrial and business activities where CMT had already made an impact; rather, it extended to the general consumer market where the benefits of keeping in touch at any time and any place were recognized. Thus, the number of subscribers to CMT services grew at an impressive average rate of 48.6 per cent per year from 1986-1992 during which time the total number of connected mobile phones exceeded 15 million. In the following year alone, between 1992 and 1993, another increase of 45 per cent was realized, raising the total connected figure in the world to over 22 million. It is of interest to note, however, that the total number of mobile phones connected in the United States alone was 13 million[6], which accounts for nearly 60 per cent of the world cellular mobile phone market.

31 The Advanced Mobile Phone System, which was developed in the United States, dominated the world market, accounting for 62.4 per cent of the world's cellular phones (Figure 1). This was followed by the United Kingdom's Total Access Communication System with 14 per cent share, and the Nordic Mobile Telephone Systems (NMT 450 and NMT 900) claiming 11.5 per cent of the world's total CMT connections. The Global System for Mobile communications(GSM), now gaining acceptance as one of the world standards, has only tapped a small share of the market, 1.8 per cent.

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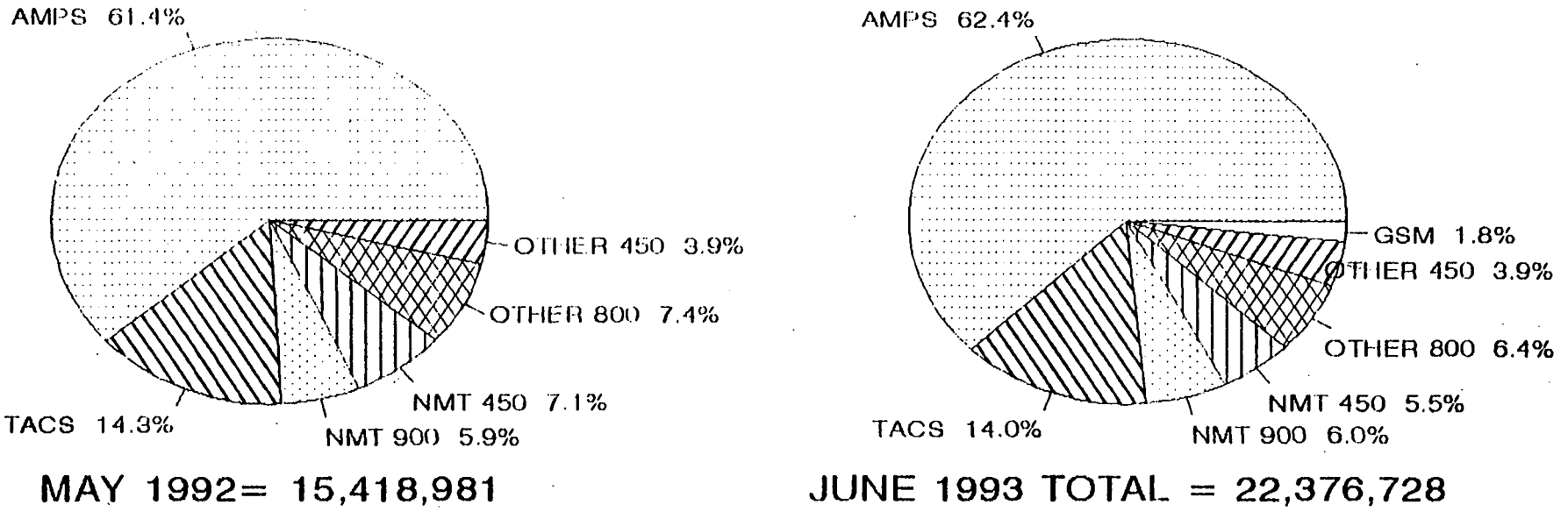
[6] Telecommunications Engineering and Management, 1989.



SOURCE: CELLULAR BUSINESS (5/92& 6/93) EXCEPT GSM ESTIMATED

FIGURE 1

World cellular subscribers

(by system type)

32 While the above generally shows the leaders in the cellular mobile telephone, there was no clear dominating supplier in mobile switches and mobile base stations. The key suppliers of the above equipments were however, Ericsson, Motorola and AT&T[7]. In 1995, however, Ericsson is emerging as the dominant supplier for cellular network, but facing strong competition from big companies such as Motorola, Siemens, Alcatel, and AT&T. On the other hand, in the sale of mobile telephones, Ericsson ranked third largest supplier behind Motorola of the United States, and Oy Nokia of Finland[8].

3.2 Cellular mobile telephone systems technology

33 In the preceding section the trends in the development of CMT and the major systems and suppliers were briefly presented. In the following section the major subsystems for operating cellular mobile telephone services and possible areas of their applications are explored.

34 A Cellular Mobile Telephone, in its simplest form, is a system that can provide telephone service in motion through the efficient use of the available frequencies. Most of the available frequencies, however, are allocated to fixed communication and broadcasting services, leaving little freedom in the choice of radio frequencies with sufficient width to meet other demands. The fact that the power of radio signals declines with distance, makes it possible to design radio transmitters to cover a specified locality and with sufficient power output to avoid interference in the neighbouring areas. This allows the same frequencies to be used again, while maintaining the separation distance required to avoid interference.

35 A cluster of small areas, or cells, can be designed where frequency reuse schemes can be planned in order to meet traffic and connection demands in a particular area. The fact that signal strength declines in direct proportion to distance, and together with the frequency reuse scheme combine to overcome the problem of shortage of radio frequencies for CMT. Figure 2b illustrates a configuration where a cluster of seven cells was chosen. Each of the cells in the cluster has its transceiver with the designated frequency band assignment and its share of the total number of channels allocated for the cluster. In the case of narrow-band allocation, if "n" is the total number of radio channels available to the cluster, then each cell will be assigned n/7 channels. These clusters are repeated as frequently as required to cover the total area to be served. Increase in demand of connection or traffic can be met by cell splitting or through installation of directional radio transmitter antennae to radiate at say
120°, thereby tripling the capacity of the previous cell.

36 The functioning of Cellular Mobile Telephone System can best be explained by tracing a call through the network. Calls are initiated from mobile sets when the hand set is on "off-hook" position. At this instance, special set-up channels designated for common use are "seized" to send messages to the mobile switching centre (MSC) on the readiness to communicate and the necessary data on the called party (Figure 2a). The MSC, which serves partly as a conventional telephone switch, controls all the radio base stations connected to it, and upon receiving request for communication from mobile sets sends out messages to all the radio base stations and locates the called party. At this point the mobile set transmits to its base station an acknowledgement message

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[7] Telecommunications Services, U.S. Industries Outlook, 1994.

[8] J. Madrid, S. Sheldon and G. Cheadla, Cellular is All the Rage, Telephone Engineering and Management, August 1989.

thereby confirming that both parties are ready to communicate. The mobile switching centre assigns to each of the mobile sets a pair of radio channels for voice communication and releases the special signalling channels used for setting up the calls. The voice channels so designated are used by the customers so long as they are located in the same cell.

37 The other function of MSC is to monitor the signal strength from the adjacent cells as the mobile user moves around. When confirmation is received that signal strength in the adjacent cell is stronger it sets up a procedure known as "hand-off" or "hand-over", whereby new pairs of radio channels will automatically be selected from the new cell site to enable communication to continue without serious disruption. The time normally required for this change of cell allocation to be carried out is very short, for example 0.05 seconds in the AMPS system, and hardly noticeable by the user.

38 The radio base station as shown in Figure 2a is the second major subsystem in cellular mobile telephone, which basically consists of transceiver, signal conversion and control system. With the assigned radio frequency (RF) and frequency band, it transmits radio signals for reception by all mobile units.

39 The number of available radio channels are far fewer than the number of subscribers to be served. As the likelihood of all channels being "seized" by more than one user at the same time is very remote, the dimensioning of channels is, therefore, based on a grade of service at peak hour traffic. For example, at a grade of service of say 2 per cent, and with subscriber traffic load of 0.05 Erlang per subscriber, a ratio of 1:10 (i.e. one radio channel for 10 mobile subscribers) would be adequate.

40 The control function of the signal received from a mobile unit is also carried out by the base stations by comparing the special signal transmitted to the mobile units with that of the return signal received from it. This information is fed to MSC to determine "hand-over" procedure.

41 The third subsystem in CMT is the cellular mobile unit which is basically of three types: vehicular, portable and hand-held. It consists of receivers for the radio signals, and a demodulator for the extraction of the audio part from the signal and a transmitter for the transmission of modulated RF signal to base stations. The mobile units also play an important role in conveying to base stations the required information on the quality of signals received. This function is carried out on a continuous basis through the reception of special signals transmitted from the base stations.

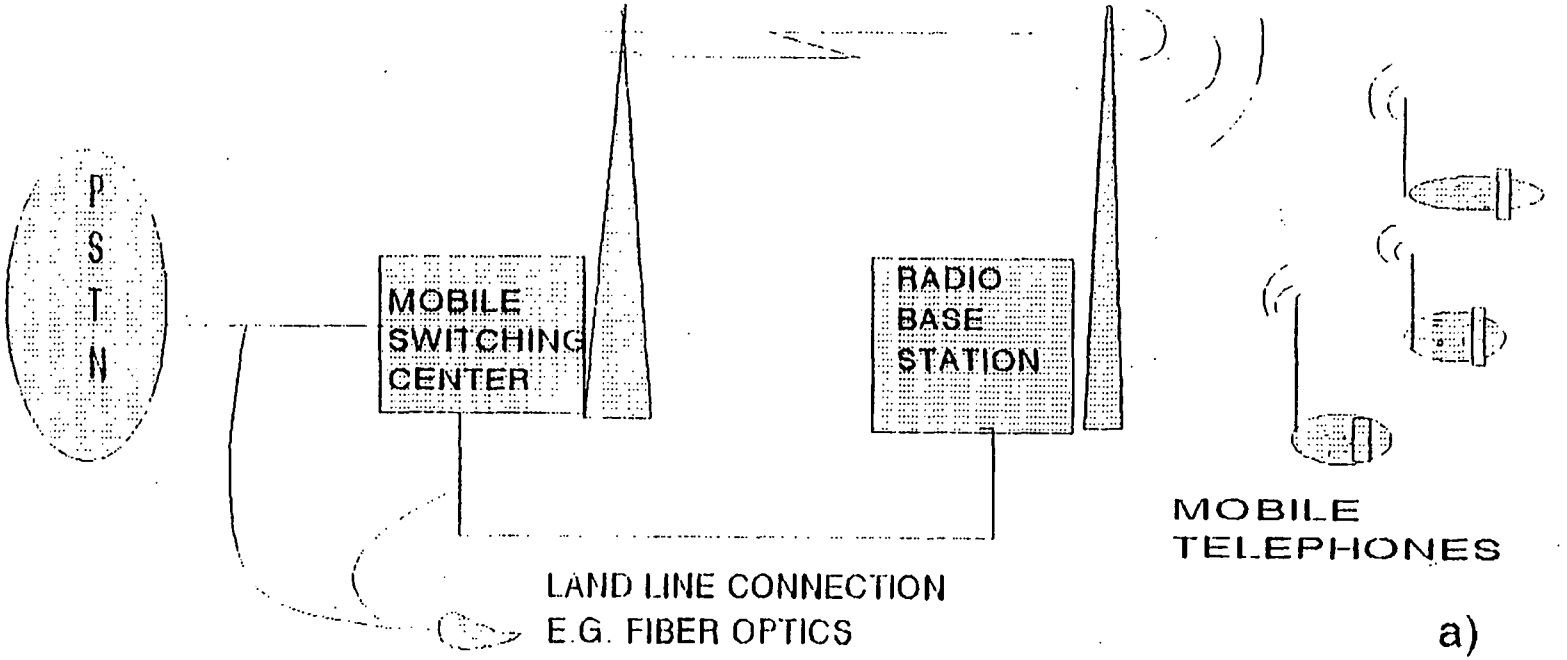
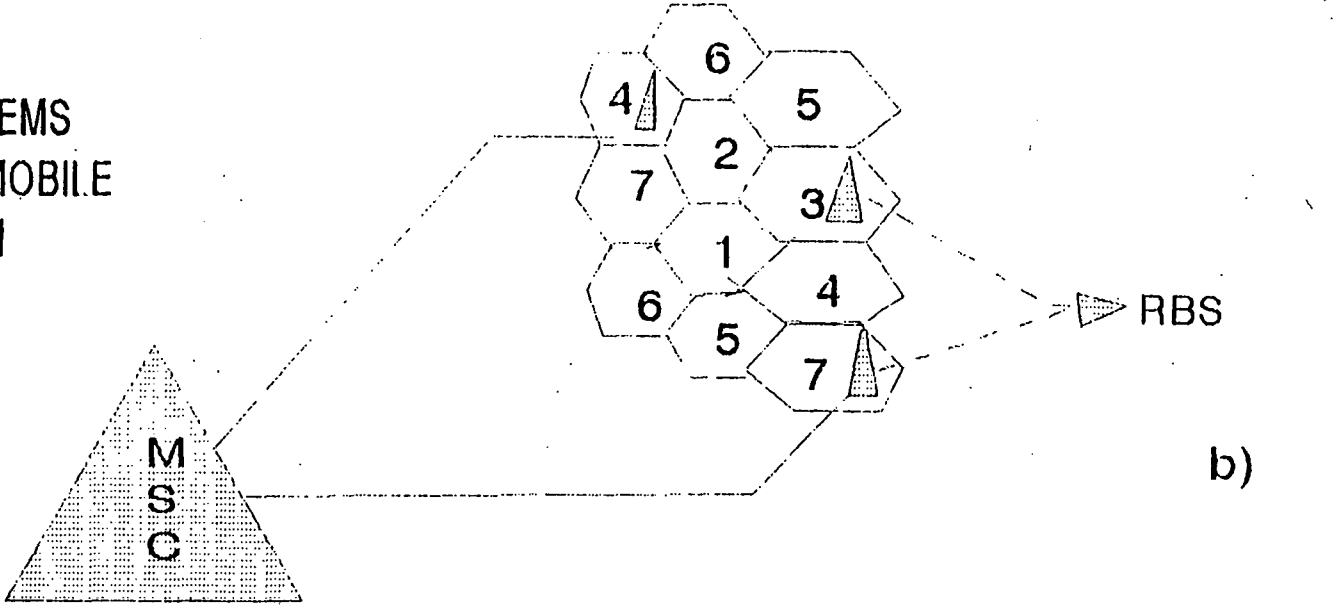


FIG 2
MAJOR SUBSYSTEMS
FOR CELLULAR MOBILE
COMMUNICATION



3.3 Comparison of major types of CMT systems

42 Because of the development of cellular mobile communications in different countries at different times, the technical features and parameters of the systems so far developed are quite different. A number of systems have appeared in the world market, the main ones include AMPS, TACS and NMT. A brief description of each of these systems would illustrate some of the differences in the design and their possible applications.

3.3.1 Advanced mobile phone system (AMPS)

43 This system, which has gained wide acceptance in North, Central and South America, uses the 800 MHz radio transceiver at the base station. The frequency spectrum ranges from 825 MHz to 845 MHz in the receive mode and 870 MHz to 890 MHz in the transmit mode. With its extended version (i.e. EAMPs), the respective band allocations are 824 MHz to 849 MHz and 869 MHz to 894 MHz for the reception and transmission, respectively. It is an analogue system with capacity up to 416 radio channels.

3.3.2 Total access communication system (TACS)

44 In its allocation in the 900 MHz RF band, it covers the spectrum range from 890 MHz to 905 MHz in the receive mode and 935 MHz to 950 MHz in the transmit mode. The maximum channel capacity is 300, and is widely used in Europe, Japan and China. An extended version of the above technology has been developed making use of additional frequency band from 872 to 888 MHz in receiver and 917 to 933 MHz in transmit modes. It is an analogue system which employs a multiplexing technique of Time Division Multiple Access and Frequency Division Multiple Access (TDMA/FDMA).

3.3.3 Nordic mobile telephone (NMT)

45 This is the system which was developed by Nordic countries and comes in two versions: NMT-450, which operates in the 450 MHz band, and NMT-900 for the 900 MHz band. With maximum channel capacity of 180, the NMT-450 has gained wider application in Nordic countries as well as in Western and Eastern European countries, such as Belgium, France, Austria, Bulgaria, etc. The NMT-900 was designed to carry higher traffic and serve a much greater number of subscribers than NMT-450.

3.4 Development of GSM

46 All the above cellular systems are based on the analogue system designed to meet the basic operational and service features, which include:

i) capability to serve large number of subscribers;

ii) efficient use of the radio spectrum;

iii) nationwide availability and compatibility;

iv) capability of providing services on vehicular and portable units;

v) provision of wired-telephone quality of service; and

vi) provision of hand-over capability.

47 Even though the above objectives are met in the design and development of CMT in Europe, America and Asia, the various countries use different radio spectra and modulation techniques with different channel capacities. For these and other reasons, it was not possible for a user to operate his/her mobile unit outside the boundaries of the countries for which the system was

standardized. Acknowledging this draw back, the European countries, with unprecedented cooperation, launched as far back as 1982, the development of digital CMT through their regional organization the Conference Europeenne des Postes et Telecommunications (CEPT).

48 The working group established by this organization, Group Special Mobile, developed a new digital CMT operating in the 900 MHz band. The system developed, known as the Global System for Mobile Communication (GSM) is now becoming a standard in all the European countries, and is gaining wide acceptance in other parts of the world. However, the parallel developments of different digital systems of CMT in the United States, the American Digital Communication (ADC) and the Japanese Digital Communication (JDC) operating in the 900 MHz of the radio spectrum, have reduced the truly worldwide application of GSM.

49 The world, therefore, seems to operate with three standards, each operating in the areas and zones of their influence. GSM, judging from its wide penetration in Europe, Asia, and Africa would probably be accepted as the standard in the countries of the above continents. The United States, Canada, Central and South America would fall under the influence of ADC, while Japan could be the domain for JDC[9]. While the overall design parameters and features of these systems are similar, one of the main differences in the above systems, however, is the channel frequency band they operate in. GSM uses 25 kHz band width while ADC and JDC employ 10.0 kHz and 8.3 kHz, respectively. Because of the smaller channel band width allocation, the number of channels that can be made available in ADC and JDC will be larger than in GSM. Such a reduction in channel band width will result in a higher signal-to-interference ratio and would permit a 21-cell cluster configuration as compared to 9-cell cluster possibility in the GSM system.

50 Regardless of the differences mentioned above, the digital CMT systems are designed to provide better quality telephone service and additional features associated with ISDN, which, inter alia, include:

i) efficiency in the usage of the spectrum;

ii) international roaming facilities;

iii) bearer of data and associated services;

iv) short message handling;

v) better security and confidentiality;

vi) possibility of operating with small hand-held mobile telephone units.

51 Future developments in GSM, ADC and JDC will require the application of systems to be used in much smaller cell sizes than are used at present. In principle it is possible to obtain more capacity per given area by reducing the size of cells. This will lead to micro and pico cell configurations where the number of channels that can be provided over a given area of coverage will greatly increase. For instance, a reduction of cell size by a factor of 10 would yield 100 times the channel capacity increase[10]. Apart from this method, the voice channel coding method could also produce capacity increase. The reduction of the full rate voice channel coding from 13 kbits/s to 6.5 kbits/s is followed by roughly doubling the channel capacity.

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[9] Stephen D. Moore, Ericsson Works To Keep Growth Growing, Indepth, September 1995.

[10] D. Bishop, Cellular Standardization, Cellular and Mobile International, Autumn 1987.

52 The future therefore favours structuring of smaller cell size clusters to facilitate the Personalized Communication Service (PCS). With relatively greater number of subscribers to be handled in such small cells, the "hand-over" procedure will, however, be more critical. In the earlier analogue system, the network (i.e. MSC, RBS, and associated equipment), conducts the necessary measurements through the base station to decide from which cell the mobile unit should be served. This is known as the Network Controlled Hand-Over (NCHO). A new procedure which could take into account propagation conditions in the user's environment would be of advantage.

53 This was achieved by distributing some of the logical functions of the network to the mobile units, in order to improve the hand-over capacity of the network. This is done in two ways: in the first one, the mobile units are assigned the task of sending continuously measured signal strength from the adjacent cells to the base station from which it is currently being served. With the additional data obtained from the base station and mobile units on the signal strength and quality of the currently established connection, the network can then make the appropriate decision. This procedure, known as Mobile Assisted Hand-Over (MAHO), can be applied in all the three digital CMT systems, i.e. GSM, ADC and JDC. It has the advantage of reducing the need for the network to make measurements in adjacent base stations, as decisions are made basically on the information reported by the mobile units.

54 Further improvement can, however, be achieved if the mobile unit takes over the whole control in the "hand-over". This is what is being done in the Mobile Controlled Hand-Over (MCHO) where, just as in MAHO, all the appropriate measurements are carried out by the mobile unit and the base station, but the final decision for hand-over to the adjacent cell is made by the mobile unit. In this system, assessment of rapid changes in conditions at the mobile site is improved. This procedure is currently applied in the Digital European Cordless Telecommunication, European Standard (DECT), and in Cordless Telephones 3 (CT3), the business cordless system developed by Ericsson.

55 Concerning the application of CMT, the trend indicates increased usage of the digital system for business as well as the general public. Increases in capacity and better quality of service were some of the factors which attracted more subscribers. As of 1993, there were 54 GSM networks established in 36 countries[11], with a total of over 403 000 subscribers. The application of smaller cells and the use of MAHO will establish the future base for the development of Personnel Communication Service.

4 Introduction of cellular mobile telephone services in Africa

56 In 1994, there were 14 African countries operating cellular mobile telephone systems with a total number of 278 299 subscribers. The predominant systems in operation are the Advanced Mobile Phone System (AMPS) and the Total Access Communication System (TACS). AMPS, which is the standard adopted in North America, operates in the 800 MHz band while TACS is of European standard and operates in the 900 MHz spectrum. Some of the countries in North Africa have, however, introduced the Nordic Mobile Telephone system (NMT), which operate in the 450 MHz and 900 MHz bands (Table 6).

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[11] H. Eriksson and Per. O. Nilsson, Development of Radio Access in Cellular System - The basis for Personal Telephone, Ericsson Review, 1991.

TABLE 6

Cellular mobile telephone subscribers and operators in Africa: 1994

Country	System	Year inst.	No. of subs.	Equipment used	Operators	Owner
Algeria	900- NMT	1989	3 000	NOKIA	PTT	STATE
Egypt	800PANASO	1979	2 600	MATSUSHITA	ARENT0	"
	800 TACS	1989	3 000	N.A.	"	"
Gabon	800 AMPS	1992	1 500	MOTOROLA	PTC	"
Gambia	900 TACS	1992	430	MOTOROLA	GAMTEL	"
Ghana	900 TACS	1992	2 000	MOTOROLA	MOBITEL	
	AMPS	1990	N.A.	AT&T	CELTEL	MILLICOM/CDC
Kenya	900 ETACS	1993	1 169	NEC	KPTC	PRIVATE
Mauritius	900 ETACS	1989	3 700	MOTOROLA	EMTEL	STATE
Morocco	450 NMT	1987	7 000	ERICSSON	PTT	EMTEL/PRIVATE
Nigeria	900 ETACS	1990	10 000	MOTOROLA	MTS	STATE
South Africa	C 450	1986	13 000	SIEMENS/ALC	VODACOM	NITEL/DCA
	900 GSM	1994	220 000	MOTOROLA/ERI	VODACOM/MTN	
Tanzania	900 TACS	1994	250	MOTOROLA	STATE (MOC)	MILLICOM
Tunisia	450 NMT	1985	3 000	ERICSSON	TELECEL	
Zaire	800 AMPS	1988	6 500	MOTOROLA		TELECEL
	" "	1988	N.A.	N.A.	Express Comm.	-
Angola	800 AMPS	1990	1 150	MOTOROLA	ENATEL	STATE
TOTAL			278 299			

57 Lately, however, several countries have introduced the Global System for Mobile Communication (GSM) system. For example, South Africa has installed GSM system and achieved an unprecedented success by connecting 220 000 subscribers within one year from the date the system was put into service. Similarly, the Kenya Posts and Telecommunication Corporation (KPTC) has prepared plans to extend its mobile network using the new GSM technology, with a capacity to serve an additional 50 000 subscribers. Nigeria and Mauritius as well have decided for GSM system for their second CMT networks with capacities to serve 100 000 and 3 000 subscribers, respectively. Furthermore, Zimbabwe and Uganda are also planning to start operating GSM in late 1995, while Malawi and Namibia have committed themselves to GSM based CMT networks.

58 Although the data is far from comprehensive, the above examples tend to indicate a trend away from the earlier and currently predominant analogue systems (AMPS and TACS) towards the newer digital GSM systems. In particular, the countries in Southern Africa have all committed to the GSM system and if it is standardized, the potential for cross-border roaming will be created.

59 The general picture in the region as a whole is still that of a proliferation of many different systems and operational protocols which do not allow roaming capability. This lack of standardization may be explained in part by the fact that the installation of these systems in Africa are still dependent upon the source of financing, which often derives from the countries supplying the particular system. While the financial assistance is certainly appreciated at the national level, its impact at the regional level is not favourable in that cross-border roaming would not be possible. Furthermore, with different systems operating in the generally small nation-states in the continent, the possibility of cooperative arrangements for joint procurement of equipment is diminished. The logical conclusion one could reach is that CMT is being introduced in Africa purely on the basis of national priority to be able to meet the high demand for telecommunication services.

60 Another development of significance in the mobile communication market in Africa is the participation of the private sector. Out of the 14 countries included in the study, private sector participation can be found in five, namely:

i) Ghana: Where Mobitel of Ghana has joint venture with Millicom of the United States, which holds 80 per cent of the share capital.

ii) Nigeria: Nitel of Nigeria in a joint venture with Digital Corporation of Atlanta, United States, operates ETACS cellular mobile network. A second joint venture arrangement is under way with EMIS to operate a GSM system with a capacity of 100 000

iii) Tanzania: The Tanzania Telecommunication Corporation Ltd. (TTCL), in a joint venture with Millcom International Cellular (MIC) also plans to extend mobile services to Dar es Salaam, Zanzibar and the other major towns. MIC has 51 per cent of the share capital.

iv) Namibia: Mobile Telecommunication Ltd. (MTC) has a joint venture with Telia International and Swedfund holding 26 per cent and 23 per cent, respectively, and the Namibian Post and Telecommunications Holdings 51 per cent of the share capital. MTC operates a GSM cellular mobile network with a capacity to serve 8 000 subscribers.

v) Zaire: Telcel is a private operating company owned by Zairian Micko Rwayitare, and provides cellular mobile communication service with the analogue 800 AMPS system, having a capacity for 8 000 subscribers. A second company, Express Communications also operates 800 AMPS system.

61 It is evident from the recent entry of the private sector in the development of CMT services in Africa that perhaps more will come in the near future (e.g. Uganda, Zimbabwe). Private capital would certainly make a significant contribution to the development of telecommunications in Africa where the demand for services far outstrips the capacity that the traditional public operators can provide. However, appropriate investment environment must be created in order to attract private capital into Africa. This will entail, among other things, the establishment of clear private investment codes and transparent regulatory regimes in the industry.

62 Cellular technology can also be applied to provide fixed telecommunication services. For example, Ethiopia and Zambia have plans to install fixed cellular telecommunications systems to provide services in the rural communities of quality no less than that provided in the urban areas. The necessary plans are underway in Kenya to introduce wireless loop in the network. Similarly, in South Africa, the two CMT operators VODACOM and MTN, have already committed to install a total of 29 000 phone shops in the rural communities using cellular technology. This application of cellular technology will be discussed in detail in Section VI of this report.

5 Application of cellular communication systems

5.1 General

63 The technological advance in mobile switching equipment, as well as in radio transceivers and mobile terminal units have greatly expanded the scope of application of the cellular mobile communication system beyond its conventional domain of mobile customers into areas where it can complement, or in some cases offer alternative and economical choices for providing fixed telecommunication services. The alternative application in the extension of basic services to remote and rural areas, where conventional wired services would be too expensive and time consuming and in some cases not even practical, deserves serious consideration by the African countries. The ability for quick connection and the response to demands for telephone service in the suburban, remote and rural communities makes cellular technology a viable alternative for providing telecommunication services.

64 The possible applications of cellular communication can essentially be divided in two: the various services it provides under the general CMT coverage with or without the features associated with mobility (such as roaming, hand-over etc.) and the provision of access to basic telecommunication services (telephone, FAX, etc.) to under-served or un-served areas.

5.2 Application as a cellular mobile communication system

65 An article titled "Customers Don't Have Monopoly on Cellular Service" by Mr. Dale Fox, illustrates the benefits that can be accrued in improved quality of telephone services by providing field staff with cellular mobile terminals to increase their responses to fault clearing, installation, etc.[12]. He cited the case of Illinois Bell Telephone, a company with a work force of about 2 500 technicians and 300 supervising managers, where information from field staff used to flow to the maintenance and operational centres through portable data terminals operating via land-line connections, which were normally accessible at the subscriber's premises or distribution and connection boxes. The company's decision to move the supervisors out into the field for better control of field activities, coupled with increased use of the portable data terminals by technicians, created the need for field supervisors and technicians to directly retrieve information on trouble reports, to perform appropriate tests and finalize reports, without the intervention or assistance of the staff at the maintenance and operation centres.

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[12] World Report 1993, Cellular and Mobile international, 1993.

66 The only alternative available was the use of mobile systems, but decision still had to be made between enhancing the mobile radiocommunication which the company was already operating then, or the adoption of a new cellular mobile telephone system. After careful consideration of the performance of both systems and its organizational impact, the decision was made to adopt the cellular mobile telephone system. The installed number of cellular mobile terminals in the work force then rose to 1 300 of which 300 had data handling capability. The tangible benefits that were derived from the choice of CMT included the reduction of workload of the maintenance and operational centres, and an overall reduction of cost. A less tangible benefit, but equally important from customer relation point of view, was the avoidance of intrusion into private lines.

67 The other area of application of Cellular Mobile Communication which would have relevance to developing countries is the utilization of fixed cellular terminals for providing basic telecommunications services. In the case where cellular mobile telephone service already exists, it would also be possible to provide standard telecommunication services with some modification of the technical and operational features of the cellular mobile communications systems. For example, the charging principle can be reconciled with that applicable to customers connected to the fixed network; the normal mobility features associated with cellular mobile system can be constrained or disabled (i.e. roaming, hand-over, location monitoring etc.) and the subscriber numbering and routing plans can be integrated to reconcile with those in the fixed network.

68 Figure 3 illustrates the basic network architecture for accessing basic telephone service through the fixed cellular terminal. The arrow shows the main elements which constitute a cellular terminal for a single telephone line connection. The cellular network can be based on any of the CMT systems available in the market, i.e. AMPS, TACS or GSM. Fixed terminals can be provided to serve individual customers or they can be grouped in a concentrator to be shared by several subscribers. The latter scheme could reduce the cost of the fixed terminal and would in most cases be adapted to rural areas where the traffic generated by individual subscribers is relatively low.

69 The above system could be of advantage to those telecommunication operators who already have installed cellular network covering wide service areas and are in addition required to offer basic telecommunication services which would otherwise be too expensive or time-consuming. For example, the Spanish public telecommunication operator, Telefonica, initially had procured from Alcatel an analogue system to serve 70 000 fixed cellular terminals. It later expanded this network by another 30 000 units, but this time with the digital version which can operate in the GSM environment.

70 In Eastern Europe, just after the downfall of socialism, the telecommunication operators faced the challenge to quickly integrate their antiquated systems with those in Western Europe. Taking the case of Hungary, for example, in 1989 it was operating with equipment designed in the 1930s. It was not difficult to observe the huge capital outlay it would require to modernize the network to the extent required to meet the high demand. The waiting time was so long, (an average of 12 years, and the estimated unmet demand was in the vicinity of one million) that a local joke circulating then was that "half of Hungary is waiting, while the other half is waiting for dial tone" depicted the status of telecommunication services at that time. The Hungarian Telecommunication Company had then prepared a long-term plan, which would have cost $US 5 billion dollars, to increase its network to almost 960 000 lines and to cut the waiting time for connection to one year[13].

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[13] Telephone Engineering and Management, August 1989.

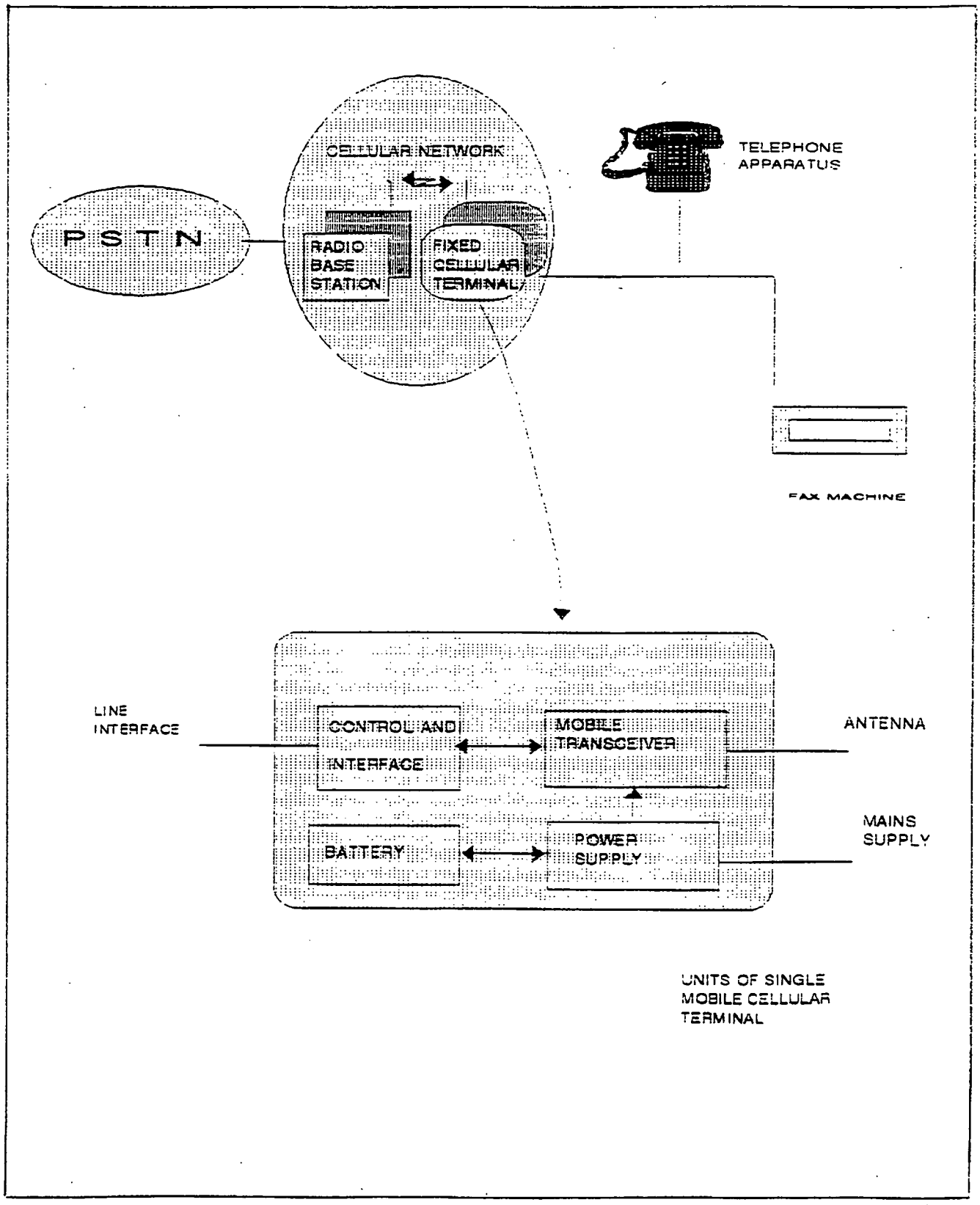

FIGURE 3

Access to PSTN through fixed cellular terminal

71 In the interim period, however, it had to address pressing demands for connection especially resulting from Government's decision to move towards a market economy. This and other prevailing circumstances in the post socialism period led to the formation of a joint venture company, Westel Radiotelefon Kft, between US West and the Hungarian Telecommunication Company to operate a cellular mobile telephone system with a capital of $US 10 million dollars, 50 per cent of which was to be contributed by US West. The plan was to provide a system with a capacity of 50 000 lines. The system was inaugurated in October 1990 and the targeted connection of 2 500 subscribers for the first three months was passed and nearly doubled. The traffic generated by the mobile subscribers was about the same level as that for the fixed locations. The average utilization of air time per subscriber and per month was two to three times that in the United States, which was about 200 minutes. Demand for the cellular mobile service grew steadily that Westel had to increase the capacity initially provided. In 1995 the number of connected subscribers reached 47 500. Furthermore, two more operators were licensed to provide cellular mobile service, and the data received from one of them, namely Pannon GSM Tavkozlesi Rt, shows that 46 000 mobile units were installed as of August 1995. The Hungarian situation clearly demonstrates the contribution that CMT can offer in addressing urgent needs for telecommunication services and bridging the gaps where capacities of the existing network, especially the outside plant, fail to meet demand.

72 The phone-shop concept introduced in South Africa provides another example of the application of CMT technology to provide telecommunications services in remote low density areas. The system is based on a computer managed telecommunication service where a number of telephone lines, say ten, are fixed in a pre-fabricated container or in a room prepared for this purpose, and strategically located for the use of the general public. Each telephone line is provided with an individual display and metering unit (DMU) for monitoring the charges by the caller, and a master control unit (MCU) through which the operator controls calls from each telephone line. The customer has two options for paying: he can pay in advance, in which case the individual meter shows the amount remaining as conversation continues; or he can choose to pay on call completion based on the charges registered for the total duration of the call. If required, the operator can issue a receipt to the customer from the printer attached to the MCU. Furthermore, the whole transaction of calls can be produced for each and all lines connected for traffic per auditing period, or per shift.

73 The required ten telephone lines can be provided through two-wire connection to the local exchange or through a radio base station as a fixed cellular subscriber. In the former case, the phone shops are designed to provide service at selected places in the urban areas. In the latter case, the phone shops are dispersed in remote and rural communities served by the CMT network. The two cellular network operators in South Africa, Vodacom and MTN, have already launched a programme to install 22 000 and 7 000 of such units, respectively. Such a system could provide solutions for access to basic telecommunication services to the communities in remote and isolated rural areas.

5.3. Radio access system with cellular structure

74 Despite the demand which far exceeds the supply of telecommunication services in Africa as a whole, the utilization of the installed capacity of switching equipment is on average below 70 per cent and yet the waiting lists of subscribers is over 27%. The major constraint to effective utilization of installed capacity is often the lack of local line plants. Extension of line plants is expensive and quite time consuming. The radio access system based on frequency reuse in a cellular

structure provides an easy, flexible and fast approach in bridging the last leg from local switches or remote subscriber stages to the customer. Its application for extension of services needs to be explored.

75 There are two approaches for providing local access telephone by means of radio, or wireless local loop (WILL). The first approach is to provide one radio channel for each two-wire loop per subscriber; while the second method employs concentration factors based on traffic volume, subscribers calling rate and the required grade of service.

76 The basic structure of the first version is shown in Figure 4 where the local switching equipment is connected to the radio base station on the basis of one subscriber number to one radio channel. The subscribers who are provided with fixed transceivers connected to a normal telephone apparatus enjoy the same services and are assigned the same numbering scheme as those subscribers who are connected on two-wire copper lines. The radio base station is normally located within the local exchange, and normal voice cables are used to connect the radio channels to the switching equipment. At a later stage when the network develops and requirement justifies, this same site could be used as one of the sites in CMT network.

77 The extent of coverage by the above system depends on the power of the transceivers in the base station and their antenna gain, as well as on the fixed subscriber radio terminal power and its antenna gain. For instance, a transceiver with 45 W output and antenna height of 80 m and gain of 16 dB can cover an area of 30 km when the subscribers are provided with a fixed radio subscriber terminal (RST) having an output power of 3 W. If, however, a 5 m yagi antenna is used to increase its gain to 10 dB. for the same base station parameters, the radio coverage would be adequate to provide services over a radius of 48 km. If the antenna height of the RST is doubled, then the services can extend over 70 km radius[14].

78 Since there is no concentration factor between the radio channel and the number of subscribers served in the above scheme, the cost of the radio channel per subscriber is relatively high. On the other hand, the system is simple; most of the work involves only the installation of RBS, which can be carried out within a relatively short time.

79 The second version of WILL system introduces a concentration factor which compels subscribers to share the limited resources of radio channels. The extent of this sharing is based on grades of service considered to be adequate and on the calling rate of the subscribers. It is considered normally acceptable to base the channel requirements on 5 per cent grade of service and 50 m Erlang traffic per subscriber. Business subscribers could, however, generate far greater traffic which could reach 100 m Erlang/subscriber. Figure 5 highlights the basic units of the radio access system referred to above. There are three basic units: the radio base station with its controlling and interface unit, the concentrator or switching interface module as it is referred to by some suppliers, and the subscriber radio terminal (SRT) to which an ordinary telephone, FAX or modem is connected.

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[14] T. Hackler, Hungary Plugs Into the Modern World, Cellular and Mobile International, Fall 1991.

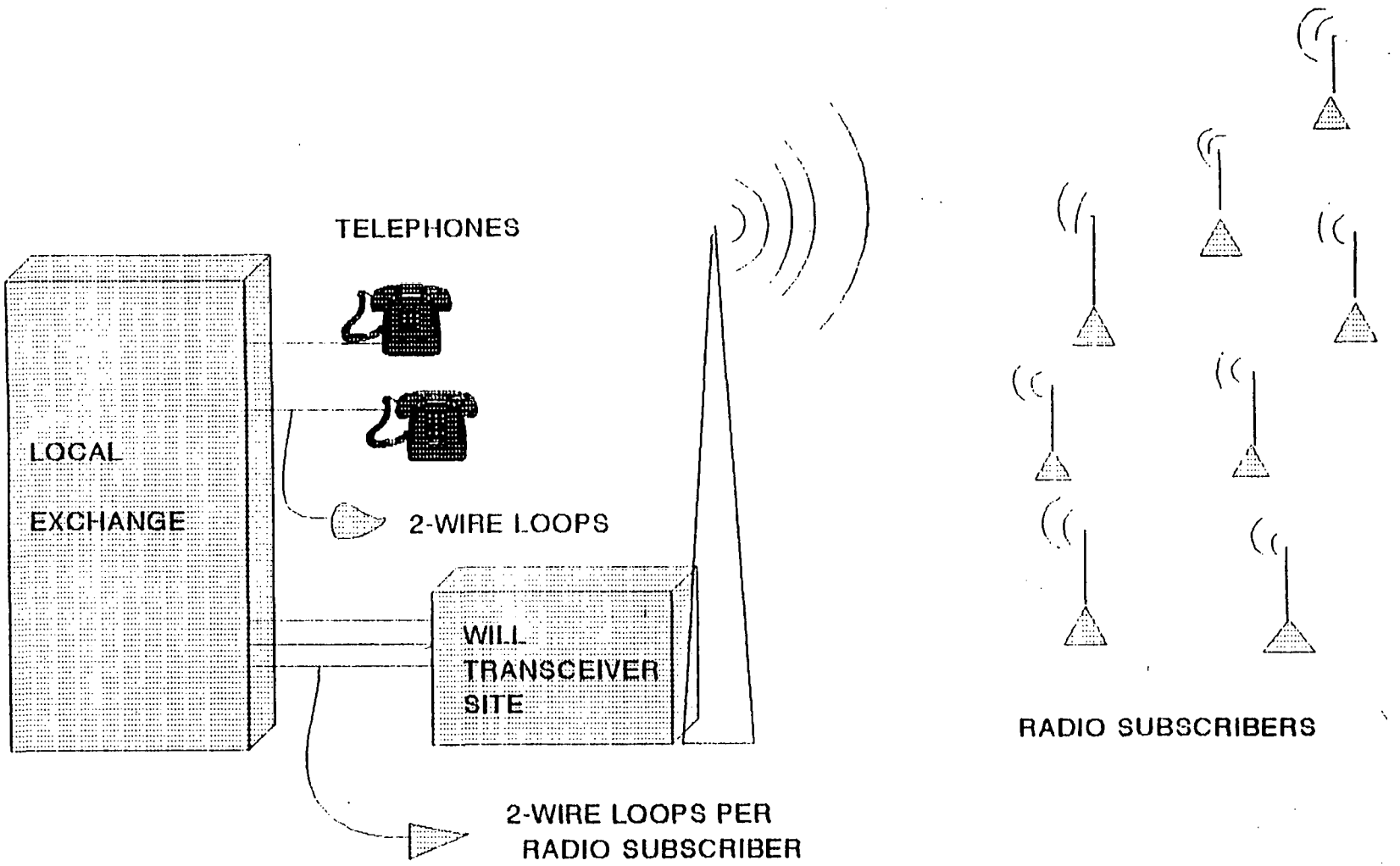

FIGURE 4

Single WILL cell site

80 The function of the radio base station is to provide a pool of radio channels to serve a number of SRTs and to supervise the quality of radio transmission when calls are in progress. The connections between RBS and concentrators are made through digital links (PCM cables or UHF radio) on the basis of one time slot per radio channel. Between the concentrator and the switching equipment, a dedicated time slot is allocated per subscriber, i.e. for each subscriber number a time slot is assigned on a permanent basis. On the path between concentrator and RBS, the available transmission links are for common use by all subscribers. The concentrator, or the switching interface module performs the function of registering the special identity number of SRTs associated with the dedicated time slot for each subscriber, so as to make the final connection to the correct SRT terminals.

81 The spectrum of the radio frequency commonly used for the above radio access system are 380 - 450 MHz and 800 - 1 000 MHz. Although the lower frequency band is often congested with other services, it offers better propagation characteristics suitable for long distance coverage. But for areas which are expected to generate high traffic, the higher frequency band, i.e. 800 - 1 000 MHz is normally preferred.

82 With cellular structured distribution of the radio base stations and controlling units, it would be possible to develop a network to serve any desired number of subscribers. A network can also be designed on a modular scheme of, say, 1 000 subscribers or any other convenient capacity depending on the system to be adopted. For example, based on RAS 1000 (Radio Access System), a network can be designed for 1 230 subscribers with a traffic load of 100 m Erlang at a grade of service of 0.5 per cent. A system offered by Motorola where services to 1 000 subscribers can be packaged with a grade of service of 5 per cent and 50 m Erlang traffic to be generated from each subscriber may also be cited. Working with such modularized units would simplify planning and budgeting and also the installation of radio wireless loop for areas of high or low traffic.

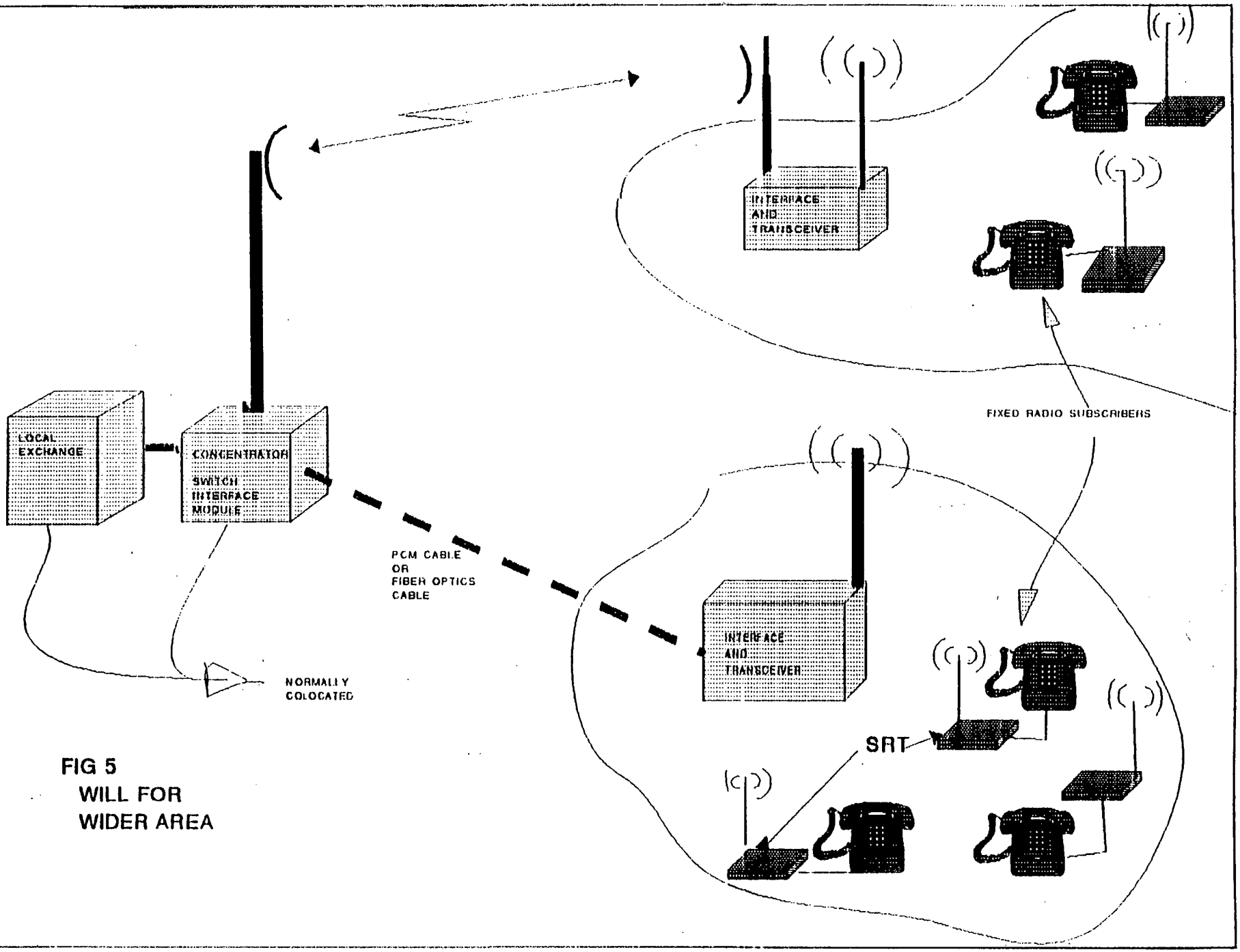

FIG 5
WILL FOR
WIDER AREA

6 Comparison of cost and performance of WILL and wired networks

6.1 Objective

83 In the foregoing sections the various applications of cellular mobile telephones were illustrated. This section focuses on the application of CMT in a fixed network where it can offer cost effective basic telecommunication services to areas where it would be extremely difficult to install wired networks. The time savings that can result is another factor which could influence the choice of fixed cellular mobile services in areas of difficult accessibility as well as to those areas where demand for connections should be met with minimum delay. A comparative study was conducted on the alternatives of wired and fixed cellular mobile networks in an African country.

6.2 Background of the areas selected

84 The selected areas are typically located in the outskirts of a main city, where through the assistance of the government and private initiatives, a large housing project was constructed. Even though plans were drawn for the basic infrastructure, such as access roads, telephones, and other public utility services, either they were not ready by the time the housing projects were completed, or the services provided were not adequate. This was at least the case for telephone services. There were many constraints that would have had to be overcome to provide adequate services to the area, the main ones include:

i) the difficult terrain in which to install the subscriber cable network to provide reliable connection;

ii) the absence of subscriber cables and the time it would take to construct the network for immediate connection to customers already waiting for telephone services; and

iii) the coordination required with other utility organizations and the municipal authority to assign the right-of-way for the cable route which is often very difficult and time consuming and sometimes not even possible to obtain.

85 There are a number of technically feasible alternatives that could be explored to overcome the problems cited above, and fixed cellular mobile telephone is one of the technical solutions that can be applied in a cost-effective manner. As the distribution of subscribers in the area will be somewhat scattered, fixed CMT provides the flexibility required to connect subscribers located within the radio propagation area, thereby eliminating the uncertainty element of the exact locations of potential subscribers.

86 To illustrate cases where CMT could be economically feasible, cost comparisons were carried out between the fixed wired network and a fixed cellular system.

6.2.1 Cost of wired network

87 Figure 6 shows the two areas under consideration; the area designated as A has a very difficult access road, and is separated from the main city area by a big river. The rocky area around the river and the absence of any permanent right-of-way, and the narrow road leading to the bridge makes the construction of any kind of subscriber cable an expensive alternative. Even if decisions were made to proceed with the cable construction, the unavoidable damages and mishandling of the cable plants in the process of the inevitable road improvements and other construction works to be

carried out in the future would degrade the quality of the cables and seriously affect the dependability and availability of the services to be provided.

88 The cost of laying the cables especially along the section from the main exchange up to the centre where secondary distributions of the cable network are made, should include the cost of special protective measures to safeguard the cables from any possible damages. Considering the difficult terrain of the area to be covered by the cable network and the expected high incidence of cable breakdown and damage, the alternative to lay copper wire cables on the site would not be a sound engineering choice. The most advisable solution in the long run would therefore be installation of Remote Subscriber Stage (RSS) at the appropriate locations in Area A, and a digital radio junction line link to the local exchange. The other alternative is the installation of a fixed cellular telephone system, if necessary with a directional antenna to cover areas around it. However, the choice to install RSU will require coordinated construction of a building, as well as the installation of switching equipment and local cable network within Area A. The CMT alternative, on the other hand, requires only the installation of the radio base station and switching interface or concentrator, and the connection of subscriber units as requests come.

89 For the area designated as B, where cable route is not as rugged and difficult as that in A, normal protection measures can be employed for the cables. As the right-of-ways along which the cables are to be laid are not fixed, experience shows that the cables will not escape from damages and interruption during the inevitable road improvement works to be carried out at some future date.

90 The cables to be constructed are assumed to be connected to the new proposed exchange site, where a new switching equipment would be erected to serve the surrounding areas including A and B to serve an estimated 1 000 customers requiring immediate connection, and based on $US 476.2 of installation cost per line pair and allowing 20 per cent additional pairs for flexibility of the cable network, the cost of a wired network would be 476.2 x 1 200 = $US 571 400.00.

6.2.2 Cost of wireless local loop (WILL)

91 For each of the above areas A and B, a WILL alternative can provide an equally or better service. For the case chosen in this paper the two cells serving each of the areas shown in Figure 6, and the cell sites located within the local switching equipment can provide adequate coverage for basic telecommunication services. There is no blocking structure nor mountains which would adversely affect the propagation conditions. Since the systems are normally designed to cover a radius of 20-25 km, there would not be any degradation of signal strength to affect communication quality.

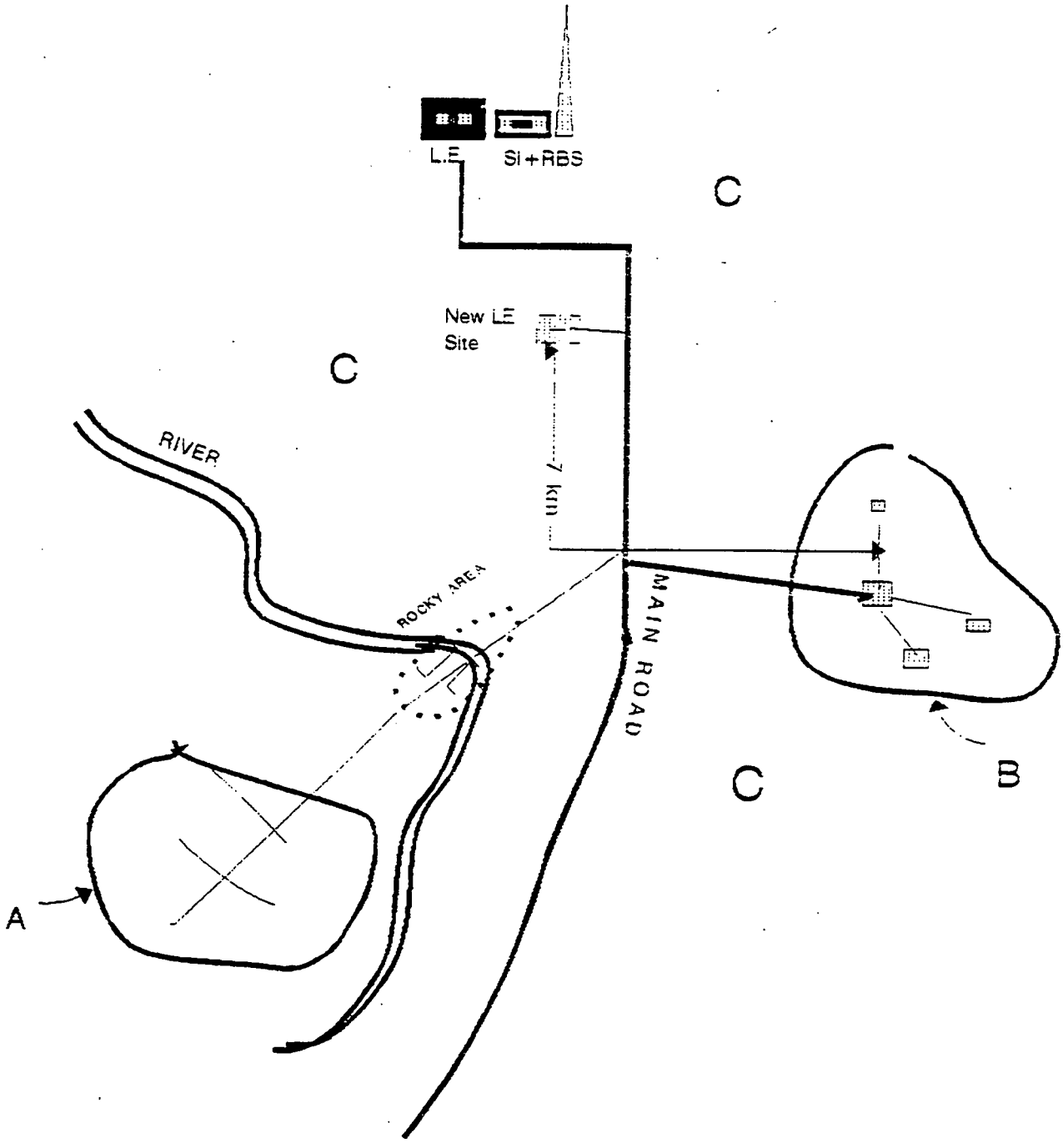

FIGURE 6

Sketch for possible application of CMT

92 As the equipment configuration and cost parameters are the same, the costs for each cell are identical. Furthermore, system capacity considered for each cell is 1 000 subscribers and the traffic load assumed is 50 m Erlang/subscriber at a grade of service of 5 per cent. The cost of equipment per subscriber based on the above assumption is:

		$US
i)	Main equipment (SIM + RBS)	750 per line
ii)	Fixed subscriber terminal	500
iii)	Total cost per subscriber	1 250
iv)	Cost for 1 000 subscribers	1.25 m
v)	Cost for 1 000 subscribers plus labour and transport	1.3 m

6.2.3 Cost comparisons

93 Comparing the investment costs under the two schemes, it is observed that the WILL alternative is two to two-and-half times as expensive as the wired network. But the time it would take to install the new exchange and lay the required subscriber network is quite long. It is estimated that, without taking into consideration the procurement process, at least 1 to 1.5 years would be needed to have the wire-based system ready to connect subscribers. It would require an additional half-year to connect 1 000 subscribers. The WILL can, however, be installed in a much shorter time of 3 to 4 months, and the system would then be ready for connection of subscribers.

94 If we consider a time difference of one and half years between the wired network and the WILL option, the revenues that would be generated during the above period would be $US 400 x 1 000 x 1.5 (average revenue/sub/yr x No. of sub x No. of yrs) = $US 600 000. The additional $US 50 connection charge per subscriber would bring the total revenue to $US 650 000. This amount practicably offsets the additional initial investment cost of the wired network, which as already noted above, was estimated to cost $US 571 400. Investment cost of WILL, less the revenue expected to be generated in the one and half years (i.e. 650 000), nearly matches the cost of the wired network, not counting the social and economic benefits to be derived by meeting the demand for services within the short period.

95 The above comparison is made for the area designated as B in Figure 6. For area A, the wired network would not be technically feasible for the reasons already brought out above. The WILL alternative is therefore the preferred option to provide telecommunication service to the area. In addition to these targeted areas A and B, possibilities will be created to meet urgent demands in area C, which is already being served by wired network, but not enough to provide the required connections. In the long run when network extension is implemented, with the erection of more exchanges and construction of additional line plants, the WILL equipment can easily be converted to serve as one cell site equipment for a cellular mobile telephone network of the future.

7 Conclusions and recommendations

96 It is clear from the above analysis that the development of telecommunications in Africa continues to fall short of the demand for services which continues to increase, partly due to the general awareness of the population about the importance of telecommunications in their daily activities, be they personal, social or business. Cellular communication technology seems to offer

an attractive alternative because of the range of services it can offer, especially the mobile aspect, and also for the possibility for much faster installation.

97 The cellular communications technology is making major in-roads into the African telecommunication market. In 1990 there were only six African countries offering cellular mobile telecommunications services, namely, Algeria, Egypt, Morocco, Tunisia, Mauritius, South Africa and Zaire. That number almost doubled to 11 in 1992 and is approaching 20 by the end of 1995. While the early systems are analogue, the more recent ones are nearly all digital, with GSM becoming the preferred standard.

98 Another characteristic of the cellular mobile telecommunications systems in Africa is that they are being introduced in a very uncoordinated manner, with different systems in adjacent countries. This approach will limit the exploitation of capabilities such as cross-border roaming. It is noteworthy, however, that the countries in the Southern Africa region have seen the need for standardization and all seem to have committed to installing the GSM.

99 The migration to the digital CMT systems also has the advantage that the digital systems offer more value-added services, provide better quality of service and improved security.

100 The cellular concept employed in the normal cellular mobile telephone system is increasingly being adopted as a basis for wireless access system to provide basic fixed telecommunication services to suburban and rural communities. The system allows for direct connection of radio channels to the local switching equipment, thereby eliminating the need of mobile switching exchange. It enables the efficient use of frequency through frequency reuse schemes, and of radio channels through sharing mechanisms provided in the design of the system to connect a large number of subscribers depending on the calling rate from customers and the grade of service desired. The major advantages of the cellular application for fixed telecommunications services are:

i) it enables fast connections to critical areas of demand where the wired network does not have the capacity for additional lines;

ii) it permits cost effective provision of basic telecommunication services to suburban areas where wired networks would be expensive and time consuming;

iii) it creates the possibilities for providing basic telecommunication services to areas where terrains and environmental conditions make the wire networks not a viable engineering option; and

iv) it provides cost effective means to offer the rural community equally good telephone services as those available in urban areas.

101 The application of the radio access system or the wireless loop enables telecommunications operators to provide basic access to telecommunication services. Thus the systems can play an important role in reducing the waiting list, to meet critical connection demands in the urban centres, and address the demands in the rural and suburban areas. It is, therefore, **recommended that African Administrations seriously consider the technical and economic merits of radio access or wireless loop system to reduce constraints faced in their existing network in meeting critical demands for telecommunication services in both the suburban and rural areas.**

102 One of the factors that had influenced the fast development of cellular communication in the world was the changes made in the regulatory framework, allowing private companies, business groups, and independent operators in the operation of cellular mobile communication services. The competitive atmosphere created thereby benefited the customer as the services provided became

cheaper and the quality of service much improved. Accelerated expansion and improvement of services with additional features through the application of digital technology have also been made possible. Some countries in Africa such as South Africa, Ghana, Nigeria etc. had made similar changes in their regulations and have achieved satisfactory results in the expansion of the cellular network. Restructuring the existing telecommunication organizations and limiting their monopolistic role and also introducing competition on the new and advanced telecommunication service would contribute towards the development of telecommunication network and services. It is, therefore, **recommended that necessary changes be made in the regulatory framework to allow and encourage private sector participation in the development of cellular mobile communication services in order to enhance fast development of cellular network and also the use of state-of-the-art technologies.**

103 The concept of phone shop based on fixed cellular technology as introduced in South Africa deserves serious consideration by African telecommunication operators. It does not only extend services to rural areas, but also provides opportunities for small scale entrepreneurs to run phone shops as private business. Thus the major telecommunication operators would be promoting entrepreneurship by subcontracting such services to private individuals.

104 The services envisaged under the phone shop concept was the result of negotiations between the government and the two cellular operating companies, where the latter committed part of their resources to the improvement of telecommunication services in the rural communities. This approach, which invites private companies to invest in a relatively less profitable area and yet contribute significantly to the development of the basic telecommunication services, is worth emulating. In principle, therefore, when negotiating for the provision of new and value-added services, the competing companies should be requested to contribute towards the development of the telecommunication infrastructure in the rural communities. It is therefore recommended that:

i) **the phone shop concept deserves serious consideration by telecommunication organizations and all appropriate measures should be taken to encourage their implementation;**

ii) **African countries should include in the terms of conditions and rules for operating value-added and advanced telecommunication services by competing private companies or business groups, a provision by which these companies commit themselves to play a part and contribute to the extent possible towards the development of rural telecommunication services.**

105 The cellular mobile communication systems introduced in Africa were of different types, thus not permitting the use of the same mobile unit in all the African countries. Adoption of a common system at regional and subregional level would have positive impact on the development of CMT in Africa. It would permit international roaming and facilitate the preparation and implementation of operational agreements on cross-border traffic. Furthermore, it would establish a single system on which all African operators could cooperate in the development of the type of services most relevant to Africa. In addition, it would create the basis for establishing the manufacturing of the various units and subsystems in Africa. In consideration of the above points, it is recommended that:

i) **Each subregion, through its appropriate meetings and conferences, should create a committee to discuss the economic and technical issues regarding the adoption of a single standard of cellular mobile communication system in Africa, and to monitor future development and application of the system.**

ii) **A follow-up action should be taken to organize and establish at subregional levels the mechanism for common purchasing of equipment.**

iii) **Each subregion should consider developing the capability for manufacturing components, parts, units and subsystems of cellular mobile communication systems for the countries of the subregion in order to adapt CMT systems to Africa's needs.**

iv) **PATU should be given a major role in the coordination and implementation of the above recommendations.**

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INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 9-E
18 March 1996
Original: French

For Action

PLENARY MEETING

SOURCE: SENEGAL

TITLE: PART I - INDUSTRIALIZATION AND MANUFACTURING

PART II - DEVELOPMENT OF THE TELECOMMUNICATION SECTOR IN SENEGAL *(for information/support)*

PART III - PANAFTEL: A GOOD EXAMPLE OF INTERNATIONAL COOPERATION

PART I - INDUSTRIALIZATION AND MANUFACTURING

Requirements to be taken into account in the overall framework of the continent's economy

The African continent is reputed to have the poorest telecommunication infrastructure in the world. This is hardly surprising, telecommunications being a good indicator of economic activity in general.

It should be noted that the relative level of investment in telecommunications in Africa is correct: between 1990 and 1994 it represented 4.19% of gross fixed capital formation, compared with a world average of 4% for the same period[1].

In absolute terms, none the less the level of investment is still low.

The industrialization of telecommunications in Africa should therefore be seen in the global context of the continent's economic development.

There are great disparities among the African countries, but there are certainly far more things they have in common, and it is on these that attention is focused.

Competitiveness and profitability are a guarantee of durability

The basic purpose of industrialization is to satisfy a market. There are other reasons, including sovereignty, security of supplies, etc.; however, they are not dealt with in this contribution, since they may be the subject of policy decisions, in more appropriate forums.

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[1] Source: ITU Statistical Yearbook - 1994.

Although we shall confine ourselves to solely commercial considerations, it is worthwhile noting the following:

- are we targeting the service or equipment market?
- is the market to be satisfied national? subregional? regional? global?
- should not competitiveness be the guiding principle?
- does the continent have the means to be competitive?

A brief breakdown of the telecommunication market might take the following form:

Real opportunities in a difficult environment

1) Telecommunication services
   - basic services[2]
   - value-added services[3]
     - sources of information
     - development of applications
     - supply of contents

2) Telecommunication equipment
   - manufacturing of telecommunication equipment
   - services related to the manufacturing of telecommunication equipment
     - software development
     - equipment assembly
     - equipment installation

Strategic mergers among the major telecommunication equipment manufacturers indicate the increasing difficulty they are finding in being present at all levels of the market, where new needs arise every day. In this sector the smaller concerns have only very little chance of survival.

It is also worthwhile bearing in mind the binding rules laid down by the World Trade Organization, of which the most pressing in this context relate to: market access, most-favoured-nation clause, national treatment and transparency. These principles establish once and for all the global character of the market in goods and services.

Moreover, objectively speaking the African countries do not have the economic strength required to take advantage of the few acceptable "exceptions".

Perhaps it would be wiser for Africa not to embark in the immediate future on the local manufacturing of telephone exchanges, radio-relays, optical fibres or computers.

None the less, under certain conditions it would be possible, and even desirable, for operations such as those listed below to be carried out on a broader scale in the short term:

– assembly of equipment imported in kit form;

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2 Whose provision is directly linked to the basic telecommunication network infrastructure.

3 Which are supported by basic services to which they add some value (procedural, informational, etc.).

- manufacturing of passive subsets, such as boxes and cabinets;
- and even the manufacturing of terminal equipment, such as subscriber equipment for telephone exchanges, subscriber line adapters for a wireless local loop (WLL), telephone sets etc.

Likewise, the installation of telecommunication equipment by African companies (even imported equipment) can be increased.

However, this cannot be achieved unless the manufacturers have something to gain.

The point is often made that software accounts for a major part of the cost of telecommunication equipment (up to 75%).

The cost of skilled manpower is a considerable asset for the CSC[4] based in Africa. This is certainly an area in which an intelligent partnership could be forged between major manufacturers and SSI, so as to ensure greater competitiveness in the world market.

Besides, by using the telecommunication facilities available in many African countries (e.g. Senegal) special procedures such as Telnet could be applied for the purposes of "tele-development", which would integrate human resources in Africa into virtual development teams.

In more general terms, the telecommunication software industry is a sector in which Africa can be very competitive, whether in terms of software for basic telecommunication network infrastructures, for services which conform to CSI to CS3[5] of the intelligent network or for autonomous applications of value-added services.

"Appropriate technologies" are not necessarily the right solution

In the final analysis, it would seem fanciful to wish to create a competitive "appropriate technology" industry in the African region alone. In order to be viable, initiatives in the industrial sector must be competitive in the global market.

Subregional integration may be a major asset

The opportunities for local assembly and manufacturing described above can only be realized if the main operators in the different subregions (e.g. West Africa) translate into action their desire to harmonize equipment policies.

In so doing they could offer a scale of activity which would make such operations more attractive to manufacturers.

A pragmatic approach to subregional integration (harmonizing and coordinating where possible, without further delay) could form the bedrock for such activities.

Table 1 summarizes the opportunities available and attempts to classify them according to the degree of industrialization deemed realistic.

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[4] Computer service companies.

[5] CSI - CS3: "Capacity set 1 to 3" Service levels defined by ITU-T SG 11 with a view to the gradual preparation of recommendations on the intelligent network in the light of current technological capacities.

TABLE 1

Main segments of the market for telecommunication industrialization - immediate benefit for Africa

	SERVICES				SUPPLY OF EQUIPMENT				
	Basic services	Value-added services			EQUIPMENT		SERVICES		
		Computer media	Development of applications	Supply of contents	Manufacture of core units	Manufacture of peripheral equipment	Participation in development of software for telecommunication systems	Assembly of equipment imported in kit form	Installation of equipment
Degree of industrialization sought	Development to be speeded up	1	5	5	0	2	5	4	5

NOTE	MEANING
0	Unrealistic or inappropriate at present.
1	Assembly of imported components.
2	Manufacture of CPE or subscriber line interface cards; not necessarily urgent.
3	
4	Manufacture of passive elements and assembly of imported subsets; subregional coordination required.
5	Feasible without major constraint; as soon as possible.

The teleservice[6] industry may be a great opportunity for Africa.

It is an area where the support of the international community would be welcome, and might take the following forms:

1) facilitating the participation of basic service operators in forums dealing with the basic minimum requirements for providing teleservices;

2) organizing, on behalf of the private sector (CSC and other SME[7]), forums on state-of-the-art techniques for software development;

3) helping to fund pilot projects involving telecommunication operators, teleservice operators (private) and application developers;

4) backing up those telecommunication operators which have undertaken to support private initiative in this area.

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[6] Teleservices: "any value-added service provided between separate legal entities, using telecommunication facilities" (definition borrowed from Thierry Breton).

[7] SME: small and medium-sized enterprises.

PART II - DEVELOPMENT OF THE TELECOMMUNICATION SECTOR IN SENEGAL (FOR INFORMATION/SUPPORT)

1 Introduction

With the explosion of new telecommunication services, the natural telecommunication monopoly in the country proved inadequate to cope with the upheavals that could be expected in the sector.

Without losing sight of its specific problems as a developing country, Senegal has endeavoured to adapt to the situation by restructuring its management, creating a subsidiary company and revising the legislative provisions hitherto in force.

2 Restructuring of the telecommunication sector

Prior to October 1985, telecommunication services in Senegal were provided by two separate entities: the OPT and TELESENEGAL.

The OPT, a government-owned corporation, operated the national telecommunication network; TELESENEGAL, a national company, was in charge of the international telecommunication network.

The OPT had a cumbersome management system, which did not allow it the freedom to invest and that recruit that is essential in telecommunications, a sector where the rapid pace of change requires a more appropriate response.

The network was dilapidated, unreliable and saturated, with a very high demand that could not be satisfied.

The OPT's resources were inadequate and it was over-staffed. The distribution of revenue was unfair and profited TELESENEGAL.

For its part, TELESENEGAL managed its resources independently, was relatively flexible and employed a staff of 300.

The restructuring of the telecommunication sector decided upon by the Government in 1985 resulted in the establishment of SONATEL, a national company run on an independent basis, whose mandate, as laid down by the Government, consists in:

> "providing telecommunication services to the maximum number of users, at minimum cost, with a good quality of service, while balancing its budget".

The so-called emergency and recovery plans of 1983-1986 and 1986-1989 respectively, implemented at the same time as this restructuring, were intended, in keeping with the above mandate, to provide Senegal with a telecommunication network that would meet the current and future needs of economic and social development.

Under these plans the results for the period 1985-1990 gave grounds for satisfaction on many essential counts, which confirms the correctness of decisions taken by the Government in 1985.

- Today, Senegal has one of the most efficient telecommunication networks in the continent;
- the total number of telephone lines virtually quadrupled between 1985 and 1995;
- the technical quality of the network has greatly improved;

- despite very heavy investment in modernization and expansion, the tariffs for telecommunication services in Senegal are among the lowest in the continent;
- the way the Senegal telecommunication network is managed is often cited as a model by international telecommunication organizations and funding institutions;
- since 1988, Senegal has been equipped with a reliable packet-data transmission network (SENPAC), which is indispensable to enterprises; since 1995, it has had access to all Internet services;
- lastly, improvements in the social climate based on the development of internal communication and the negotiated settlement of claims have helped to created a working environment that is likely to lead to better performance by staff.

Although SONATEL is under the administrative supervision of the Ministry of Communication, its dealings with the State are governed by a programme contract, which clearly defines the obligations of the two parties.

For internal purposes, modern management tools have also been developed:

- a 20-year master plan sets global objectives, while a four-year rolling plan gives the details of action to be taken with a view to attaining those objectives;
- a company plan (or strategic plan) prepared over a five-year period (currently under revision) defines:
  - the strategic approach of the enterprise;
  - general and sectoral objectives and policies;
  - environmental constraints;
  - sectoral plans for equipment, maintenance, trade, human resource management, management improvement and financial matters.

Some difficulties have also been encountered in the process of restructuring: resistance to change, introduction and assimilation of the organizational structure and financial and administrative procedures, harmonization of staff regulations, development of business culture.

3 Redefining the monopoly

In 1998, SONATEL set up the SENPAC network and developed a few new services; it had been pursuing a commercial policy targeted at subscribers.

Between 1988 and 1995 SONATEL invested a good deal (approximately 50% of its turnover for the period) in renovating and upgrading the national network, thereby providing a quality of service that is more than satisfactory. This is a qualitative factor in the development of new services.

In order to be able to meet the demand from enterprises for new services, SONATEL opted to set up a subsidiary company, called TELECOM-PLUS, with the following objectives:

- to develop services suited to consumers' new requirements;
- to ensure the financial viability of SONATEL, so that it can continue to fulfil its public service function;
- to promote all activities that might result in an increase in traffic;
- to ensure the overall efficiency of the telecommunication sector and to keep costs as low as possible for the community.

The subsidiary company has independent management and certain performance objectives to be attained.

Its principal activities are:

- telematics and data communication services: marketing of message handling services, access to databases and development of local servers;
- unilateral paging: marketing of a service providing a permanent link with the partner of one's choice;
- peripheral telephony: installation and management of new telecentres, management of public booths, card distribution;
- study activities and consultancy, engineering and training, marketing of skills and expertise in Senegal and the subregion.

4 Revision of legislative provisions

A study of the legislative provisions relating to the telecommunication sector revealed that regulations had not kept pace with technological development.

Telecommunication law in Senegal basically consists of Act No. 72-39 of 26 May 1972 and two decrees, Nos. 61.44 and 76.841, dealing respectively with private radio and the introduction, construction and use of radio equipment.

Act No. 72-39, which defines the telecommunication monopoly, is based on Article L33 of the French PTT code dating from 1937, a time when the only telecommunication service provided was telegraphy.

That is why on 31 January 1996 Senegal adopted a telecommunications code, the thrust of which is:

a) opening up SONATEL capital to national and international private partners (individuals and/or legal entities);

b) liberalizing certain segments of the telecommunication market (particularly cellular telephony);

c) separating the operating from the regulatory function;

d) establishing the State's role as arbiter and regulatory body.

PART III - PANAFTEL: A GOOD EXAMPLE OF INTERNATIONAL COOPERATION

Today, telecommunications have become a fundamental support for all sectors of the economy.

Thanks to the traditional telephone, the need to travel has been reduced considerably and information is now available in real time.

Technological progress in the last two decades has diversified the so-called new services available, such as electronic mail, file transfer, server consultation, video conferencing etc.

Africa should not miss out on this technological revolution.

However, it does not yet have the means to develop its potential.

In years to come, international cooperation will still play an important role in the process of Africa's social and economic development.

Modern society is agreed that international solidarity will play a fundamental role in establishing lasting peace in the world.

1 Financial assistance

In 1977 the Canadian International Development Agency (CIDA) undertook on behalf of the Canadian Government the construction of a section of the Pan-African Telecommunication Network (PANAFTEL), namely, the Senegal-Benin route.

The project was finally completed in December 1992, the whole route being brought into service from one end to the other, i.e. from Dakar in Senegal to Cotonou in Benin, via Mali, Burkina Faso and Niger.

Since then, the link up to the global network and the operation and maintenance of this radio-relay system, which is 2 700 km long, has represented a challenge both for the African and for the Canadian partners.

In 1983 CIDA spelt out its future sphere of action in agreement with the administrations concerned with a view to helping them achieve a reasonable level of financial and technical autonomy.

In 1984 a protocol of agreement was signed between the Government of Canada and the Governments of the beneficiary countries.

This important step subsequently led to signature of a buying agent contract in 1985 between Dourserv-BCI INE, representing the Canadian party, and the telecommunication offices of the countries concerned.

This contract falls within the scope of the DEVTELAO project.

The main elements of Dourserv-BCI's mandate were:

- to develop mechanisms which would enable the telecommunication offices to obtain supplies of the spare parts required for maintenance from Canada.
- to provide assistance to the offices in defraying the recurrent costs of the purchase of spare parts, re-calibration and repair of measurement equipment and repair of spare parts.

In September 1989, a second buying agent contract was signed between Dourserv-BCI and the offices.

It provided the offices with the services of a buying agent for a period of five years, as well as lines of credit for the supply of spare parts, equipment, measuring devices and other elements for the maintenance of the PANAFTEL-CIDA network, its modernization and its extension within the framework of the DEVTELAO project.

It was the radio-relay transmission network on the main route, the subsidiary lines and rural telephone systems that were mainly concerned.

In addition, in the interests of training and optimum use of available resources, the establishment of local laboratories and workshops was encouraged.

These laboratories were provided with equipment for the purposes of the project, thereby allowing certain repairs to be done locally instead of the components being sent back to the manufacturer.

Local staff were given the necessary training so as to ensure that the laboratories would be properly run.

As part of the improvement and modernization of network management methods, computer systems equipment and software packages were supplied.

The lines of credit opened up for Senegal have been completely used up since February 1995.

2 Technical assistance

In Senegal the links established under this project are the Kaolack-Tambacounda-Kidira links.

These are radio-relay systems of the Rayton type, manufactured by the Canadians and provided free of charge to different countries.

The systems have a capacity for 960 analogue channels.

Installation of equipment was carried out by national and Canadian experts. The necessary training was provided in Canada and on site.

An atmosphere of open and efficient cooperation prevailed throughout the entire project.

In setting objectives for the project, emphasis was laid on future autonomy in the management, maintenance and operation of the systems.

Every effort was made to ensure the optimum use of available resources.

At the national level, special teams of engineers and technicians were detached for project implementation.

No difficulties arose, and the project went off perfectly.

A project review committee was set up with the mandate of evaluating the project's success in fulfilling its objectives and of taking action as necessary to prevent or settle problems with interfaces etc.

The committee met regularly in Montreal or travelled to locations in the field, as required.

The committee met on a quarterly basis to examine the different technical reports from the telecommunication offices or CIDA, it acted quickly and effectively to remedy any shortcomings.

The committee, whose function was to supervise and intervene where necessary, issued reports at each meeting on quality objectives and financial aspects.

The technical training provided has enabled the PANAFTEL transmission routes to be run and used for several years in optimum conditions.

3 Subregional cooperation

A communication link establishes a relation between two points, which may be situated in the same country or in two different countries.

The systems used must meet the same standards in order to operate and be properly maintained so as to keep up performance levels and comply with the quality objectives set.

This project provided an opportunity for engineers and technicians from different countries (Mali, Burkina Faso, Niger, Benin and Senegal) to get acquainted, work together, exchange experiences and develop excellent working relations, which has enabled these communication media to be operated for several years, to the great satisfaction of the peoples of those countries.

The implementation of the project proved that communication and exchange are factors contributing to progress.

The time has come to set up large-scale cooperative groupings that can pool their efforts and thus combat under-development more effectively. This project has been pointing in that direction for several years.

The way has been marked out for economic and social integration at the subregional level in optimum conditions.

The modernization of the global network has prompted administrations to plan the replacement of analogue systems with digital systems.

Some countries use digital radio-relay systems; Senegal has opted for fibre-optic systems.

It is thus planned to replace the Rayton analogue system in 1998 with a fibre-optic system over the entire Kaolack-Tambacounda-Kidira route.

Already by 1996, the Thies-Diourbel-Kaolack subsidiary link on the PANAFTEL route will have been replaced by a fibre-optic system.

4 Conclusion

Clearly this project is a good example of international cooperation, on the one hand between the African beneficiary countries and Canada, and on the other hand among the countries in the subregion themselves. The benefits of implementing this project have been felt in many different ways.

At all events, partnership, which is today recognized as the only lasting form of cooperation, has been put to the test by this project, which can certainly be called a success.

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Document 10-E
18 March 1996
Original: English

For Information/Support

Agenda item: 2.2 **PLENARY MEETING**

SOURCE: ITC

TITLE: ITC AND ITS SUPPORT TO TELETRAFFIC ENGINEERING

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1 Background

The first ITC was organized in 1955 by Arne Jensen, E. Brockmeyer, C. Jacobœus, L. Kosten and N. Rodenburg. It was held in Copenhagen, Denmark, the place where A.K. Erlang lived and where he developed fundamental theories for the field of teletraffic.

The ITC was born out of the need to engineer the telephone networks properly, i.e. to maximize the utilization of network resources and to maintain a high quality of service.

Telecommunication networks have undergone a significant extension and technology change towards fully digital, computer-controlled networks. The classic theories still apply to many basic problems, but many new problems have appeared such as new telecommunication services, distributed offices, advanced manufacturing and computing environments, intelligent and mobile networks.

These new problems require an integrated approach for computer-based communication corresponding with integrated models for the analysis, optimization and control.

Since the first ITC Congress was held in 1955 the following congresses were held:

1955 ITC-1 Copenhagen, Denmark
1958 ITC-2 The Hague, Netherlands
1961 ITC-3 Paris, France
1964 ITC-4 London, United Kingdom
1967 ITC-5 New York, United States
1970 ITC-6 Munich, Germany

1973 ITC-7 Stockholm, Sweden

1976 ITC-8 Melbourne, Australia

1979 ITC-9 Torremolinos, Spain

1983 ITC-10 Montreal, Canada

1985 ITC-11 Kyoto, Japan

1988 ITC-12 Turin, Italy

1991 ITC-13 Copenhagen, Denmark

1994 ITC-14 Antibes-Juan les Pins, France

Future ITC congresses are planned for:

1997 ITC-15 Washington, United States

1999 ITC-16 Edinburgh, United Kingdom

2001 ITC-17 Salvador, Bahia, Brazil

2 Purpose of the ITC

The purpose of the ITC is to stimulate the development and application of teletraffic theory for planning, engineering, managing and administrating telecommunication networks. Its roots are based on the theory of probability and stochastic processes for the proper characterization and description of traffic phenomena in telecommunications networks requiring measurements, forecasts, engineering and network management algorithms. The aim of traffic engineering is to achieve a desired grade of service and optimum resource utilization under the given traffic loading.

The ITC gathers teletraffic experts from research organizations, universities, manufacturing companies, network operators and international technical organizations. This guarantees a well-balanced contribution from theory and from application. ITCs are organized so that researchers, engineers and administrators can interact and benefit from discussions and exchange of ideas. The ITC also benefits from the social environment which allows for the creation of new personal contacts between delegates.

In association with the International Telecommunication Union (ITU) under the auspices of the United Nations, the ITC supports the dissemination of teletraffic concepts to countries throughout the world with developing telecommunication infrastructure.

Teletraffic related issues, such as traffic descriptors, grade of service metrics, network performance and traffic engineering procedures, are also part of standardization. The ITC has therefore established firm relations to the ITU Telecommunication Standardization Bureau (ITU-T), which are reflected by permanent representation of ITU-T within the IAC[1] and by sessions within the ITC congresses that are dedicated directly to ITU-T work.

The ITC congresses have been scheduled triannually, but will after the ITC-15 be held biannually. In addition, ITC Specialists' Seminars and ITC co-sponsored Regional Seminars are held typically on an annual basis.

[1] International Advisory Council of the ITC.

Since the ITC-13 (Copenhagen) each congress also holds so-called workshops in parallel to the other sessions. A workshop on developing countries matters is now regular within the ITC congress programme.

3 ITC specialist seminars

ITC specialist seminars were introduced in the late seventies to explore new fields of research and engineering. Nine specialist seminars were held so far, and one is forthcoming this year:

1977 Modelling of SPC Exchanges and Data Networks
Delft, Netherlands

1978 Traffic Measurement and Traffic Simulation and their Role in Telecommunication System Planning
Budapest, Hungary

1984 Fundamentals of Teletraffic Theory
Moscow, USSR

1986 ISDN Traffic Issues
Brussels, Belgium

1987 Traffic Engineering for ISDN Design and Planning
Lake Como, Italy

1989 Traffic Theory for New Telecommunications Services
Adelaide, Australia

1990 Broadband Technologies: Architectures, Applications, Control and Performance
Morristown, N.J., United States

1992 Universal Personal Telecommunications: Traffic Issues Related to Services, Architecture, Control and Performance
Santa Margherita Ligure, Italy

1995 Teletraffic Modelling and Measurement in Broadband and Mobile Communications
Leidschendam, Netherlands

1996 Control in Communications
Lund, Sweden
17-19 September 1996

4 ITU regional seminars

The ITC also sponsors regional seminars which address particular problems of a region as, e.g. a fast developing telecommunication infrastructure. ITC experts from all over the world contribute to these seminars and provide outside expertise. Eleven regional seminars were held in the past:

1988 Sofia, Bulgaria

1988 Beijing, People's Republic of China

1989 Moscow, USSR

1991 Cracow, Poland

1992 Beijing, People's Republic of China

1993 St. Petersburg, Russia

1993 Brasilia, Brazil

1993 Bangalore, India

1995 St. Petersburg, Russia

1995 Pretoria, South Africa

1995 Bangkok, Thailand

ITC Committee III is at present investigating the possibility of organizing future regional seminars.

Following the seminar organized in 1995 in Pretoria, South Africa, which was mainly addressed to English-speaking countries in Africa, as the seminar was held in English[2], the ITC is interested in sponsoring a seminar specifically addressed to the French- , Spanish- and Portuguese-speaking countries in Africa, and would like to discuss this matter here at the AF-WTDC-96.

The successful results of the ITC sponsored seminar in Pretoria, South Africa, in 1995, will be commented on by the Manager of Telkom responsible for Teletraffic Engineering in South Africa, Mr. Baron Peterssen, also a member of ITC Committee III. He will briefly inform about the following:

- The regional ITC sponsored teletraffic seminar in Pretoria (1995).
- The training courses in teletraffic engineering, compiled by Telkom.
- Teletraffic training courses available at South African universities.
- The SA Teletraffic Initiative Program (supporting applied teletraffic research at universities).

Another regional seminar aimed at the Arab States[3] is also under discussion.

5 IAC - The International Advisory Council

The International Advisory Council (IAC) of the ITC is the permanent steering committee for the ITC and its related activities. The IAC operates on the basis of a charter, wherein the IAC is constituted as a non-profit organization. Its members are appointed. The IAC reviews the activities of the ITC, sponsors special seminars and provides advice and support in the organization of events. Currently the following countries and organizations are represented in the IAC:

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[2] Any country of the region addressed may attend such seminars.

[3] Partly concerning the Africa region.

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The Technical University of Denmark, Denmark

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Committee II Charles Pack, United States

Committee III Lars Engvall, Sweden

Contacts:

1. IAC Secretariat
c/o Institute of Communication Switching
and Data Technics, University of Stuttgart
Seidenstrasse 36
D-70174 Stuttgart,
Federal Republic of Germany

Tel.: +49 711 121 2479
Fax: +49 711 121 2477
Telex: 721 703
E-mail: kuehn@ind.
uni-stuttgsrt.d400.de

2. Dr. Lars Engvall
Chairman of Committee III
(Developing Countries and ITU)
International Teletraffic Congress (ITC)[4]
Avenue de la Marne 44, Batiment "B"
F-06100 Nice (France)

Tel.: +33 93 81 91 84
Telefax: +33 93 81 50 75
E-mail: Lars.Engvall@itu.ch
CompuServe: 101444,3440

[4] The ITC is a registered member of the ITU ("m").

6 Annexes

Statements made at the First ITC Congress Workshop for Developing Countries, in 1991 at the ITC-13, in Copenhagen, Denmark. (Ref. Book, North-Holland Studies in Telecommunications, Volume 17: Teletraffic and Datatraffic; Socio-Economic Aspects; ITC-13. ISBN 0 444 89389 X)

1) Foreword by the Secretary General of the International Telecommunication Union,

   Dr Pekka Tarjanne (1 page).

2) Teletraffic Engineering Situation in Africa,

   Daniel C. Onyewuenyi, Former Secretary General of Pan African Telecommunication Union (3 pages).

ANNEX 1

FOREWORD
by the Secretary General of the
International Telecommunication Union

Dr. Pekka Tarjanne

The importance of teletraffic engineering was understood during the infancy of telephone services, and one of the greatest scholars in teletraffic engineering history was born in Denmark, where the 13th International Teletraffic Congress was held in 1991. I am, of course, referring to A.K. Erlang, who gave his name to the unit of traffic.

He studied the theory of probabilities of telephone calls at the beginning of this century and developed the statistical equilibrium concept which has been in use since then by traffic engineers worldwide.

It was also in Denmark in 1955 that the ITC - International Teletraffic Congress - was founded by a group of scientists under the guidance of Dr. Arne Jensen. Since that year, congresses have been held every three years, and engineers, mathematicians, economists, etc. from operating companies, industries and universities from all over the world have come together to present and discuss the latest advances in the field.

All through these years the ITU has been associated with the work of the ITC. In fact, one of our CCITT Counsellors (R. Chapuis) participated in the small gathering in Copenhagen in 1955, when the historical decision was taken to create ITC. Since then, ITU has always been represented at the ITC congresses.

I am particularly happy to see that the ITC-13 Congress has organized a special Workshop on Developing Countries, in order to discuss the teletraffic engineering particularities and problems often found in these countries. ITU is also pleased to know that its representative to the ITC-13, Dr. Lars Engvall, was asked to organize and chair this Workshop.

Requests to the ITU for advice and assistance from developing countries have continued to increase over the years. The teletraffic engineering field is also very wide and concerns planning, engineering of systems, habits of users with regard to various types of service, network management, tariff considerations, etc. When we are preparing a Master Plan of teleservices for a country, setting up training courses, organizing seminars and workshops, teletraffic engineering is usually involved. The range of activities is also reflected in this document, with papers presented by specialists from both developing and industrialized countries.

I understand that at this Congress, developing countries were particularly well represented: 77 participants from 27 developing countries came to Copenhagen. Many more, I understand, wished to participate but were unable to do so for various reasons.

The decision taken by the ITC Advisory Council to continue to hold such workshops at future ITCs and at other specially organized workshops for developing countries, is a very commendable decision, which the ITU strongly supports. The longstanding cooperation between ITU and ITC that has existed since 1955 should continue and be reinforced in the future, particularly for the benefit of developing countries.

Pekka Tarjanne

PEKKA TARJANNE

ANNEX 2

TELETRAFFIC AND DATATRAFFIC
Socio-Economic Aspects. ITC-13
A. Jensen and V.B. Iversen (Editors)
Elsevier Science Publishers B.V. (North-Holland)
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TELETRAFFIC ENGINEERING SITUATION IN AFRICA

Daniel C. ONYEWUENYI, Former Secretary General
Pan African Telecommunications Union, B.P. 8634
KINSHASA, Republique of Zaire

1. INTRODUCTION

1.1. I would like to thank the Secretariat of the ITC-13 and the Chairman of the ITC-13 Workshop on Developing Countries for the honour of inviting me to deliver one of the key-note addresses to this Congress. My organisation, the Pan African Telecommunications Union (PATU), which is the specialised agency of the Organisation of African Unity (OAU) in the field of telecommunications, was established in 1977 to coordinate the development and integration of telecommunications in Africa in a harmonious and concerted manner. In pursuit of this noble objective it has always emphasised the indispensability of application of teletraffic engineering techniques in the design and management of telecommunications networks so as to ensure that good quality of service and the resultant, economic and financial benefits can be obtained from them. This Congress is, therefore, relevant to us too and we would like to share with you our experience in teletraffic engineering in Africa.

Before discussing the teletraffic engineering situation in Africa I would like to describe in general terms the status of the telecommunications services and their control organisations in Africa.

2. PRESENT STATUS OF TELECOMMUNICATIONS SERVICES IN AFRICA

2.1. The telecommunications infrastructures of African countries are dominated by imported equipment.
Industries for manufacturing the required equipement at national, sub-regional and regional levels have not yet been established although a few national assembly outfits have been set up. Consequently, the bulk of telecommunications equipment in use in Africa is imported from industrialised countries outside the continent.

2.2. Current switching and transmission facilities installed in the networks of the countries are predominantly of the analogue types. Some of the countries have changed their purchasing policy in favour of digital equipment which will be used for network expansion initially and replacement of the analogue types eventually. Some of these changes are forced by the unavailability of similar systems and their spare parts from the original suppliers due to the phasing out of the production of analogue equipment. In some cases, this has resulted in premature amortization of serviceable equipement. However, the use of digital switching and radio relay systems at the moment is at its infancy.

2.3. Network architecture at the national level is in most cases star-shaped because of shortage of equipement, with exchanges inter-connected by transmission media. Hierarchical organisation is generally adopted for the purpose of automatic call routing to primary and secondary switching centres. However, where it can be justified, high usage routes are provided.

2.4. Most of the telecommunications operating entities are State-Controlled and operate either as departments in the Ministry of Communications or Ministry of Transport and Communications or as a Government-owned parastatal and, therefore, depend solely on the Governement for their financial resources.

2.5. Inter-connection of national networks is by means of direct inter-state links. Switched

transit connections and their advantages are missed in favour of technical or hard-patched transits because of delay in evolving tariff arrangements for remunerating switched transit and problems of obtaining information about available transit facilities in international telecommunications switching centres.

2.6. In some cases distinct organisations manage the national and international networks.

Against this background information on the present status of telecommunications services in Africa, the application of teletraffic engineering technique in the design and management of telecommunications networks can now be discussed.

3. NATIONAL TELECOMMUNICATIONS NETWORKS

3.1. The major problem in the design of national networks lies in the dimensioning of the trunk networks. The trunk network is dimensioned for a given traffic loading depending on the grade of service to be offered. When the network is put into operation, the actual traffic flow in it and its overall performance are monitored. If the results over a reasonable period of use reveal areas of under-dimensioning the traffic engineering staff initiate proposals for effecting remedial action which may involve provision of additional equipment.
Procuring additional equipement has its ownproblems which are precipitated by either budgetary constraints or shortage of foreign exchange. For several years a traffic engineer may be reporting in vain on the same problem and a conscienteous officer could become frustrated and regard further teletraffic engineering action on the network as a waste of time.Some even seek transfer to other sections of the organisation.
This type of situation is a contributory factor to the unsatisfactory teletraffic engineering attention to the national telecommunications networks in Africa.

4. INTERNATIONAL NETWORKS

4.1. Generally speaking, the routing of international traffic in many countries in Africa is accomplished in an uneconomic manner. There are, infact, no cases of neighbouring countries sharing transit facilities available in each country or designate one transit exchange for a group of neighbouring countries.
In order to have economic routing, a number of countries in the same geographical area should use transit facilities available in that area to route traffic to different areas in the world. But this is not soo in Africa.
Each country accomplishes its own routing plan despite the small international traffic generated per country. This type of routing makes the network even more expensive to the end user and explains why international calls are unnecessarily expensive.

4.2. The problem of dimensioning mentioned for the national telecommunication routes is not as serious in the international routes because the outgoing and incoming international traffic has to be accounted for in aid of reconciliation of accounts between corresponding countries. Furthermore, the number of circuits linking two countries and hence the volume of traffic to be carried on the link is fixed by mutual agreement and any changes are subject to negotiation.

4.3. The teletraffic problem on the international network lies on the interface with the national network. This affects the in-coming call completion rate and, hence, the revenue realisable from the in-coming calls. Teletraffic engineering attention is provided at both ends of the interface to ensure free flow of designed traffic between the national and the international network. Where the two networks are under one management control there is no problem in coordinating this activity.

The design of the national network will accomodate the requirements for international traffic. If on the other hand the two networks are under distinct management organisations, the teletraffic engineering activities relevant to ensuring reasonable flow of traffic between the two networks are not easily coordinated because of mutual problems that characterise such an institutional framework. In some cases this has resulted in various restrictive measures being adopted to discourage universal access to the International Direct Dialling (IDD) facility by the subscribers.

5. PROBLEMS AFFECTING EFFECTIVE TELETRAFFIC ENGINEERING PRACTICE.

5.1. Although the importance of teletraffic engineering technique is recognised by

all the African telecommunications administrations, there are various hinderances to the effectiveness of its application.

5.2. Among these are :

- Given that it takes 5 - 7 years to establish a network after completion of the relevant plan, traffic engineers are required to forecast traffic loading of the network 7 years ahead. The accuracy of such a long forecast is, of course, questionable and could be out-of-phase with reality when the network is eventually established.
- Measurement and analysis of traffic flow are not regularly carried out. The responsibility for reading the traffic meters in the telephone exchanges is assigned to the exchange maintenance staff. Often, this part of their duty is given the least attention. Also there are only very few staff employed and trained for traffic engineering duties.

- Unreliable or in some cases non-existent statistical records to facilitate forecasting.
- Inadequate traffic measuring equipment.
- Inadequate arrangements for training traffic engineering personnel.

- Very infrequent direct contacts between traffic engineering services of administrations to exchange information regarding service continuity, volume of traffic, congestion etc and to coordinate activities.

- Lack of adequate response by administration to recommendations for service improvement. This usually leads to frustration of staff and loss of interest in further monitoring of the performance of the network.

6. CONCLUSION

6.1. In concluding this address, I would like to recall that global objective of the African Governments is to acquire an adequate and reliable telecommunications network to enable all African countries communicate with each other without having to transit through countries located outside the continent of Africa. In the 1980 Lagos Plan of Action, African governments recognised that such a regional telecommunication network would facilitate the growth of other sectors of the economy, the social-economic integration of Africa and the promotion of intra- and extra- African Trade. Towards establishing such a network priority attention was directed towards the implementation of the Pan African Telecommunications (PANAFTEL) Network.

6.2. The investment by African telecommunication administrations in the establishment of the PANAFTEL Network is enormous and over the years tremendous progress has been made in the implementation of the Network. In order to achieve the objective of establishing the Network, as well as derive adequate return on their investment, African Telecommunication Administrations are doing their best, within the limits of available financial, material and manpower resources, to ensure the reliability and availability of the Network. My organisation has, through Meetings, Seminars and Workshops, continued to emphasise the desirability of teletraffic engineering practice in the management of the network. Specifically, we are stressing the redoubling of efforts to carry out the following actions :

- ensuring that in routing traffic, the first priority is given to PANAFTEL routes.

- administrations with transit facilities informing others about their relevant technical and financial conditions.

- carrying out regular traffic measurements.

- analysing and using traffic data for management of their networks.

- training staff in traffic engineering.

6.3. Concerted efforts are being made to solve the problems highlited in the explanation of the use of teletraffic engineering principles.

6.4 In the long run victory of these problems must be won in order to have efficient national and international telecommunications networks which in turn will stimulate and sustain the economic, social and cultural development of our continent.

6.5. On a final note we would like to share with the industrialised countries their experiences in the application of teletraffic engineering techniques through fellowship awards channelled through the Pan African Telecommunications Union.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 11-E
19 March 1996
Original: English

For Information/Support

Agenda item: 2.1 **PLENARY MEETING**

SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU

TITLE: DEVELOPMENT OF NETWORKS - PRIORITIES FOR LDCs

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1 Introduction

In 1971 the international community recognized the existence of a category of countries whose distinctiveness lies in the profound poverty of their people and in the weakness of their economic, institutional and human resources, often compounded by geophysical handicaps. The *Least Developed Countries* (LDCs) are defined as low-income countries that are suffering from long-term constraints to growth, in particular low levels of human resource development and severe structural weaknesses. The group represents the weakest segment of humanity and presents a major challenge to its development partners.

The LDCs are also among the least developed in terms of the poor state of their telecommunication networks and the limited range of services offered. There is evidence to suggest that they are falling further behind other developing countries in the race to construct modern telecommunication networks. This failing arises not so much because they are not installing the latest equipment - in many cases the LDCs have modern, state-of-the-art digital networks - but rather that they are not expanding fast enough to close the gap with other developing countries. Whereas the LDCs have increased their level of teledensity (telephone lines per 100 inhabitants) from 0.19 to 0.29 over the last decade, the group of other low-income countries (including China, India, Egypt and Pakistan) has increased from 0.31 to 1.21, more than three times faster.

1.1 List of African LDCs

There are currently 48 LDCs as defined by the United Nations General Assembly of which 33 are from the African continent as shown in the map. The list was most recently updated in December 1994 with the "graduation" of Botswana and the addition to the list of two new countries, Angola and Eritrea. When the listing started in 1971 there were 24 LDCs of which 14 were from

Africa. The criteria for inclusion and graduation of economies in the list of LDCs are expounded by the ECOSOC's Committee for Development Planning.

1.2 ITU Policy on LDCs

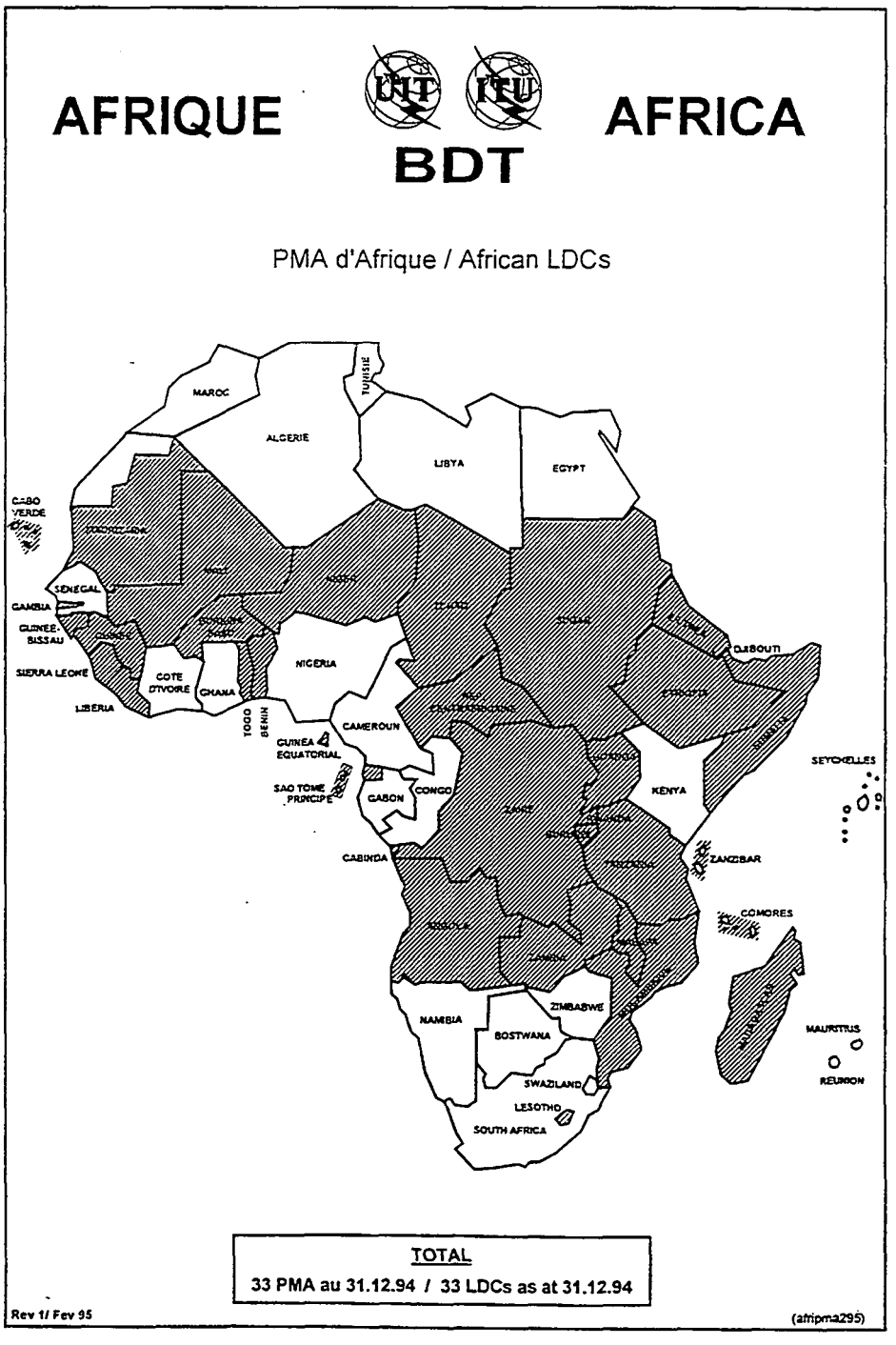
The ITU Policy on LDCs emanates directly from the Plenipotentiary Conference Resolutions on LDCs, starting from Malaga-Torremolinos in 1973 through Nairobi (1982), Nice (1989) and Kyoto (1994). The current Resolution 30 of the Kyoto Plenipotentiary instructs the Secretary-General to, *inter alia*, propose the adoption of **concrete** measures intended to bring about **genuine** improvements and provide **effective** assistance to LDCs (emphasis added). The policy requires the BDT to accord the greater part of its assistance to LDCs.

A strategy to implement the policy is embodied in Resolution 30 of the Kyoto Plenipotentiary Conference as well as Resolution 1 of the WTDC (Buenos Aires, 1994) which involves according priority to five selected areas of critical weakness and allocation of some 70% of the BDT's funds for the BAAP to LDCs, as well as funds from the Special Voluntary Programme and the excess revenue from Telecom.

It will be recalled that until 1992 the ITU assistance to LDCs was accorded on a piece meal ad hoc basis. Thereafter a programmed approach was adopted as both policy and strategy to ensure more effective utilization of resources. However, the special programme of action was not matched by specific allocation of funds.

2 Status of telecommunications in the LDCS

It would be expected that the state of development of telecommunication networks and services in the LDCs would be poor. Nevertheless, there are exceptions where telecommunication networks are better developed than in non-LDCs. Some LDCs, for instance, have all-digital networks, notably Djibouti and Gambia, while others have had some of the fastest growing networks in the world over the last ten years. There exists a very wide gap between the telecommunication facilities of developed countries and those of the LDCs. The average level of teledensity among the LDCs is 0.29, or just over one telephone for every 350 people. The total number of telephone main lines in the 48 LDCs stands at just over 1.5 million.



Most of the LDCs are far from the position of meeting either potential or actual demand. There are almost one million people "officially" waiting for a telephone line in the LDCs. At current network expansion rates, it would take almost 13 years to eliminate the registered backlog let alone provide service for the countless others who want a telephone but have been discouraged from making an application.

There is generally a close relationship between the level of economic development and telecommunication development. For example, in a study of 164 economies, the strength of the relationship was found to be significant (correlation coefficient = 0.85 where 1.0 would equal perfect correlation). The relationship between wealth and teledensity is weaker among the LDCs

(correlation coefficient = 0.5) suggesting that there may be other factors affecting telecommunication development. In fact, when the relationship between GDP per capita and teledensity among LDCs is plotted, one of the most noticeable observations is that the countries that are doing better than expected in terms of their income level have relatively small populations. Gambia and Sao Tome and Principe typify this scenario with ML densities of 1.69 and 1.97 respectively.

3 Areas of critical weakness in the Sector

Civil strife affects over a half a dozen LDCs, resulting in a breakdown of government institutions and stability, without which, there is little hope of infrastructure improvement. For example, telecommunication development in Somalia, Liberia, Sierra Leone, Rwanda, Burundi and Sudan (South) has been adversely affected by civil unrest in these countries. However, for the most of the other LDCs, there are deficiencies in the telecommunication sector itself that are inhibiting development. There is a general consensus regarding the critical weaknesses in the LDCs telecommunication sector, namely poor management, insufficiently trained human resources, inadequate maintenance, poor planning, and a very low level of penetration of telecommunication services in the rural areas.

3.1 Development of National Telecommunication Infrastructure, in particular, rural telecommunication development

Statement of the problem

The majority of the inhabitants of the LDCs live in rural areas. It is disturbing to note that the wide gap in the telecommunication development between the developed and the least developed countries is accompanied by yet a larger gap between the urban and the rural areas of the LDCs. In some LDCs, the rural main line density is lower than 1 per 10 000 inhabitants with large areas of territory without any telephones, and the alternative of having to travel for several hours to find a telephone, and perhaps many more to find a working one.

The importance of rural telecommunications needs to be better appreciated. Rural telecommunication services could be provided on a community basis which would help to attract small-scale industries such as handicrafts, agricultural and animal product processing. Rural telecommunication services could also support education and health programmes (tele-education and telemedicine). These applications, together with commercial marketing of rural products, could contribute immensely in bringing higher living standards and increasing the welfare of rural populations. They could also help create new employment and thus reduce the abject poverty in these areas. These services would help stem the flow of rural migrants to urban areas with consequent reduction of urban decay in rapidly growing cities.

Some of the LDCs have very dispersed rural populations. Remote villages can be several hundreds of kilometres from the nearest town or telephone. One disappointment is that in some of the rural LDC townships, telephone and telegraph services existed earlier, although with poor trunk facilities, but have since progressively been abandoned or left unmaintained for a variety of reasons.

Action

1 **BAAP Programme No. 9**

a) Major activities included two pilot projects which were executed by consultants in Uganda and CAR. The pilot networks have been planned in detail including equipment specifications. Financing for the projects is being sought. New pilot projects are planned for.

b) Study Group 1, in which 30 participants from LDCs took place in May and December 1995.

Study Question 4/2 on communications for rural and remote areas is being undertaken and its outputs will benefit LDCs.

During the period 1991-1994 (before the BAAP) assistance in the establishment of rural networks and services in African LDCs was provided either as a composite of individual Master Plans or through the RASCOM pilot activities. A number of seminars and workshops (mainly financed by manufacturers) were also held in Africa to discuss and disseminate information on the latest technologies for providing rural telecommunication networks and a variety of services viz. telephony, telegraphy, facsimile and broadcasting. The philosophy of telecentres or public call offices was emphasized for providing services on a communal basis because of the costs involved.

3.2 Management

Statement of the problem

Management, or rather poor management, is perhaps the major cause of the other weaknesses cited below. Management of all types of resources including people, finances, and networks, is a cause for great concern. There is a lack of adequately trained personnel at all levels. While there may be too many staff with the wrong or outdated skills on the pay-roll, insufficiently trained personnel prevents full benefit being realized from investments already made. Manpower planning which identifies staff and training requirements is incomplete or non-existent.

Technical staff members proficient in their field are often promoted to senior management positions. This has led to difficulties since these staff have not had specific training in management and in non-technical areas such as administration, procurement, personnel, finance and negotiation with governments and financial institutions. While not necessarily needing to be experts in such fields, senior managers must have sufficient knowledge to supervise and guide the staff dealing with these areas.

Many of the LDC telecommunication operators, whether autonomous units, corporations or offices, are actually operated as government departments which are barely responsive to market forces. They are strictly regulated and cannot plan and invest as a commercial organization would. The situation is characterized by poor revenue collection, inadequate logistics support, demotivated staff and rampant pilferage of resources.

More autonomy for the telecommunication operating entity should be the starting point to provide the conditions that will encourage efficiency, cost-effectiveness and productivity. Too often, the telecommunication sector is affected by overall government economic policies which, for instance, may impose substantial cross-subsidies for other sectors and may require that significant proportions of telecommunication income be transferred to the central government, to the detriment of network and service expansion.

The fundamental solution to the management problem in LDCs lies in political change to bring about restructuring of their telecommunication entities through greater autonomy and clear separation of management, regulatory and policy-making functions.

Action

1 BAAP Programme No. 2

Mismanagement was the real matter of concern in LDCs but was also a symptom of other ills such as improper organizational structures, lack of reforms, poor training, pilferage, etc. Reform and restructuring of the sector alone would eliminate most of the management problems. Assistance was accorded as follows:

2 BAAP Programme No. 1

Policy documents such as the Green Paper in Africa, the Blue Book for the Americas, the Arab Book and the Handbook on Regulation Guidelines in ASP will help LDCs to make appropriate policy choices and improve their management efficiency and effectiveness. Restructuring and privatization assistance was extended to several LDCs.

3 MANDEVTEL

The following HRD/HRM activities were carried out in 1995 in the Management area through MANDEVTEL in Africa:

i) Restructuring the Telecom Sector workshop, with 25 participants (English).

ii) Telecom Operators Strategies and Modern Management Techniques, with 14 participants (French).

iii) Human Resource Management workshop, with 18 participants (French).

A total of 57 middle and top managers were trained in Africa, a majority of whom were from LDCs.

4 Direct assistance in HRM

HRD Regional Meetings were implemented in each region with experts from developed countries presenting papers at no cost to ITU. Beneficiaries in Africa were mainly LDCs.

5 During 1991-1994, before the establishment of the BAAP, assistance in Management Workshops and Seminars as well as courses availed to Regional/Subregional Training Institutes AFRALTI, ESMT-Dakar and the BLMS school. Individual training fellowships were also awarded to candidates from various countries.

3.3 Human resources development

Statement of the problem

The governments of the LDCs have put considerable effort and investment into human resources development. But a combination of brain-drain and poaching by commercial companies has left a deficit of trained staff at all levels. Promising young staff are often lost to the public telecommunication sector because of the lack of career prospects within their institutions. This is exacerbated by rapidly changing technology and techniques which call for more frequent retraining of staff. There are certainly many well-qualified staff in the technical fields, but some of these get

promoted to management roles where they are not sufficiently trained to manage increasingly complex operations in a continually changing environment.

Poor training is reflected in productivity statistics. On average, each telecommunication employee in the LDCs supports just 16 main lines. This is only 12 per cent of the world average and 8 per cent of the average for developed countries. Productivity in the LDCs grew at around 7 per cent per annum from 1983-1993, less than the 12 per cent for developing countries as a whole. One LDC that has made a major improvement is Nepal, where the number of main lines per employee rose from 7 in 1983 to 20 in 1993. Its commitment to human resource development is manifested in an increase in its training budget of 80 per cent over the last five years to around 1.5 per cent of operating expenditures.

Action

1 **BAAP Programme No. 2**

a) A training needs survey in LDCs was carried out through the use of a questionnaire. There was a poor response but work is continuing through Study Group 2 as well as the HDR Regional Officers.

b) Training Fellowships

c) A large number of HRD/HRM activities not specifically designed for LDCs did in fact benefit the LDCs.

d) A substantial number of training Fellowships were awarded to LDCs in 1995 as follows:

Angola	12	Ethiopia	17	Niger	11
Benin	21	Gambia	14	Rwanda	9
Burkina Faso	19	Guinea	17	Sao Tom & Princi.	8
Burundi	15	Guinea-Bissau	8	Senegal	19
Cameroon	9	Lesotho	10	Sierra Leone	12
Cape Verde	12	Liberia	8	Sudan	11
Central African Rep	12	Madagascar	8	Tanzania	15
Chad	12	Malawi	7	Togo	11
Comoros	10	Mali	24	Uganda	18
Djibouti	20	Mauritania	15	Zaire	12
Equatorial Guinea	9	Mozambique	17	Zambia	13
Eritrea	9	Namibia	8		

During the period 1991-1994 training and other fellowships were awarded annually to virtually all African LDCs as done in 1995 in d) above. Subregional training institutions such as AFRALTI and ESMT-Dakar also received assistance in various ways including provision training materials and equipment. Several Workshops and Seminars were also held.

3.4 Maintenance

Statement of the problem

Maintenance problems of telecommunication networks in LDCs are closely linked to both external and internal causes. One of the factors impeding good maintenance is the difficult environment found in most of the LDCs. These conditions are characterized by high temperatures, extreme weather variations and natural disasters. For example, cyclone Ofa, which hit Western Samoa in 1990, destroyed most of the rural telephone network. Another external factor is ongoing construction work on buildings, roads, and utilities which severely affect the outside telecommunication plant. Yet another factor is donation of outdated equipment or purchase of equipment tied to bilateral assistance for which few spare parts exist.

Maintenance problems are further compounded by poor internal administration characterized by improper planning of the outside plant, manual handling of fault complaints, difficulties of adapting to new technology, day-to-day efforts aimed at individual problems rather than long-term preventive maintenance, and the variety of equipment that must be maintained. A lack of equipment standardization or restrictions on end user provision of terminal equipment, results in PTOs having to maintain a variety of customer equipment.

Other problems include shortages of measurement equipment, spare parts, tools and vehicles. Transportation problems are especially acute in Chad, the second largest LDC after Sudan. According to the telecommunication administration in Chad, vehicles *"spend more time in the garage than in the field"*. Another problem is insufficient facilities in the field to house staff so that they can maintain remote equipment. Vandalism and theft also contribute to maintenance problems.

Action

1 BAAP Programme No. 7

a) The specific programme for LDCs includes: Identification of quality of service indicators, and performance indicators development or introduction of network management systems, updating and implementation of the National Plan for Improvement of Maintenance (NPIM) in Africa, support for regional maintenance projects/activities. Development of a guide on the introduction of a Computerized Subscriber Maintenance System (CSMS) activity already tackled with a partner, the Company EML, from the United Kingdom. A questionnaire was sent out at the end of 1995 to English and French speaking developing countries. The Spanish version is under preparation for despatch in early 1996. On the basis of the replies, two workshops will be organized in 1996 in Africa and the Arab States. These workshops will also provide an opportunity to exchange ideas with the participants on the importance of the measures to be taken in order to ensure that the CSMS functions properly.

b) Ad hoc assistance was extended to Madagascar and Sierra Leone.

c) TCDC type assistance was given to six West African countries (Benin, Burkina Faso, Guinea, Niger, Mali and Senegal) for the digitalization of their interstates network.

d) Seminars were organized in Kenya and Italy (Trieste) and Colloquium in Togo (Lomé) in which several LDCs participated on maintenance related matters.

3.5 Planning

Telecommunication planning is an important activity to ensure that network growth is sustainable and contributes to socio-economic and cultural development in a controlled and predictable manner. Good planning improves efficiency through appropriate network dimensioning and timely introduction of new technologies.

One indication of poor planning in the LDCs is capacity utilization. At one extreme are countries where the capacity of local telephone exchanges are at full utilization, suggesting a lack of forward planning. At the other extreme, are most of the other LDCs, where on average, only 75 per cent of the existing telephone capacity is being used despite unmet demand. The unused capacity suggests that there has been poor planning in integrating the exchange potential with the rest of the network. In a number of countries, if the existing exchange capacity was used, the waiting list would be eliminated.

The long-range planning function in LDCs is generally managed by a senior engineer and staffed by technicians. Their objective is to prepare telecommunication network plans with supporting costs and human resource needs to cater for a given period. These technical plans are then presented to the institutions' top managers who in turn present them to the relevant finance ministries or to donor agencies who have shown an interest in financing equipment purchases. There is negligible contribution to the planning process by other divisions of the organization (such as finance, personnel or marketing). Economic analysis, human resource development needs and service requirements are not given sufficient importance.

Many LDCs have been provided with assistance in the preparation of telecommunication Master Plans. For example, all of the Pacific LDCs have developed Master Plans, typically in conjunction with the establishment of active planning departments, and these have been instrumental in attracting bilateral and multilateral assistance. In a number of other countries, Master Plans have been abandoned, partly because governments were unable to provide inputs on a timely basis as specified in the plans.

Action

1 BAAP Programme No. 3

The preparation of "Guidelines for the elaboration of a Business-Oriented Development Plan" (a new definition adopted by the WTDC for Master Plans including management, marketing and financing issues) was completed in 1995 but will be published in 1996. This guide will enable the countries to prepare their own short- and long-term plans in accordance with the objectives and strategies adopted by their governments.

Telecommunication Sector Studies (an essential planning requirement) were carried out in Angola, Eritrea and Uganda.

2 BAAP Programme No. 5

The following African LDCs benefited from PLANITU activities:

Transfer of software: Djibouti, Uganda and Sudan; Update of software: Ethiopia and Zambia.

3 During the period 1991-1994 a number of African LDCs were trained on PLANITU software and received the software free of charge. During the same period, Master Plans were initiated or completed in several African LDCs.

3.6 Any new priority areas?

In a very dynamic sector it is indeed plausible that new priorities have cropped in since **Buenos Aires** which need to be addressed with some urgency. One such area is the policy item of the BAAP and concerns sector reform. Nearly all developing countries are now under pressure to restructure their telecommunication sectors within perhaps the wider economic reforms being undertaken by these countries.

Any restructuring that leads to privatization and introduction of competition must be carried out judiciously and in a well-studied manner. The BDT is now well placed to provide technical and regulatory advice in this area. Perhaps telecommunication sector restructuring could be retained by African LDCs on an interim basis as an additional priority area where they could seek BDT assistance. A resolution on African LDCs should embody this point.

Another emerging area is the global mobile personal communication systems. Many African countries are experiencing pressure to buy relatively new and untried global mobile systems whose short- and long-term evolution and financial consequences are not yet quite clear. It would be advisable for manufacturers and their agents to provide to LDCs the cost implications on a medium- to long-term basis for investing on these new technologies. The ITU-D should also provide technical advice on the matter, in particular the impact of the new systems on existing national and international services.

4 Conclusions

Though the majority of LDCs are nowhere near the levels of telecommunication development of other developing and developed countries, there are wide variations among the LDCs themselves. LDCs where main telecommunication operators have been partly privatized have been doing relatively well. At the other extreme, civil strife in a number of LDCs precludes serious telecommunication development until stability is restored. In the middle are the remaining LDCs, most of whom should be performing better despite their low level of economic development.

The LDCs, even in the context of Africa alone, are highly varied by geography, culture, income level, population, land area and structure of their economies. Those LDCs which have above average levels of network development tend to be characterized by a small population size, a well-developed services sector and some degree of private foreign participation in the Public Telecommunications Operator (PTO). These factors must be considered in evaluating each country's potential for telecommunication development.

The LDCs have a number of critical weaknesses in their telecommunication sector including management, maintenance, training and planning problems which are symptomatic of state-run operators with limited autonomy. LDC PTOs have often been slow to provide new business-oriented telecommunication services, such as mobile services, leased lines or data communications, and are thus missing out on potential revenues.

Rural telecommunication provision is low in most LDCs, despite the fact that the majority of the population in these countries live in rural areas. In a number of LDCs, the rural sector is also economically significant, accounting for over 50 per cent of GDP.

The LDCs have limited regulatory experience and the few liberalization efforts have shown mixed results. Countries with partly privatized nationwide fixed-link and cellular operators have fared well while those that have some degree of foreign-ownership of their international operators, whether

through privatization or inherited colonial connections, have generally not had such a favourable experience.

5 Recommendations

5.1 Recommendations to LDCs

a) The LDCs should accord top priority to the five areas of critical weakness which have been identified in order to minimize resource losses due to these factors and thus create a solid basis for accelerated development of their networks.

b) The LDCs need to grant greater autonomy to their telecommunication entities so that they can better meet market demand for telecommunication services and to create incentives to remedy limitations in management, maintenance, training and planning. The close relationship between small population size and higher level of telecommunication development among the LDCs also indicates the benefits of decentralizing the operations of the PTO and/or opening the market to new entrants.

c) Closely related to management autonomy is the need for greater financial autonomy. This might take the form of clarifying the financial relationship between the operator and the state to replace automatic state levies with a more transparent system of an income tax on telecommunication services. Tariff reform should be progressively introduced to ensure long-term network self sufficiency.

d) LDC policy-makers should establish independent regulatory authorities to oversee the licences issued to the telecommunication operators. Regulatory authorities should work with PTO management to set targets for key indicators such as network growth, investment and quality of service.

e) The LDCs should consider closer cooperation among themselves to pool their resources and strengthen their bargaining positions. This is difficult because of the wide geographical spread of the LDCs. However, within Africa, there are sufficient LDCs and other developing countries to act together on a subregional basis in areas such as joint training and pooled equipment purchases. They should also take advantage of existing cooperative regional and international telecommunication activities as well as new projects such as the WorldTel.

f) Governments of the LDCs should give higher priority for rural telecommunications in order to bring about easier access to telecommunication services by rural populations. Governments need to define clear universal service objectives and specify how, within the prevailing conditions, they can be achieved. Policy-makers may consider asserting pre-conditions for the franchising or privatization of lucrative services, such as mobile communications or international services, for instance by stating obligations to develop rural telecommunications in the licence conditions of new operators.

5.2 Recommendations to development partners

a) Development partners should assist LDCs in identifying the best ways and means of securing financial assistance from different sources. This could be done through organizing investment seminars for LDCs to help raise funds for telecommunication investment. There needs to be mutual understanding of the requirements and obligations of each party (country, development partners, private sector). This will help the LDCs to adopt a long-term strategy to make their telecommunication sectors self-sufficient.

b) Multilateral donor agencies, such as the Bretton Woods Institutions and the regional development banks, should focus a higher proportion of their overall lending on the LDCs and should be more systematic by funding a series of projects over a number of years to remedy the present uneven pattern of investment. The development banks should work together to develop a common set of criteria to be used when evaluating potential projects. These criteria could include preference given to those countries which move furthest with market liberalization, creation of stable regulatory environment, tariff reform and management reform. A certain percentage of funds set aside for infrastructure projects in the LDCs might be reserved for initiatives with a high degree of private sector participation.

c) The LDCs face increasing external pressures to liberalize their networks and independent assistance is essential to provide advice about various options and stages towards sector reform. Objective advice is essential to avoid the problems some early LDC reformers have encountered with uneven network development. Development partners should consider the urgent need for assistance in creating and training regulatory authorities. Provision for training should form a higher percentage of investment funds provided by donor agencies. Development partners should also consider assisting the LDCs to increase their participation in regional and international bodies.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Corrigendum 1 to
Document 12-E
3 May 1996
Original: English

For Information/Support

Agenda item: 1.1

PLENARY MEETING

SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU

TITLE: THE DEVELOPMENT OF TELECOMMUNICATIONS IN AFRICA AND THE GENERAL AGREEMENT ON TRADE IN SERVICES

Replace pages 143, 144, 152, 153 and 161 by the attached pages.

1. OVERVIEW OF EXISTING SITUATION

1.1 Key Facts

Tanzania has an area of 945,000 sq. km. Its population was approximately 28 million inhabitants as at end of 1994. Eighty percent of the population lives in rural areas. GDP per Capita was US$ 90 in 1991[1]. A speech made by the country's Minister's of State for Economic Planning in Parliament on 15th June 1995 says GDP per capita rose to US$ 130 at the end of 1994[2].

There were 88,000 main telephone lines in Tanzania at the end of 1994. This translates to a teledensity of 0.3 telephones per 100 inhabitants compared to the Sub-Saharan average of 0.46. Waiting applicants for telephones (expressed demand) were 145,000. The quality of service is very poor. While average fault per telephone is two per year, the calling rate for inter-urban and international telephone calls was 20% in 1994. This poor quality is largely due to congestion in the network and aged equipment.

The views of customers, particularly business users, about the quality of service are mixed. Some are highly frustrated, particularly those in Dar Es Salaam. They complain of difficulty in calling from one area of the city to another; or that their telephones are out of order for a long time without being attended. Others think the Tanzania Telecommunication Company Limited (TTCL) is trying its best in difficult circumstances. These positive views are a result of commercial orientation being adopted by TTCL in recent times including educating customers about causes of service problems and remedial action being taken. Consistent with the egalitarian policy of the Tanzanian Government (with emphasis on rural development) the little telephone service available has been spread as widely as possible over the country. All the 110 administrative district headquarters and some rural areas have telephone service. The total demand including existing connected subscribers, waiters and unexpressed demand is estimated to be 300,000 lines.

Basic telecommunication services (telephone, telex and facsimile) are provided by the TTCL. Millicom (Tanzania) Limited, operating as Mobitel, has been providing mobile cellular services since the second half of 1994, initially in Dar Es Salaam and later in the Island of Zanzibar. A second private operator (Tritel) is now providing mobile telephony services since 15 December 1995. Furthermore, a Joint Venture Agreement was signed between the Tanzania Telecommunication Company Limited (TTCL) and M/S Nexus International on 21 December 1995 for provision of data communication services. A company has been formed and services will begin by June 1996. There are no public data or public value-added services yet. Private leased circuits are provided by TTCL for specialized services necessary for business users.

1.2 Constraints on Telecommunication Development.

The same constraints to telecommunication development that plague other African countries account for the poor state of telecommunication services in Tanzania. They are shortage of finance, human resources and technology.

(a) Financing:

The main sources of financing for telecommunications in Tanzania, as in other least developing countries, have been primarily multilateral and bilateral loans. Before the break-up of the East African Community, telecommunication services for its members, Kenya, Tanzania and Uganda, were operated by a single entity and financed by regular loans from the World Bank (International Bank for Reconstruction and Development). After the collapse of the Community in 1977, there were attendant dislocations. Common resources, for example senior management and technical staff, as well as facilities, had to be duplicated in all three countries. This took time and additional expenses. It was not

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until in the early 1980's that Tanzania was able to establish new sources of finances, mainly the International Development Association (IDA) Wing of the World Bank and bilateral sources including Japan, Sweden and Belgium. Even so, the amounts obtained from these sources were sporadic and small. Due to restrictive tariff policy, the Tanzania Posts and Telecommunication Corporation (TPTC), TTCL's predecessor, almost consistently made losses in the 1980's. There were not enough internally-generated funds for re-investment.

In 1993, a consortium of financiers led by the World Bank committed a total of US$ 212.4 million to finance a Telecommunication Restructuring Project (TRP) aimed at meeting current demand and modernizing the network. Total project cost is US$ 242.8 million of which TTCL is contributing US$ 30.4 million. The co-financiers of the Project and respective amounts are shown in Figure 1.

FIGURE 1:
Telecommunication Restructuring (Project Financing in US$)

Financier	Local Cost	Foreign Cost	Total Cost
European Union		30.6	30.6
The World Bank (IDA)		77.5	77.5
African Development Bank		41.1	41.1
Swedish International Development Agency		34.5	34.5
Japanese International Cooperation Agency		9.2	9.2
Danish International Development Agency		6.0	6.0
Kuwait Fund		13.5	13.5
TTCL	30.4		30.4
Total	30.4	212.4	242.8

source: Tanzania Telecommunication Company Limited.

The amount required to meet demand at the end of the 5-year project (originally 1991 - 1996; but now 1993 -1998) was approximately US $ 400 million. The size of the project that the financiers thought could realistically be implemented is the project sum of US$ 220 million, about half of the amount required to meet demand. Yet, the TRP is a project of unprecedented magnitude in the history of telecommunication development in Tanzania. The size of the investment can be appreciated by comparing IDA's contribution of US $ 77.5 million with previous investments by IDA affecting telecommunication development in Tanzania. The major financier of telecommunications in Tanzania, IDA made loans of a total of US $43 million to the Tanzania Posts and Telecommunication Corporation between February 1978 and the initiation of the TRP in the early 1990's.

The TRP is part of the Tanzania's Economic Recovery Programme (ERP) which aims at sustained economic growth and improving the efficiency of the various sectors of the economy through

flexibility is also provided for opening the sector to private investment on special approval. The Government recognized that the investments and human resources required to meet the large demand for telecommunications services cannot be made available from state, multilateral and bilateral sources alone. While detailed policy is under formulation the broad policy of the Government is to encourage private sector investment in telecommunications. The various modes of that participation are considered in this section.

3.2 Privatization

It is the macro-policy of Tanzania to Privatize most of the 400 public owned enterprises which have dominated economic activity in the country, since the promulgation of the socialist policy via the Arusha Declaration in 1967. The Privatization taking place may be partial or total and is effected through bids or negotiations with strategic investors.

A sale of shares by public offer has not played a significant part due to the lack of a stock exchange. A Capital Authority that is preparing for the establishment of a stock exchange was created in 1994. It will take time before a capital market becomes fully operational. However, that does not prevent the sale of shares through public subscription. The lack of a stock exchange will only limit the effectiveness of public sales due to lack of easy tradability.

The Tanzania Telecommunication Company (Incorporation) Act 1994 has enabling provisions for gradual privatization of the national telecommunication operator, the Tanzania Telecommunication Company Limited (TTCL). However, early privatization of TTCL is not likely to be an option of private sector participation in telecommunication development in Tanzania for several reasons. Firstly, the Presidential Parastatal Sector Reform Commission which is responsible for privatization of public enterprises announced in April, 1995 that public utilities, including TTCL, will not be privatized. Secondly, some of the bilateral financiers of telecommunications projects in Tanzania, especially the Telecommunication Restructuring Project (TRP) are against immediate selling of TTCL'S assets acquired partly through their contributions.
Thirdly, there is currently a strong public reaction against the privatization of financially viable public enterprises, and in particular the sale of such businesses to foreigners.

3.3 Opening Services to Competition

3.3.1 Terminal Equipment and Related services

The opening of telecommunications services to competition in Tanzania started in 1993 when subscribers were allowed to acquire terminals from suppliers of their choices provided they were type-approved. Dealers in terminals and providers of wiring and maintenance services have to be licensed, the objective being to ensure that they have necessary technical capacity and in order to protect customers.

3.3.2 Mobile Cellular Services.

In 1993 Millicom (Tanzania) Ltd, operating as Mobitel, was licensed to provide cellular mobile services in Dar Es Salaam and Zanzibar. The shareholding of Millicon (Tanzania) Ltd is comprised of Millicom International (56.6%), TTCL (27.8%) and Ultimate Communications (15.6%). A second operator TRI of Malaysia, was (in June 1995) in the process of being licensed.

Mobitel started with a capacity for 1500 subscribers; but with a projection of 5000 over five years. The 1500 capacity was exhausted within a year. Given the large waiting list for ordinary telephone services, including potential business customers, the service became very popular. Mobitel planned to accelerate the implementation of its development programme to cater for more customers before its competitor TRI, started offering service. The second cellular operator is wholly private-owned: 60% foreign 40% local.

The number of bids for provision of mobile cellular service in Dar Es Salaam in 1992 had been high - about 10 international companies, some with local associates, submitted bids. The Tanzania Communications Commission has taken a cue from their interest and divided the country into 4 mobile cellular services areas, in order to meet some of the demand for telephone service. Limited competition, duopoly, will be allowed in each service area in order to minimize problems of radio frequency limitation. The Commission invited bids for licenses in April, 1995 for all areas, except the coastal area (which had two licensees already). Any operator or prospective operator may bid for provision of service in one or more areas. Zantel has been issued with a licence but operations are yet to begin.

3.3.3 Other Non-basic Services

Data and value-added services have been partially opened to competition. They are, however, subject to licensing by the Commission. A joint venture on data services has been formed as reported in 1.1 above. The Commission has invited proposals for the provision of public data services on competitive basis. Private networks, including closed-user group networks for large commercial concerns, are being licensed.

3.4 Competition in fixed telephone services

3.4.1 The Tanzania Communications Act envisages the possibility of competition in all services. Indeed, encouraging competition is one of the functions of the Commission under the Act. Also, the Commission is required to perform its functions in accordance with government policy. Comprehensive policy which no doubt will address short-term and long-term objectives and strategies for telecommunication development, is under formulation. The short-term policy was indicated in an announcement in the local press on 23 July 1995, in an invitation by the Commission for provision of basic telecommunications in the rural areas of Tanzania. The notice declared that, for the time being, the Tanzania Telecommunication Company Limited (TTCL) will continue being the only basic telecoms operator. But in a bid to develop telecommunications in the rural areas, the Commission would license operators who would have a strong component of local (national) participation (public or private) through joint ventures to operate basic telecommunications networks in demarcated rural areas. TTCL will, according to the notice, provide inter-connection to such networks.

The invitation left it to applicants to chose the areas in which they wish to operate. The announcement promised a number of incentives for operators in rural areas. They include negotiated license fee rebates, access to a Rural Telecommunication Fund yet to be established or even monopoly guarantees for specific periods. Operators of other infrastructures in rural areas, like railways, electricity suppliers and other interested in rural investment, were encouraged to apply. The Commission indicated in its announcement that it would be prepared to license more than one operator in any demarcated rural area.

An application by Zanzibar Telecom Limited, a joint-venture company established with the approval of the Government of Zanzibar, is under consideration by the Commission. If the company is successful in its application it will partly compete with and partly complement TTCL in the provision of telecommunication services in Zanzibar.

APPENDIX 1

PERSONS MET DURING THE FIELD STUDY IN TANZANIA.

Mr. V. Mrisho	Principal Secretary, Ministry of Trade and Industries.
Mr. W.L. Mwakimi	Principal Foreign Trade Officer, Ministry of Trade and Industries.
Mr. G.P.E. Lauwo	Senior Trade Officer, Ministry of Trade and Industries.
Mr. Sekwao	Ag. Principal Secretary, Ministry of Works Transport and Communications.
Mr. A.Sizya	Principal Economist, Department Public Investment, Ministry of Finance.
Mr. E.N. Ole-Kambaine	Director General, Tanzania Communication Commission, TCC
Mr. Mushesha	Director of Finance and Administration, TCC
Mr. A.S. Ndakidemi	Director of Consumer Services and Industry Affairs, TCC.
Mr. E.N. Madeje	Director of Posts, TCC
Mr. J.S Ngatena	Deputy Managing Director/Customer Service, Tanzania Telecommunication Company Ltd. (TTCL)
Mr. J.S. Murasi	Company Secretary, TTCL.
Dr. J. Kilimbe	Director, International Services, TTCL
Mr. P.S. Malembeka	Acting Director of Business and Strategic Planning, TTCL
Mr. N. Felician	Director, Commercial Services, TTCL
Mr. D.R.J. Omara	Principal Economist, TTCL.
Mr. R. Rose	General Manager, Millicom Tanzania Ltd (Mobitel)

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3.4.1 The Tanzania Communications Act envisages the possibility of competition in all services. Indeed, encouraging competition is one of the functions of the Commission under the Act. Also, the Commission is required to perform its functions in accordance with government policy. Comprehensive policy which no doubt will address short-term and long-term objectives and strategies for telecommunication development, is under formulation. The short-term policy was indicated in an announcement in the local press on 23 July 1995, in an invitation by the Commission for provision of basic telecommunications in the rural areas of Tanzania. The notice declared that, for the time being, the Tanzania Telecommunication Company Limited (TTCL) will continue being the only basic telecoms operator. But in a bid to develop telecommunications in the rural areas, the Commission would license operators who would have a strong component of local (national) participation (public or private) through joint ventures to operate basic telecommunications networks in demarcated rural areas. TTCL will, according to the notice, provide inter-connection to such networks.

The invitation left it to applicants to chose the areas in which they wish to operate. The announcement promised a number of incentives for operators in rural areas. They include negotiated license fee rebates, access to a Rural Telecommunication Fund yet to be established or even monopoly guarantees for specific periods. Operators of other infrastructures in rural areas, like railways, electricity suppliers and other interested in rural investment, were encouraged to apply. The Commission indicated in its announcement that it would be prepared to license more than one operator in any demarcated rural area.

An application by Zanzibar Telecom Limited, a joint-venture company established with the approval of the Government of Zanzibar, is under consideration by the Commission. If the company is successful in its application it will partly compete with and partly complement TTCL in the provision of telecommunication services in Zanzibar.

APPENDIX 1

PERSONS MET DURING THE FIELD STUDY IN TANZANIA.

Mr. V. Mrisho	Principal Secretary, Ministry of Trade and Industries.
Mr. W.L. Mwakimi	Principal Foreign Trade Officer, Ministry of Trade and Industries.
Mr. G.P.E. Lauwo	Senior Trade Officer, Ministry of Trade and Industries.
Mr. Sekwao	Ag. Principal Secretary, Ministry of Works Transport and Communications.
Mr. A.Sizya	Principal Economist, Department Public Investment, Ministry of Finance.
Mr. E.N. Ole-Kambaine	Director General, Tanzania Communication Commission, TCC
Mr. Mushesha	Director of Finance and Administration, TCC
Mr. A.S. Ndakidemi	Director of Consumer Services and Industry Affairs, TCC.
Mr. E.N. Madeje	Director of Posts, TCC
Mr. J.S Ngatena	Deputy Managing Director/Customer Service, Tanzania Telecommunication Company Ltd. (TTCL)
Mr. J.S. Murasi	Company Secretary, TTCL.
Dr. J. Kilimbe	Director, International Services, TTCL
Mr. P.S. Malembeka	Acting Director of Business and Strategic Planning, TTCL
Mr. N. Felician	Director, Commercial Services, TTCL
Mr. D.R.J. Omara	Principal Economist, TTCL.
Mr. R. Rose	General Manager, Millicom Tanzania Ltd (Mobitel)

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 12-E
4 April 1996
Original: English

For Information/Support

Agenda item: 1.1

PLENARY MEETING

SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU

TITLE: THE DEVELOPMENT OF TELECOMMUNICATIONS IN AFRICA AND THE GENERAL AGREEMENT ON TRADE IN SERVICES

THE DEVELOPMENT OF TELECOMMUNICATIONS IN AFRICA AND THE GENERAL AGREEMENT ON TRADE IN SERVICES

A Policy study of five African countries

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU
AND THE
UNCTAD AND UN-DDSMS
COORDINATED AFRICAN PROGRAMME OF ASSISTANCE ON SERVICES

March 1996

4.4.96

FOREWORD

Ever since the start of the micro-electronic revolution, and the development of a range of associated technologies such as digitalization, satellite and fiber-optic transmission, the telecommunications industry has been thrown onto a path of rapid and on-going change. The sharp drop in capital costs associated with the new telecommunications technologies has both fueled and been fueled by an ever growing demand for new and sophisticated services by businesses and consumers alike.

Governments everywhere have had to respond to the challenges and opportunities created by the rapid changes in the economics of the industry. Despite the low level of development in their basic telecommunications infrastructure, African countries are not immune to these changes. African businesses, more than ever before, need many of the same telecommunication services as those that are made available to their counterparts elsewhere in the world. As well, telecommunication services are needed to meet many social and community needs such as health-care, education, and other in a far more efficient manner and at a lower cost. The challenge, everywhere, is for governments to seize upon the new opportunities arising from new technologies and the increasing willingness of the private sector to participate in the development of the sector.

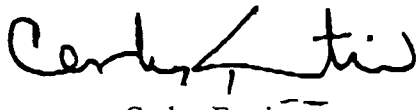
Telecommunications in many African countries suffers from a lack of capital, a lack of technology and a lack of necessary skills. Their public sector simply does not have the resources it takes to develop the sector and satisfy the demand. The opening-up of the telecommunications market to competition and to the inflows of resources from the private sector - both domestic and foreign - has become the order of the day. Effective management of this process of change is the key to maximizing its potential benefits.

The opening-up of the telecommunications sector to private capital and competition is happening at the same time that a comprehensive multilateral trade framework for services, including telecommunication services, is entering into force. The General Agreement on Trade in Services (GATS) - one of the agreements negotiated as part of the Uruguay Round of trade negotiations and one of the building blocks of the newly formed World Trade Organization - is opening new challenges, but also new opportunities for African countries.

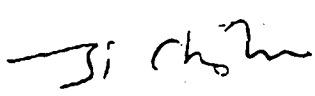
This study is a primer on how African governments can use the process of progressive liberalization under the GATS to strengthen reforms aimed at achieving a faster pace of development in the telecommunications sector. It has been prepared by two African telecommunication experts; Messrs. Simon Moshiro and Brahima Sanou, (respectively of Tanzania and Burkina Faso), as part of a joint collaboration between the Telecommunication Development Bureau of the International Telecommunication Union (ITU/BDT) and the Coordinated African Programme of Assistance on Services (CAPAS) of the United Nations Conference on Trade and Development (UNCTAD) and the United Nations Department for Development Support and Management Services (UN-DDSMS). This study represents a strong example of how three international organizations can combine their efforts, resources and expertise for the purpose of assisting developing countries in making the most out of the opportunities created by the GATS agreement.

The views, opinions and recommendations expressed in the study are those of the authors and do not necessarily reflect the opinions of the ITU, UNCTAD, UN-DDSMS, or their members.

Ahmed Laouyane
Director
Telecommunication
Development Bureau



Carlos Fortin
Deputy to the Secretary General
United Nations Conference on
Trade and Development



Ji Chaozhu
Under-Secretary General
United Nations Department for
Development Support and
Management Services

2 April 1996

ACKNOWLEDGMENTS

This report was prepared by two experts contracted by the ITU/BDT, Mr. Brahima Sanou and Mr. Simon Moshiro (respectively of Burkina Faso and Tanzania) with the support and collaboration of the ITU, UNCTAD, UN-DDSMS and WTO staff.

The study is based in part on the analyses of the ten countries participating in the CAPAS project (including Benin, Burundi, Ghana, Guinea, Kenya, Nigeria, Senegal, Tanzania, Uganda, and Zimbabwe), including detailed field studies in five of them (Ghana, Guinea, Senegal, Tanzania and Uganda). Its preparation benefited from considerable support and input from many individuals in the telecommunication and trade ministries as well as in the private sector of the five countries targeted for field studies.

The experts are indebted to the National Coordinators of the CAPAS project for facilitating their field studies in the five countries visited. They are Mr. Kwadwo Agyepong (Ghana); Dr. Younoussa Koita (Guinea); Mr. Issa Mbaye (Senegal); Mr. George Lauwo (Tanzania) and Mr. Sabakaki and Mr. Mayiga (Uganda). The experts also thank the members of the Inter-Institutional Working Groups (IWGs) in the five countries for their collaboration during the field- studies.

Lastly, the experts would like to thank all of those interviewed in the course of the study as named in the country annexes.

TABLE OF CONTENTS

ACRONYMS
EXECUTIVE SUMMARY

1. INTRODUCTION **1**

1.1 BACKGROUND 1
1.2 OBJECTIVES OF THE STUDY 1
1.3 METHODOLOGY 2
1.4 STRUCTURE OF THE REPORT 2

2. TELECOMMUNICATION DEVELOPMENT CONCERNS **5**

2.1 THE EXPANDING ROLE OF TELECOMMUNICATIONS 5
2.2 CURRENT STATE OF TELECOMMUNICATION SERVICES 5
2.3 CONSTRAINTS ON TELECOMMUNICATION DEVELOPMENT 6
2.4 TELECOMMUNICATION DEVELOPMENT OBJECTIVES 7
2.5 BALANCING NEEDS 9
2.6 REFORM INITIATIVES 9

3. COMPETITION AND TELECOMMUNICATION DEVELOPMENT **11**

3.1 DEFINITION 11
3.2 FROM MONOPOLY TO COMPETITION 11
3.3 THE COSTS AND BENEFITS OF COMPETITION 11
3.4 THE SLOW PACE OF COMPETITION IN TELECOMMUNICATION SERVICES 13
3.5 SERVICES OPENED TO COMPETITION 13
3.6 ALLOWING COMPETITION 15
3.7 COMPETITION AND UNIVERSAL SERVICE 15

4. THE GENERAL AGREEMENT ON TRADE IN SERVICES (GATS) PROVISIONS AFFECTING TELECOMMUNICATIONS **17**

4.1 THE WORLD TRADE ORGANIZATION (WTO) 17
4.2 THE GENERAL AGREEMENT ON TRADE IN SERVICES (GATS) 20
4.3 GENERAL OBLIGATIONS UNDER THE GATS 20
4.4 SPECIFIC OBLIGATIONS 24
4.5 THE ANNEX ON TELECOMMUNICATIONS 26
4.6 NEGOTIATIONS ON BASIC TELECOMMUNICATION SERVICES 27
4.7 PROGRESSIVE LIBERALIZATION 28

5. LIBERALIZATION UNDER GATS AND TELECOMMUNICATION DEVELOPMENT **29**

5.1 INTRODUCTION 29
5.2 THE ENABLING ENVIRONMENT FOR MULTILATERAL LIBERALIZATION 29
5.3 COSTS AND BENEFITS OF LIBERALIZATION UNDER GATS 30
5.4 REVIEW OF TELECOMMUNICATION COMMITMENTS OF AFRICAN COUNTRIES 33
5.5 PROPOSALS FOR MARKET ACCESS OFFERS/REQUESTS 35
5.6 PREPARATION OF SCHEDULES OF COMMITMENTS 38

6. OTHER REFORMS FOR TELECOMMUNICATIONS DEVELOPMENT **39**

6.1 NEED FOR APPROPRIATE REGULATORY FRAMEWORK 39
6.2 SEPARATION OF POSTAL AND TELECOMMUNICATION OPERATIONS 43
6.3 CORPORATIZATION AND COMMERCIALIZATION OF THE PUBLIC TELECOMMUNICATION OPERATOR 43
6.4 PRIVATIZATION 43
6.5 FINANCING ARRANGEMENTS 44
6.6 AREA AND LOCAL NETWORKS 44
6.7 PRIVATE NETWORKS 45
6.8 TARIFFS 45
6.9 REGIONAL COOPERATION AND INTEGRATION 46

7. OTHER FINDINGS AND LESSONS FROM THE FIELD STUDIES **49**

7.1 INFORMATION TECHNOLOGY DEVELOPMENT 49
7.2 THE CAPAS PROJECT 49
7.3 THE ROLE OF ITU 50

8. CONCLUSIONS **51**

ANNEXES

A. GLOSSARY
B. LIST OF REFERENCE DOCUMENTS
C. SELECTED EXCERPTS FROM THE WTO
C.1 - ANNEX ON TELECOMMUNICATIONS
C.2 - ANNEX ON NEGOTIATIONS ON BASIC TELECOMMUNICATIONS
C.3 - DECISION ON NEGOTIATIONS ON BASIC TELECOMMUNICATIONS
C.4 - ANNEX ON ARTICLE II EXEMPTIONS
C.5 - SELECTED ARTICLES OF THE GATS
D. COUNTRY ANNEXES

GHANA	(ANNEX D.1)
GUINEA	(ANNEX D.2)
SENEGAL	(ANNEX D.3)
TANZANIA	(ANNEX D.4)
UGANDA	(ANNEX D.5)

ACRONYMS

AFRALTI	African Advanced Level Telecommunication Institute
BDT	ITU's Telecommunication Development Bureau
BLT	Build-Lease-Transfer
BOT	Build-Operate-Transfer
BTO	Build-Transfer-Operate
CAPAS	Coordinated African Programme of Assistance on Services
COMESA	Common Market for Eastern and Southern Africa
DERPT	Directorate of Studies and Regulation of Posts and Telecommunications - Senegal
ECOWAS	Economic Community for West African States
GATS	General Agreement on Trade in Services
GATT	General Agreement on Tariffs and Trade
GII	Global Information Infrastructure
GPT	Ghana Posts and Telecommunications Corporation
IBRD	International Bank for Reconstruction and Development
IBS	International Business Services
IMF	International Monetary Fund
INTELSAT	International Telecommunications Satellite Organization
ITU	International Telecommunication Union
KBO	Kagera Basin Organization
LDC's	Least Developed Countries.
MFN	Most Favoured Nation
NCA	National Communication Authority - Ghana
NGBT	Negotiating Group on Basic Telecommunications
NITEL	Nigeria Telecom
OAU	Organization of African Unity
ONATEL	Office National des Télécommunications - Burundi
PANAFTEL	Panafrican Telecommunication Network
PATU	Panafrican Telecommunication Union
PTO	Public Telecommunication Operator
RASCOM	Regional African Satellite System
SADC	Southern African Development Community
SATCC	Southern Africa Transport and Communications Commission
SONATEL	Société Nationale des Télécommunications du Sénégal
SOTELGUI	Société des Télécommunications de Guinée s.a.
TCC	Tanzanian Communication Commission
UNCTAD	United Nations Conference on Trade and Development
UN-DDSMS	United Nations Department for Development Support and Management Services
VSAT	Very Small Aperture Terminal
WAEC	West African Economic Community
WTO	World Trade Organization

EXECUTIVE SUMMARY

Objectives of the Study

The purpose of this study is to identify ways and means in which telecommunication development and regional integration objectives of African countries may be enhanced through multilateral liberalization under the General Agreement on Trade in Services (GATS).

This study is based, in part, on a review of the recent experience of ten African countries participating in the Coordinated African Programme of Assistance on Services or CAPAS-- namely Benin, Burundi, Ghana, Guinea, Kenya, Nigeria, Senegal, Tanzania, Uganda and Zimbabwe. In particular, the study:

- offers a detailed review of the efforts of Ghana, Guinea, Senegal, Tanzania and Uganda in developing a modern telecommunication infrastructure through policy reform emphasizing competition and including liberalization commitments under the GATS;

- formulates proposals for further domestic reform or suggests additional inputs to ongoing reforms in the CAPAS countries, wherever relevant;

- draws lessons from the CAPAS countries and identifies ways for speeding up and intensifying domestic reform in all African countries through the preparation of market access requests and offers under the GATS.

Telecommunications Development Concerns of African Countries

African countries recognize the critical role telecommunications plays in facilitating social, economic and cultural development including conducting business in a regional and international context. Under current conditions of scarce resources and underdeveloped telecommunication networks, the main preoccupations include clearing long waiting lists, expanding access to as many people as possible and modernizing facilities in order to increase quality and variety of services.

Heavy reliance on loan financing, imported technology, shortage of suitable human resources and inappropriate sector management structures are the main constraints to telecommunications development in Africa. African governments recognize the need to remove or minimize those constraints, mainly through the adoption of more effective sector management structures and the involvement of the private sector in developing telecommunications.

General Agreement on Trade in Services and the GATS provisions affecting Telecommunications

The GATS is one of the agreements included in the Final Act of the Uruguay Round. Other agreements established the World Trade Organization (WTO) and the General Agreement on Tariffs and Trade (GATT, 1994). The GATS sets concepts, principles and rules for the multilateral liberalization of international transactions in services, including telecommunications. Under GATS, developing countries have been given flexibility in applying some of the rules and disciplines in order to take into account their level of development.

Telecommunications is treated by the GATS as a service sector, like any other sector, subject to general obligations and specific commitments. In addition, telecommunications is recognized in the GATS as being a major "transport means" for information needed by all service providers in the conduct of business, irrespective of the sector. For this purpose, GATS includes an Annex on Telecommunications that grants firms from any Member non-discriminatory access to and use of telecommunications for the supply of a service included in the Schedule of Commitments of a Member. At the conclusion of the Uruguay Round in December 1993, a decision was taken by the Ministerial Conference to open further negotiations on liberalization of basic telecommunications on a voluntary basis. The Negotiating Group on Basic Telecommunications (NGBT) is continuing the negotiations up to April 30, 1996.

Competition, Multilateral Liberalization under the GATS, and Telecommunications Development

Domestic reforms that emphasize increasing competition in telecommunications and other economic sectors have been on the agenda of CAPAS and other African countries for quite a number of years. Although there are benefits, there are costs for such policy. Notwithstanding the potential benefits of competition, the opening up of the telecommunications sector to competition has been slow in CAPAS and other African countries. Policy-makers have been reluctant to permit substantial competition in telecommunications for fear that private investors would seek high-profit segments and compromise the goals of universal service. Furthermore, the telecommunications market of many African countries is small, while a degree of economies of scale is necessary in the operation of basic telecommunications networks. There is a need for policy-makers to review objectives of universal service in order to reconcile them with the goal of providing sufficient modern services essential for business activities, thus enabling their countries to attain and maintain competitiveness in the regional and international market place.

In order to further the development of telecommunications, CAPAS and other African countries are creating environments conducive to greater private sector participation, including greater participation of foreign service providers. This includes fiscal and other investment incentives, adoption (or planned adoption) of policies for the development of the sector and the establishment or intention to establish an adequate regulatory framework for supervising the sector.

Liberalization undertaken unilaterally remains amenable to sudden and extensive changes. In contrast, multilateral liberalization under GATS commits countries not to change conditions of market access and national treatment. Accordingly, it guarantees stability and hence provides more effective encouragement to private sector investment both local and foreign. Permitting foreign competition in selected segments of telecommunications services through commitments under the GATS potentially may attract greater flows of financing in hard currency and, where needed, greater flows of human resources necessary for expanding and modernizing services and establishing telecommunications links between African countries.

Other Reforms for Telecommunications Development

African countries have adopted or envisage other policy reforms to improve the efficiency and to stimulate the development of their telecommunications sector. Some reforms are necessary to fulfill the general obligations and disciplines under the GATS. These reforms encompass:

- Creation of a regulatory framework and establishment of a separate Regulatory Body to supervise the telecommunications sector.

- Establishment of state-owned telecommunication operators as commercial enterprises with sufficient financial and management autonomy (corporatization);
- Privatization of state owned national telecommunication operators;
- Other measures for encouraging private sector participation including joint-ventures and build-transfer schemes.

The five substantive chapters of this report explore the development needs of telecommunications sectors throughout Africa and stress the role of reform, especially the role of competition and liberalization (i.e., the opening of the domestic market to competition from foreign service providers), in meeting some of those needs. The report also highlights the potential contribution of multilateral liberalization under the GATS to the process of economic reform of the sector and the linkages between the introduction of competition and other dimensions of reform, including the strengthening of the regulatory environment and the establishment of Regulatory Bodies.

The discussion of the potential contribution of competition in meeting the development needs of the sector is based, in part, on a review of the costs and benefits derived from the experiences of competition by the CAPAS countries. Likewise, the study's discussion of how African countries might use the opportunities resulting from multilateral liberalization under GATS for strengthening the process of domestic reform is based on a review of how several CAPAS countries have proceeded in this regard.

Article XIX of the GATS grants developing countries substantial flexibility in tailoring their commitment to multilateral liberalization to their particular level of development -- especially their commitments with respect to market access (Article XVI) and national treatment (Article XVII). The study is quite specific in its recommendations of possible conditions and limitations that countries might want to maintain with respect to individual telecommunications subsectors.

Finally, the GATS recognizes not only the right of countries to regulate service sectors, but also the importance of strengthening the regulatory environment, especially in such sectors as telecommunications, as a means to manage competition (Article VI). The report draws attention to the fact that regulatory reform is an important complement to the process of overall reform in the telecommunications sector involving competition, including multilateral liberalization under GATS.

This study demonstrates the importance for all African countries in determining their own national policies and development objectives and in coordinating the various responsibilities of the different government agencies in order to make their objectives a reality.

Recommendations

Based on a review of recent experiences and ongoing reforms in CAPAS and other sub-Saharan African countries, this study arrives at a number of recommendations.

Recommendation #1: Competition

Given the financial constraints bearing on African governments and the priority to address critical social needs such as health-care and education, governments from the region should encourage the involvement of the private sector in the development of telecommunications by allowing for an appropriate level of competition and the infusion of private sector capital.

Recommendation #2: Universal Service Objectives

Given the great scarcity of resources, African telecommunication policy-makers should reconcile the objective of universal service with the goal of providing modern telecommunication services essential to the conduct of business. This is necessary if African economies -- and African businessmen and business women, in particular -- are to attain or maintain their competitiveness in the regional and international marketplace.

Recommendation #3: Liberalization under GATS

The entry into force of the General Agreement on Trade in Services (GATS), negotiated during the Uruguay Round, is a major opportunity for telecommunication policy-makers in Africa to consolidate the process of market reform -- including competition -- underway in the sector. African governments should consider making market access offers under GATS in a number of telecommunication service subsectors. Preferably, such offers/requests for telecommunications services should be part of a package of offers/requests in a number of service sectors which ensures a positive balance of trade-offs under the GATS.

Recommendation #4: Commitments on Telecommunications under GATS

The consolidation of reform under GATS involves "binding" levels of market access and national treatment for foreign telecommunication providers in specific telecom subsectors inscribed in a country's so-called "schedule of commitments". Here, the term "binding" means that the country legally promises not to introduce new measures that would reduce significantly the scope of market access and national treatment already guaranteed to foreign service providers. When preparing their schedules of commitments, African countries should make maximum use of the flexibility accorded to developing countries under the GATS, including a clause (Article XIX) allowing them to liberalize at a rate consistent with their level of development.

Recommendation #5: Establishment of a Regulatory Body

To be able to manage telecommunications reforms, including the introduction of competition and liberalization under the GATS, African countries should strengthen or create an appropriate regulatory framework, including the establishment of an impartial Regulatory Body, consistent with each country's policies, and constitutional and administrative systems.

Recommendation #6: Information Infrastructure

In view of the potential of information technology in enhancing the capabilities of governments for implementing economic and social objectives, policy-makers in African countries should guide information technology development by formulating information infrastructure development policies and strategies.

Recommendation #7: The Role of the CAPAS Project

The CAPAS project should:

- expand the activities of the project to other African countries not currently involved in the project;
- involve sub-regional and regional organization in the activities of the project as a means to strengthen their ability to promote a process of regional integration that is supportive of the gains that can be accrued from liberalizing under GATS;
- increase support to the national coordinators of the CAPAS project for more intensive dissemination of the findings of policy studies, conducted under the project, to a national audience and for better coordination between the Trade Ministries and other line Ministries that are affected by the GATS negotiations -- including Telecommunications Ministries.

Recommendation #8: The Role of ITU

ITU should:

- expand its technical assistance work on GATS matters, including on the ongoing negotiations on basic telecommunications. This could be done by more extensive dissemination of information regarding those negotiations to Member Administrations and through regional and national seminars and workshops for telecom policy-makers and executives;
- pay greater attention to the special needs of African countries in the area of regulatory reform and strengthening of the regulatory environment for telecommunications, including the establishment of regulatory bodies.

Additional recommendations are included in the five country annexes. These recommendations are specific to the countries surveyed.

The following recommendation has been added by ITU/BDT.

Recommendation: Strengthening of Coordination of National Ministries

One of the main findings of the country field studies has been a recognition of the lack of coordination between and among the various national ministries. In many cases, the Ministries of Trade or Commerce and the Telecommunications Ministries have little or no dealing with each other. As a result, some countries may have over or under committed themselves in the GATS negotiations. It is therefore strongly recommended that governments better coordinate their internal mechanisms so that they may make more realistic assessments of what they can and cannot achieve under the GATS process.

1. INTRODUCTION

Telecommunications services have become a critical, facilitating input to conducting business in an increasingly globalized economy. They are also becoming a major tool for government and other organizations to deliver social and other services effectively. The ability of African businessmen and businesswomen to compete in the marketplace, as well as the ability of African governments to deliver services effectively, will increasingly hinge on the ability of African policy-makers to kick-start a process of rapid development in their countries' telecommunications sector. Given a low level of development in the telecommunication sector of most African countries and given a scarcity of resources (financial, technological, and human), the challenges are enormous.

On 1 January 1995, the World Trade Organization and the various Trade Agreements negotiated under the Uruguay Round entered into force – including the General Agreement on Trade in Services or GATS. GATS presents African policy-makers with both challenges and opportunities.

This study, a joint effort of the ITU/BDT and the CAPAS project of UNCTAD and UN-DDSMS, examines those challenges and opportunities from the point of view of African policy-makers. The report is intended for two audiences – trade negotiators and telecommunication policy-makers - both of whom are involved in GATS matters. This explains why some sections of the report may cover ground already known by some while not by others.

1.1 Background

The Coordinated African Programme of Assistance on Services (CAPAS) is a programme of technical assistance to ten African countries focusing on services, including telecommunications. Its main objective is to assist policy-makers in those countries to develop an analytical and decision-making capacity in areas of domestic service sector policy, regional integration in services and multilateral GATS negotiations on trade in services. The countries participating in the programme (referred to in this report as CAPAS countries) are Benin, Burundi, Ghana, Guinea, Kenya, Nigeria, Senegal, Tanzania, Uganda and Zimbabwe.

For ITU/BDT, the study is in accordance with Resolution No.1 (ITU Strategic Plan, 1995-1999) of Kyoto Plenipotentiary Conference (1994) which established the "full implementation of the Buenos Aires Plan, with special focus on the needs of LCD's" as a priority for the ITU Development Sector. The study has been carried out as part of the Policies, Strategies and Financing Programme of the Buenos Aires Action Plan. This programme provides assistance to ITU Members in formulating policies and strategies for developing telecommunications.

1.2 Objectives of the study

CAPAS and other African countries are taking actions to improve the efficiency of their telecommunications sector in order to achieve development and other objectives. The purpose of this study is to identify ways in which telecommunication development and regional integration objectives of African countries can be enhanced through multilateral liberalization under the General Agreement on Trade in Services (GATS).

This study is based, in part, on a review of the recent experiences of the ten CAPAS countries. In particular the study:

- offers a detailed review of the recent efforts of Ghana, Guinea, Senegal, Tanzania, and Uganda in developing a modern telecommunication infrastructure through a policy reform which emphasizes competition and includes liberalization commitments under the GATS;
- formulates proposals for further domestic reform or suggests additional inputs to ongoing reforms in the CAPAS countries, wherever relevant,;
- using the lessons from the CAPAS countries, identifies ways for intensifying domestic reform in all African countries through the preparation of market access requests and offers under the GATS.

1.3 Methodology

A methodology for conducting the study was prepared and endorsed by a meeting of the CAPAS countries held in Harare in March 1995. The methodology identified the issues to be addressed during the study as well as the manner in which the study would be carried out. Those issues are covered in this report.

The report draws from the detailed case studies in the five CAPAS countries mentioned above and presented in annexes to this report. These field studies were carried out in close collaboration with the Inter-institutional Working Groups (IWG's) established in each country at the inception of the CAPAS programme, in 1992. The IWG's are advisory bodies comprising representatives from the trade ministry, from line ministries or agencies of the Government dealing with service sectors (e.g. telecommunications, finance, or transport), from service parastatals, and from the private sector. Their mission has been to advise trade negotiators from their countries on issues relating to the General Agreement on Trade in Services (GATS) and to consider issues of national policy-making in the area of services.

1.4 Structure of the Report

The report consists of seven main chapters, following this introduction. Additional reference materials, as well as the five country studies are annexed to it.

- **Chapter 2 - Telecommunication Development Concerns,** outlines the existing state of telecommunication services in Africa and the constraints that affect telecommunication development, including trade in telecommunication services. This chapter is based mainly on a review of the existing situation in the CAPAS countries.
- **Chapter 3 - Competition and Telecommunication Development** looks at the service segments in which competition has been allowed or is planned in the CAPAS countries, as well as costs and benefits of competition.
- **Chapter 4 - General Agreement on Trade in Services (GATS) Provisions Affecting Telecommunications** outlines some of the important liberalization concepts, principles and disciplines of the GATS and their impact with respect to telecommunications.
- **Chapter 5 - Liberalization under the GATS and Telecommunications Development** discusses the costs and benefits of multilateral liberalization. Proposals are made for market access offers/requests on telecommunications for African countries.
- **Chapter 6 - Other Reforms for Telecommunications Development** addresses other issues significant for improving the efficiency of telecommunication and to promote the achievement of telecommunication sector development objectives in Africa. In most cases,

these areas of reform do not stand apart from multilateral liberalization, but rather support it.

- **Chapter 7 - Other findings and Lessons from the Field Study** examines the additional issues encountered during the study.
- **Chapter 8- Conclusions,** highlights the main findings of this study, including the need for coordination among all entities (national, regional, and international) and the importance of understanding the various process of the GATS to optimize benefits without compromising national objectives.

2. TELECOMMUNICATION DEVELOPMENT CONCERNS

2.1 The Expanding Role of Telecommunications

The telecommunications industry is changing dramatically. On the supply side, the micro-electronic revolution and the digitalization of telecommunication equipment have accelerated the merging of telecommunications and informatics and dramatically reduced the cost of transporting and processing information. A major consequence has been the expansion of new services with implications for moving away from simple telephony to multimedia services merging voice, data and image. Another major consequence is the growing number of technology choices for meeting communication needs, such as, mobile systems, fiber optic, and satellite. By providing so many alternatives, this technology revolution has eroded the merits of exclusivity for maintaining one, sole telecommunication service provider in a given country.

This technological revolution has been further reinforced by the globalization of the world economy and the increasing mobility of capital, with the following consequences for the telecommunications sector:

- a globalization of ownership and management of the telecommunications industry through a rising number of transborder joint-ventures, mergers and acquisitions, management contracts, etc.;
- a globalization of the provision of services through transborder delivery of services;
- a globalization of the needs of business users of telecommunication services, as reflected in the rise of multinational private networks and the desire by multinational corporations to negotiate with one operating company for all their needs throughout the world.

On the demand side, telecommunication services have become a strategic component to the conduct of business by firms everywhere. They are also emerging as playing an indispensable role in the delivery of a broad range of community and social services.

Until recently, African government viewed telecommunications either as essential for maintaining national sovereignty and security, or as a "luxury" service for a class of well-to-do consumers, or both. But views are changing in light of the aforementioned transformations. African policy-makers are now recognizing the strategic role of telecommunications as an economic sector that African businesses and consumers need to become significant players in the world economy.

2.2 Current State of Telecommunication Services

The fact that telecommunications has become a virtual sine qua-non to doing business in a regional and international context was well recognized by participants at the ITU African Regional Telecommunication Development Conference in Harare in 1990, and at the CAPAS meetings held in Nairobi in May 1994, and in Harare in March 1995. Yet Africa, lags far behind other regions in the development of telecommunications, in general, and in the deployment of new and enhanced telecommunication services essential for conducting business. By the end of 1994, there were only 0.46 main telephone lines per 100 inhabitants in Sub-Saharan Africa. This was 15% of world average and only 3% of the average for developed countries. The average for the five CAPAS countries in which the study was conducted was 0.45 telephone lines per 100 inhabitants at the end of 1994.

The majority of the population lives in rural areas and has no easy access to a telephone (an average of 74 % of the population for the CAPAS countries). The network is predominantly analog in many

countries and hence not ideal for data services and value-added services which require high speed transmission and high quality made possible by digital networks. Where rural service is available, some of the switches are manual. The quality of service is low. Telephone fault clearance time on average takes more than two days, and each telephone has at least one fault per year. As a result of congestion, the call completion rate is low at an average of 25 to 30% which results in reduced revenues for the public telecommunication operators.

Several constraints account for this poor state of telecommunication services in CAPAS countries and Africa, as a whole. They are briefly outlined below.

2.3 Constraints on Telecommunication Development

2.3.1 Financial Capital

The field studies conducted in the five CAPAS countries suggest that lack of adequate financing is the greatest obstacle to telecommunications development in African countries. Yet Africa has to make unprecedented investments in telecommunications infrastructure development to achieve modest results. Some US$ 8 billion will be required between now and the turn of the century for the region to attain an average of one telephone line per 100 inhabitants. It is estimated that approximately US$ 5 billion will be available from self-financing, leaving an investment gap of around US$ 3 billion.[1] The greatest challenge is to bridge this gap.

The shortage of finance has meant gross under-investment in telecommunications, in the face of increasing demand. The unsatisfactory state of the network reduces the internally generated funds available for re-investment. Multilateral financing takes long to arrange - a minimum of three years from the preparation of a project. Also, disbursement procedures are complex and conditions stringent. Bilateral loans increase the cost per line because they are usually tied to the purchase of equipment and services from the donor-country. Terms for suppliers credit are even more onerous, due to higher interest and shorter repayment periods than for multilateral and bilateral loans.

All of these problems are aggravated by the high cost of installing telephone lines in developing countries compared to the developed countries. The average cost per line in developing countries is four times more expensive than the cost per line in developed countries. These issues are particularly relevant in Africa for:

- economies of scale: most African countries, including most CAPAS countries (except Nigeria) are small and telephone operators cannot benefit from economies of scale which developed countries are using to decrease the cost of purchasing equipment.

- Governments from a large number of African countries derive a significant share of fiscal resources from customs duties and other taxes. The rates applied on imported telecommunications equipment are usually very high.

The high cost of investment has an adverse effect on tariffs which compromises affordability of telecommunications and decreases the competitiveness of the business users. Because telecommunications is a key factor for doing business in service sectors, the quality and tariff of telecommunications are important criteria for foreign investors when choosing a country in which to establish commercial operations.

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[1] Source: ITU

2.3.2 Human Resources

In general, shortage of skilled personnel, lack of management expertise and experience, and low productivity, characterize the human resources in the telecommunication sector in CAPAS countries and Sub-Saharan Africa. These deficiencies are compounded by low motivation resulting from inadequate remuneration.

2.3.3 Technology

Almost all telecommunications equipment in CAPAS and other African countries is purchased from outside the region. This not only increases the cost, but requires hard currency often in short supply in these countries. However, the lack of technology is not a critical constraint with regard to the acquisition of equipment. If sufficient funds can be raised, technology can easily be bought. Having to import equipment, poses a problem with regard to the availability and cost of spares which increases maintenance difficulties. Some suppliers price their equipment relatively low, but spares relatively high. Also as technology is constantly advancing, developing countries find themselves stuck with equipment for which spares are no longer available.

2.3.4 Organization and Management of the Telecommunication Sector

In the majority of African countries postal and telecommunication services are managed together. Policy, regulatory and operational functions are not clearly delineated. While the sector ministry is responsible for overall supervision and policy, the national public telecommunication operator (PTO) also exercises considerable influence over policy. Furthermore, where a separate Regulatory Body has not been established, the Public Telecommunication Operator exercises regulatory functions, such as, adjucating on type-approval of terminal equipment, deciding on interconnection terms where the sector has been partially opened to competition, and evaluating licensing proposals.

2.4 Telecommunication Development Objectives

To date, only a handful of CAPAS and other African countries have adopted policy statements for the development of the telecommunications sector. Nevertheless, a number of development objectives, common to these countries, are discernible from the field studies and others sources. These objectives are:

2.4.1 Universal Service

It has long been the objective of almost all countries to make telecommunication services available to all their inhabitants. With penetration rates of less than 0.5 telephone lines per 100 inhabitants, CAPAS and other African countries are reassessing this goal. The objective now is service availability which is mainly providing telecommunication services to business customers, to residential customers whenever economically feasible, and to as many communities as possible through public call offices (also referred to as community phones or telecentres).

2.4.2 Rural Development

As mentioned in Section 2.2, the extension of telecommunication services to rural areas is an important objective of governments in African countries. The majority of the African population lives in rural areas. Few rural communities have access to telephone services. The availability of telecommunications service would greatly facilitate the efforts of governments in delivering services to these areas, including education and health-care.

2.4.3 Modernization and Quality of Service

In almost all CAPAS and other African countries, the quality of telecommunication services is low, as revealed by the field studies and other studies on services. This unsatisfactory state of affairs is attributable to antiquated equipment and congestion due to lack of adequate transmission capacity and obsolete technology. These problems are compounded by poor equipment maintenance due to shortage of financing for the purchase of spares, lack of skilled technical personnel, and weak supervision. Network-modernization is a key objective for solving the technical aspect of this problem.

2.4.4 Maintaining Affordability

The majority of consumers in Africa cannot make use of telecommunication services if prices are high. Governments are as much concerned with making services available as ensuring that it remains affordable. This is an important aspect of universal service.

2.4.5 Restructuring of the Telecommunication sector

Some African countries have embarked on a process of restructuring of the telecommunications sector while others are observing. One of the main reason for reforming the sector is to improve the overall efficiency of the sector.

In Africa, as in most developing countries and, even in some developed ones, basic telecommunication services are operated by a national telecommunication operator on a monopoly basis. The provision of services by such an operator, or dominant national operator, is likely to continue for some time. The public operator in CAPAS and other African countries is usually either a Government Department or an autonomous entity operating as a civil organization. The first objective of many African governments is to have the national basic service provider operate on a commercial basis.

2.4.6 Tariff Re-balancing

Up to now, in the pursuit of universal service objectives, tariffs for domestic telecommunications services have been kept far below the relative cost in most African countries. On the other hand, tariffs for international services and leased circuits, both necessary for business operations, have been inflated in order to subsidize domestic services. There is a concern on the part of governments of African countries about undertaking a degree of tariff re-balancing without jeopardizing other objectives.

2.4.7 Development of New Services

In addition to efficient basic telecommunication services, business customers in CAPAS and other African countries need new services to conduct business operations efficiently. CAPAS countries are concerned with increasing the availability of such new services as data transmission, mobile cellular and other radio services, as well as value-added (or enhanced) services.

2.4.8 Human Resources Development

While the human resources gap can be bridged through the acquisition of foreign expertise, CAPAS and other African countries are concerned about developing self-sufficiency in this area.

2.4.9 Development of Information Technology

The majority of CAPAS and other African countries have not specifically adopted information technology as a development objective even though they recognize it as an important issue for the future.

2.5 Balancing Needs

Due to resource limitations, including a shortage of finance and manpower, all of the aforementioned objectives cannot be fully met immediately or in the near-future. Even if there were no limitations on resources, time is required to implement programmes for achieving these objectives. Additionally, countries need to strike a balance among commercial, social and fiscal requirements when formulating and implementing policies to meet development objectives for the telecommunications sector. This has to be done through a prioritization process. For example, governments now recognize the need for giving priority to commercial customers, without ignoring social objectives.

2.6 Reform Initiatives

The previous sections have presented a snapshot of the status of telecommunications development in Africa. It is now widely accepted that telecommunications is a tool for achieving overall economic, social and cultural development. Some of the main constraints facing African countries were explored and development objectives were outlined.

The following chapters examine the ways in which competition policies and liberalization, unilateral or multilateral, (via the GATS), may be utilized to alleviate constraints on development and meet telecommunications development objectives.

3. COMPETITION AND TELECOMMUNICATION DEVELOPMENT

3.1 Definition

In this Chapter and the rest of the report, competition refers to a situation in which the provision of a service is open to more than one service provider - national or foreign - by virtue of domestic policy. Multilateral liberalization, as used in this report, refers to the commitment of a country that is a Party to the GATS to legally bind its market access for and national treatment of service providers from another Party at a level from which it will not regress. Multilateral liberalization usually assumes the binding of some order of existing domestic competition policies. As well, this Chapter addresses the benefits and costs of competition, and the extent of competition in telecommunications services, as preludes to a discussion of multilateral liberalization in Chapters 4 and 5.

The description that follows draws directly from examples of the CAPAS countries.

3.2 From Monopoly to Competition

Many service sectors in CAPAS countries have been opened to competition for a relatively long time. They include tourism, banking, construction and professional services. On the other hand, telecommunication services have enjoyed a natural monopoly, in part due to the high costs of building the necessary infrastructure and in part because of government policy. Universal Service objectives (providing services to as many people as possible at affordable prices), security considerations and government ownership of national telecommunication operators, have been the basis of legal protection of the monopoly. In recent years, however, changes in demand and advances in technology, leading to lower costs for equipment and the feasibility of building independent telecommunication networks in parts of national territory, have eroded the basis for natural monopoly.

The internationalization of business and trade and the need to prepare for plugging into proposed global information highways, have added new dimensions to government objectives for telecommunication development. In addition to the provision of a utility service, governments now aim at upgrading and modernizing telecommunications in order to provide the infrastructure and the advanced services necessary for conducting business and ensuring competitive advantage in regional and international markets. In the face of having to meet these new objectives, CAPAS countries are increasingly accepting the role of the private sector and of competition in meeting present-day and future needs.

3.3 The Costs and Benefits of Competition

3.3.1 Benefits

The potential benefits of competition in promoting development in most sectors of economic development are now well accepted in most African countries. The benefits include:

- promoting the most efficient use of resources, such as capital and manpower;
- promoting innovation, productivity, diversity and quality of products. This is an important consideration for the telecommunication industry where changes occur rapidly because of advances in technology;
- competition may promote better service and lower prices resulting from efficient use of resources and innovation;

- involving the private sector in telecommunication development;
- opportunities offered by competition may create new employment. In Senegal, for example, private telecentres have added more than 3,000 jobs since the service opened to competition.

In a nutshell, competition may promote the virtuous cycle of price-cutting, productivity-increase, and innovation whose benefits will accrue to the whole economy. The experience with competition in the five CAPAS countries studied does point to some of those gains.

3.3.2 Costs

There are also costs to opening services, like telecommunications, to competition. These costs may include:

- possible increased difficulties in meeting universal service objectives. As basic telecommunication networks are opened to competition, there may be a tendency for new operators to go for the most profitable segments of the market, thereby reducing the revenues of the incumbent national operator (Public telephone operator or PTO). The ability of the PTO to provide universal service at affordable prices may thus be impaired.

- possible employment loss. The productivity gains fostered by competition may result in a reduction of employment in the telecommunications sector, at least initially.

- a possible loss of fiscal resources. The reduction in tariffs associated with competition may lead to a reduction of fiscal resources for Government. However, this will be partly a function of the size of tariff reduction and the rate of increase in demand for telecommunications services by users.

- the loss of economies of agglomeration. Telecommunications competition creates a problem of connectivity. If there is no adequate regulatory framework to ensure interconnection of competing services, customers may lose many of the benefits that should accrue from the existence of the new services. Instead, they may incur additional costs from needing to subscribe to different services.

- a possible lack of reinvestment. The new private investors, - be they domestic or foreign - may fail to reinvest their profits into the expansion of their network, draining the sector of possible new sources of investment.

3.4 The Slow Pace of Competition in Telecommunication Services

CAPAS countries are experiencing varying degrees of competition as shown in Figure 1.

Table 1 : Competition in telecommunication in the CAPAS countries

		Telephone Services			Other Services			
Country	Terminal Equipment	Payphones	Nat'l	Int'l	Mobile	Data	Value added	Paging
Benin	P	N	N	N	N	N	N	N
Burundi	P	N	N	N	N	N	P	N
Ghana	Y	P	PF	PF	P	P	Y	Y
Guinea	Y	Y	N	N	P	N	N	N
Kenya	Y	N	N	N	N	P	N	P
Nigeria	Y	Y	P	P	P	P	N	Y
Senegal	Y	Y	N	N	PF	N	Y	P
Tanzania	Y	P	N	N	P	P	P	P
Uganda	Y	P	PF	PF	P	P	P	P
Zimbabwe	P	N	N	N	N	N	PF	N

Note:
Y = Competition allowed
P = Partial competition allowed
N = Competition not allowed
PF = Competition intended in future
Source: Field study and ITU.

Apart from promoting the virtuous cycle of efficiency innovation-price-cutting, the introduction of competition in the telecommunication sector, in CAPAS countries, would provide local finance. Also, compared to privatization, competition is a less controversial approach to involve the private sector. Table 1 indicates that the experience of CAPAS countries in introducing competition in their telecommunication sector, to date, remains limited. The fear of the costs of competition referred to in the preceding paragraph may account for this situation. In addition, there is the necessity of reconciling the desire to modernize services with the goal of universal service, in terms of providing access to telecommunication services to as many people as possible, including those in rural areas and other unserved or underserved areas.

3.5 Services Opened to Competition

In addition to attracting private capital and expertise, competition promotes innovation, efficiency and low prices. As there are also costs and limitations to competition, particularly for under-developed networks such as those found in CAPAS countries, competition is being introduced gradually. This section looks at the service segments in which competition has been allowed or is planned in CAPAS countries.

3.5.1 Terminal Equipment

Terminal equipment is equipment installed at the user's premises. They include telephone hand-sets, fax machines, answering machines, private switching systems, etc. Most CAPAS countries have opened to competition the distribution, installation and maintenance of terminal equipment. In

order to safeguard the integrity of the public network, some regulatory requirements have been maintained. For example, in most CAPAS countries, type approval of terminal equipment remains necessary. In addition, in countries such as Tanzania, Benin, Guinea, and Senegal, licenses are required for installation and maintenance services.

3.5.2 Mobile Cellular Services

A number of CAPAS countries have opened mobile cellular services to competition. One or several private operators have been licensed. In Ghana and Guinea, two private companies are operating mobile cellular services. In Tanzania, the country has been divided into four geographic areas for the purpose of issuing mobile cellular services licenses. Two licenses have been issued for the Dar-Es-Salaam and Coastal area. The Tanzanian Communication Commission (TCC) has invited and received bids for licenses for the other areas. Two licenses are to be issued for each area, essentially creating a duopoly for each area. However, one operator can be licensed to operate in more than one area.

Some other countries have not yet opened mobile cellular services to competition. In Senegal, SONATEL (the Public Telecommunication Operator) is operating mobile cellular services. In Kenya, the Kenya Posts and Telecommunication Corporation (the Public Telecommunication Operator) operates mobile cellular services while in Zimbabwe the intention of the Posts and Telecommunication Corporation to operate a cellular mobile service on monopoly basis has been challenged in court by a potential competitor.

3.5.3 Data transmission services

Data transmission services permit transmission of data at low speed using the telephone network and at high speed using specialized networks. These services are very important for business users. The operation of public data services has been opened to competition in Ghana, Nigeria and Uganda.

3.5.4 Paging

Paging is a relatively inexpensive telecommunication service that allows a user to receive an alpha-numeric message on a small hand-held terminal. This service has been opened to competition in Ghana, Nigeria, Kenya, Senegal and Uganda.

3.5.5 Value added services

Value-added-services are those services that use a basic telecommunication network as a carrier for sending and exchanging information, by adding other facilities to satisfy new telecommunication needs. They include electronic mail, voice mail, on-line information and data retrieval, electronic data interchange and on-line data processing. These services have been opened to competition in most CAPAS countries. Electronic Mail (E-mail) is becoming one of the most popular services, although still being used primarily to serve a small number of persons, for research as well as business purposes. In Senegal, voice-mail services and electronic-mail services are provided by the private sector and those services are accessible through private subscription or through public booths for occasional use.

3.5.6 Payphones

Some CAPAS countries have introduced competition in payphones as a way of improving access to telephone service in urban and rural areas. Competition now exists in Ghana, Guinea, Nigeria,

Senegal and Uganda. Tanzania's TCC has delegated the licensing of payphones to the PTO. After the successful operation of a pilot payphone project by a private operator in Dar-Es-Salaam, the PTO has invited bids for further payphone projects. In Senegal, 1500 telecentres bureaus are operated by the private sector creating more than 3000 jobs, which is 1.5 times more than the personnel employed by SONATEL (the Public Telecommunication Operator).

3.5.7 Limited Competition in Fixed Network

As part of its strategy to involve the private sector in the development of the telecommunications sector, Ghana plans to allow limited competition in the fixed network. Initially, there will be a duopoly - the incumbent Public Telecommunication Operator and a second national telecommunication operator. Both operators will provide the same services and have the same rights and obligations. As in Ghana, Uganda is considering the possibility of a second network operator.

3.6 Allowing competition

Despite technological advances, a degree of economies of scale is still relevant in building sufficient infrastructure to cover a whole country, particularly in large countries. These concerns must be weighed against the critical contribution of telecommunications to the overall national development and the role that could be played by competition. Because of the small customer base in most CAPAS countries, economies of scale may not permit the licensing of more than one nation-wide operator of core-networks (facilities for the provision of fixed telephone and other basic telecommunication services such as leased circuits, telex, fax and data). Nevertheless, there is scope for increasing the level of opening of services to competition, for example non-core services such as data, mobile telephone services, value-added services and resale. Resale refers to services for which a supplier leases telecommunication lines from the network operator to provide various services to the public. These could include international telephone services and payphones.

3.7 Competition and Universal Service

Private operators are driven primarily by the profit motive. Policy-makers are concerned that private entrepreneurs would tend to invest only in the highly profitable segments of the telecommunication network and services (cream-skimming). They would reap the benefits of the existing infrastructure financed with public funds. This position is re-enforced by the existing national telecommunication operators which, naturally, would want to preserve their monopoly, at least in basic services.

The concern over "cream-skimming" can be taken care of, in part, through the stipulation of service obligations in licenses of telephone network providers including cellular mobile service operators. For the latter, public service obligations might involve the provision of payphones and the extension of the mobile service to underserved or unserved areas provided that the operator makes a reasonable profit over time. The same principle might apply where competition in fixed services is permitted. Alternatively, a telecommunication service fund might be established for all service providers to contribute towards subsidizing the provision of uneconomic services. In advanced countries, for instance Australia and the USA, such Universal Service Funds exist. In the United Kingdom, the Regulatory Body, OFTEL, has introduced an access deficit contribution. This contribution is payable by basic service providers to other basic providers who incur losses because of their universal service obligations. The mechanism may be complex but the principle is sound.

Direct subsidies by governments is yet another scenario for meeting the costs of uneconomic services provided in pursuance of universal service considerations. In the Least Developed Countries (LDCs) which include half of CAPAS countries, this does not seem to be a very practical

option. Governments are already hard-pressed to find funds for very basic social services such as education and health-care and the telecommunication sector can support itself up to a reasonable extent.

As indicated earlier, there is a need for policy-makers to review the objective of universal service. Emphasis would have to be shifted from providing service to everyone or even the majority of people to meeting demands for business customers, administrative needs, and access to telephone services to as many people as possible through payphones and community phones in a way that allows operators to realize reasonable profit margins. That would translate into choosing operators who are prepared to take a long-term commitments in their investments. Telecommunications, being a fairly stable industry for investment, should not be difficult to attract such investors if there is an environment that is conducive to private investment.

4. THE GENERAL AGREEMENT ON TRADE IN SERVICES (GATS) PROVISIONS AFFECTING TELECOMMUNICATIONS

4.1 The World Trade Organization (WTO)

4.1.1 Historical evolution

To avoid a repeat of the economic problems of the era between the two world wars, the Bretton Woods conference held in July 1944 proposed the establishment of the three following multilateral institutions: an International Monetary Fund (IMF), a World Bank (bearing the official name of the "International Bank for Reconstruction and Development"), and an International Trade Organization (ITO). The IMF and the World Bank were duly established, but because of opposition by certain countries the proposed International Trade Organization was not.

To move forward multilateral liberalization of world trade in order to avoid excessive accumulation of protectionist measures, the governments of twenty-three countries entered into negotiations in 1946. Those negotiations concluded with the General Agreement on Tariffs and Trade (GATT, 1947). Several rounds of negotiations on tariff reductions were then undertaken in 1949 (Annecy), in 1951 (Torquay), in 1956 (Geneva), 1960-1961 (the Dillon Round), in 1964-1967 (the Kennedy Round) and in 1973-1979 (the Tokyo Round).

In September 1986, Ministers of Trade of GATT member countries launched the Uruguay Round of multilateral negotiations on trade in goods and services. This was the first time services were covered by multilateral negotiations. Those negotiations were concluded in 1994 by the signing of the Final Act in Marrakesh. The so-called Final Act (or Marrakesh Agreement) includes some twenty plus agreements including, the establishment the World Trade Organizations (WTO) and the General Agreement on Trade in Services (GATS).

4.1.2 Role of the WTO

The Agreement which established WTO entered into force in January 1995. According to this Agreement, WTO has five main functions:

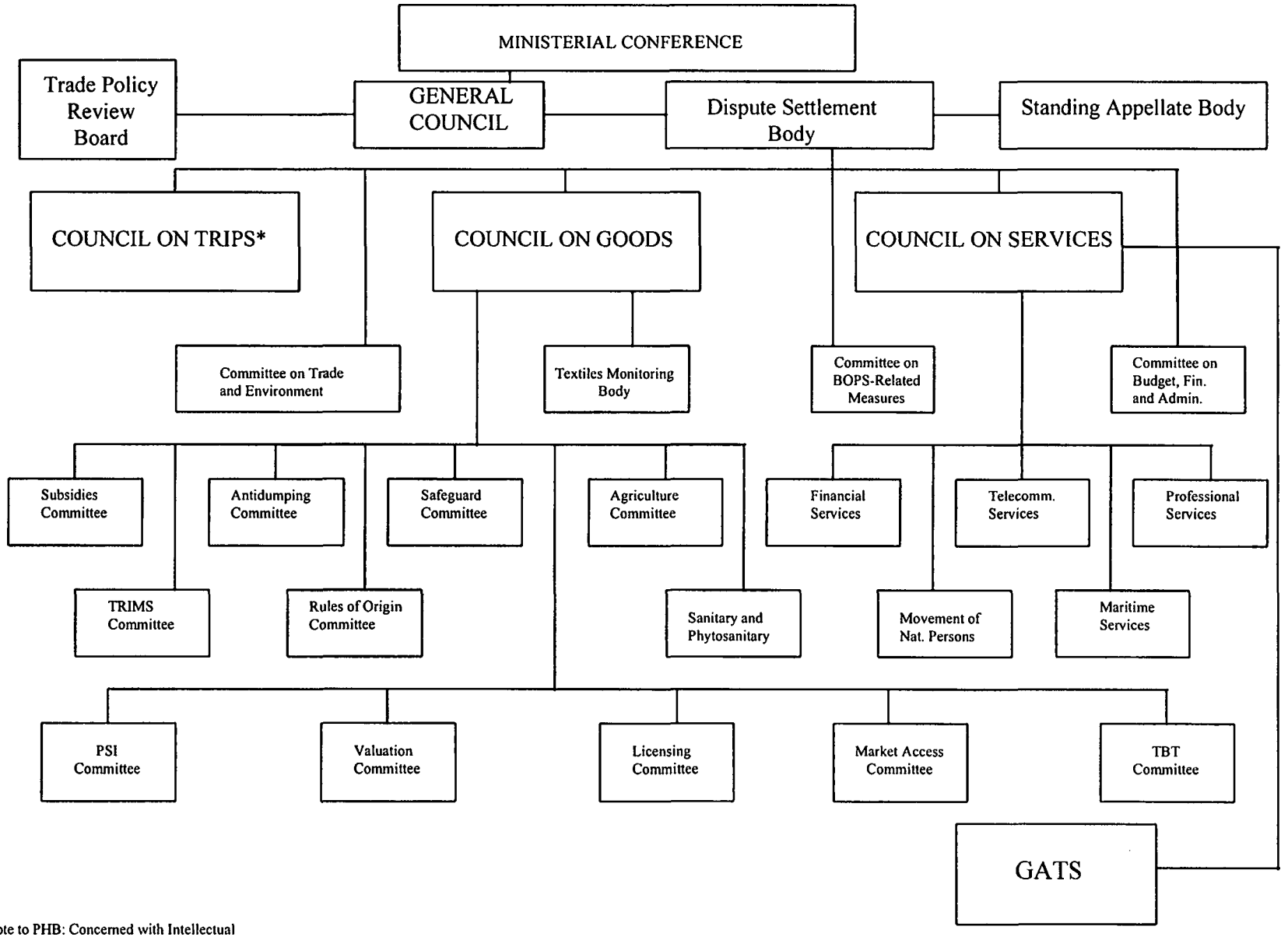
- to facilitate the implementation of the Final Act of the Uruguay Round, to perform the administrative functions required, and generally to further the objectives of the Agreements;
- to provide a forum for negotiations concerning the trade relations of the member countries;
- to administer the Dispute Settlement Understanding;
- to administer the Trade Policy Review Mechanism, which periodically assesses the trade policy of all member countries; and
- to cooperate, as appropriate, with the International Monetary Fund (IMF), the World Bank and its affiliates.

4.1.3 Organizational structure of the WTO

The organizational structure of the WTO is shown in Figure 1. The most important bodies from the telecommunications perspective are:

- the Ministerial Conference, to be convened at least once every two years, is the governing body of the WTO;
- the General Council which, in the intervals between meetings of Ministerial Conference, oversees the operation of the WTO agreements;
- the Council on Services, with its subsidiary committees is responsible for the administration of the GATS; and
- the Committee on Telecommunications (not yet established) will report to the Council of Services on telecommunications matters.

Figure 2. Organizational Structure of the WTO



* Note to PHB: Concerned with Intellectual

Source: WTO, Geneva

4.2 The General Agreement on Trade in Services (GATS)

The GATS lays down concepts, principles and rules for the liberalization of international transactions in services, including telecommunications. For the purpose of GATS, "**services**" include any service provided by any service sector except services supplied in the exercise of governmental authority. This exception is related to any service which is not supplied on either a commercial basis or in competition with one or more service suppliers. Telecommunications is treated by GATS as a service sector, and like any other sector, is subject to general obligations and disciplines and subject to possible liberalization commitments. On the occasion of the conclusion of the Uruguay Round in Marrakesh, the Trade Ministers also decided to, exceptionally, prolong negotiations for selected service sectors beyond the official deadlines. This is the case of basic telecommunications services and the Final Act includes a special Annex on Negotiations on Basic Telecommunications that sets out the framework for continuation of the negotiations in that sector after 1 January 1995. (See Annex C.2)

Telecommunications is also recognized in the Agreement as being a major "transport means" for information needed by all service providers, irrespective of sectors, in the conduct of business. As a result, there is another Annex to the GATS, the Annex on Telecommunication, that sets out a number of rules and disciplines to insure non-discrimination of foreign service providers from a GATS member country with respect to their connection (access) to and use of telecommunication services available in each GATS member country. (See Annex C.1)

The GATS is structured into a preamble, the main framework consisting of six parts and Annexes. This Chapter describes the principal features of the GATS, highlighting the implications for telecommunications development in CAPAS countries.

4.3 General Obligations under the GATS

General obligations and associated principles, rules and disciplines apply when a Party to the GATS (i.e. a member of the World Trade Organization) lists any service in its schedule of commitments.

4.3.1 Scope and Definitions (GATS Article I)

The Agreement applies to measures (laws, rules, regulations and procedures) by a Party's central, regional or local government affecting trade in services. They include, "measures in respect of the access to and use of, in connection with the supply of a service, services which are required by those Parties to be offered to the public generally".

The effect of this Article for telecommunications is to cover every form of regulation or requirement in a Party affecting telecommunication services offered to the public whether state or privately owned.

Telecommunications services for security and defense purposes are considered as services supplied in the exercise of governmental authority. Those services are not covered by the GATS.

4.3.2 Mode of Supply (GATS Article I)

The agreement defines trade in services in terms of four modes of supply namely:

- **Cross-Border Supply**: Service delivered within the territory of a Party from the territory of another Party. Although many services are now electronically transportable, many countries both developed and developing did not commit themselves in their schedules, to the provision of services across their borders via telecommunication or mail. Commercial presence in the form of investment and joint ventures is the preferred mode. With the increasing role of cross-border trade, negotiations are likely to continue in future rounds on removal of barriers to this mode of supply.

- **Consumption Abroad**: Service delivered outside the territory of Party (A), in the territory of another Party (B), to a service consumer of Party A. Examples in telecommunications include home country direct or roaming services.

- **Commercial Presence**: Service delivered within the territory of a Party through the commercial presence of the foreign supplier (e.g., through the incorporation of a company, the establishment of a branch office, a joint venture, and so forth).

- **Presence of a natural person**: Service delivered within the territory of a Party, with the foreign supplier present as a natural person.

All modes of supply may be relevant to the achievement of telecommunications development objectives in African countries. Services provided through cross-border supply increase service availability in situations of lack or shortage of services provided locally, for example data services. Provision of telecommunication services through the "consumption abroad" mode, promotes tourism, a service for which CAPAS countries usually have a comparative advantage or may encourage exploratory visits by prospective investors. Commercial presence and presence of natural persons promote telecommunication development, helping to alleviate the constraints of finance and human resources, subject to appropriate limitations to safeguard national interests.

4.3.3 Most-Favored-Nation (MFN) Treatment (GATS Article II)

The Most-Favored-Nation (MFN) Treatment (GATS Article II) requires a Party to accord immediately and unconditionally to services and service suppliers of any other Party, treatment no less favorable than that it accords to like services and service suppliers of any other countries. This obligation is subject to an exemption for measures a Party has listed under Article II (Exemption). This implies that once the GATS entered into force any measures that do discriminate across different foreign suppliers would violate the agreement, unless a temporary exemption has been made for non-conforming measure. An implication of the adoption of unconditional MFN-treatment, therefore, is that benefits, under some existing preferential arrangements, would become available to non-signatories unless exemption was sought or the preferential agreement is phased out. Also, MFN-treatment implies that Parties are not permitted to impose measures that discriminate across foreign services or service suppliers with regard to the application of measures restricting market access or national treatment. MFN-treatment does not imply a particular level of market access; it merely requires non-discrimination across foreign suppliers regardless of the openness of markets. From the foregoing description, it is evident that MFN-treatment is a core obligation under the GATS.

The Annex on Article II exemptions (MFN-treatment) enables a Party to accord special treatment to a Member or group of Members which will not be available to other GATS Members under the MFN obligation. CAPAS and other African countries should make use of this for purposes of regional integration. The Annex on Article II exemptions specifies the procedures under which such exemptions may be sought. It requires that exemptions be of limited duration (in principle not longer than ten years) and be subject to periodic review. Exemptions are liable to negotiation in subsequent trade liberalization rounds.

4.3.4 Transparency (GATS Article III)

Article III obliges each Party to publish promptly, "at least at the time of entry into force, all relevant laws, regulations, administrative guidelines and other decisions, rules and measures of general application ... which pertain to or affect the operation of this Agreement". Transparency requirements are also elaborated in the Annex on Telecommunications.

Under this provision governments, and by extension Ministries in charge of telecommunications, telecommunications operators and any others providing services offered to the public, are required to publish or make available all policies, regulations and conditions which bear on trade in or access to and use of public telecommunications services. In addition, Parties are required to establish inquiry points within two years as a means to make that information available.
Individual developing countries are given the option to ask for appropriate flexibility regarding this time limit, due to the practical difficulties that they may face in establishing quickly a full inventory of all aspects of the regulatory regimes that affect trade in services.

The requirement to publish measures immediately is simple enough and the costs can be met from appropriately pricing the relevant documents. It can therefore easily be met by CAPAS countries. The obligation on the part of developed countries to set up inquiry points within the two year period will be useful for telecommunications development in developing countries especially with regard to information on telecommunication technology.

4.3.5 Increasing Participation of Developing Countries (GATS Article IV)

"The increasing participation of developing countries in world trade shall be facilitated through negotiated specific commitments by different Members ... relating to: (a) strengthening their domestic services capabilities such as through access to technology on a commercial basis (b) the improvement of their access to distribution channels and information networks; (c) the liberalization of market access in sectors and mode of supply of export interest to them".

Greater access by developing countries to technology and know-how is one objective of this provision and is very important to telecommunications development in CAPAS countries. However, such sharing of knowledge is to be arranged as part of "negotiated specific commitments by different Members." No specific commitments of this nature were negotiated in the Uruguay Round.

4.3.6 Economic Integration (GATS Article V)

The GATS does not prevent any of its Members from being a Party to or entering into an agreement liberalizing trade in services between or among the Parties to such an agreement, provided that such agreement covers a substantial number of service sectors.

This Article excludes regional organizations like Panafrican Telecommunication Union (PATU) and other sub-regional telecommunication organizations, as they cover only one service sector (i.e.

telecommunications) and they can not be considered as regional integration organizations according to the GATS.

Regional organizations such as Economic Community for West African States (ECOWAS), the Southern African Development Community (SADC), the Common Market for Eastern and Southern Africa (COMESA) and the UEMOA (Union Economique et Monétaire Ouest Africain) might be eligible under this article if they comply with the other conditions.

4.3.7 Domestic Regulation (GATS Article VI)

In areas where specific commitments are undertaken, Parties are required to ensure that all measures of general application affecting trade in services are administered in a reasonable, objective and impartial manner.

This article does not require Parties to adopt any particular design of a regulatory system or economic policies for the service industry structure. As long as the requirements of non-discrimination between service suppliers and impartiality are satisfied, Parties are free to implement regulatory policies of their choice. However, disciplines are to be established to ensure that the processing of applications for services for which authorization is required - because of technical standards or licensing requirements - are based on objective and transparent criteria. Few CAPAS and other African countries have such regulations, for the telecommunications sector. Also, the criteria of impartiality cannot be met in countries where the Public Telecommunication Operator has a regulatory role, such as licensing, evaluating licensing proposals or approving equipment for public telecommunication networks. Countries which have made commitments or intend to make commitments on telecommunications under the GATS need to rectify these deficiencies.

4.3.8 Monopolies and Exclusive Service Providers (GATS Article VIII)

A Party must ensure that any monopoly provider of a service in its territory does not, in the supply of the monopoly service in the relevant market, act in a manner inconsistent with that Party's obligations under the Agreement.

The implication of this obligation is that where a Party's monopoly provider competes either directly or through an affiliated company, in the supply of a service outside the scope of its monopoly "...the Party shall ensure that such a provider does not abuse its monopoly position in a manner inconsistent with such commitments". There should be a "level playing field" whereby government-sanctioned monopoly or exclusive providers of telecommunications services do not use their market position to harm interests of service providers participating in activities where competition has been introduced. This harm may come from cross-subsidies from a reserved service to a competitive service. It may also take the form of long delays and limitations on interconnection and overly high access charges.

Public Telecommunication Operators in CAPAS and other countries provide telecommunications services, at least basic services, on a monopoly basis, and regulations do not usually give guidelines on conduct of such operators with regard to subsidies or abuse of monopoly power. In order to meet the obligation under this Article, CAPAS countries need to promulgate relevant regulations to prevent abuse of power by monopolies and exclusive service providers.

4.3.9 Business Practices (GATS Article IX)

Parties recognize that certain business practices may restrain competition and thereby restrict trade in services. Each Party shall, at the request of another Party, enter into consultations with a view to eliminating such practices.

This obligation relates to the kinds of behavior in a national market that could be carried out by private companies, irrespective of their size, to restrain the success of newcomers such as predatory pricing. To meet this obligation, CAPAS and other countries need to pass legislation on competition and restrictive business practices or include in their telecommunication legal framework adequate provisions for addressing such issues.

4.3.10 Subsidies (Article XV)

Parties recognize that subsidies may have distortive effects on trade in services. Parties are required to enter into negotiations with a view to developing the necessary multilateral disciplines to avoid such effects. Negotiations shall take into account the special needs of developing countries.

Cross-subsidies by telecommunication service suppliers are common in CAPAS and other African countries. This refers to not only Public Telecommunication Operators, but to other telecommunication service suppliers as well. In order to meet the requirements of this Article, it is desirable for CAPAS and other African countries to include in their legal telecommunication framework, provisions prohibiting cross-subsidies in segments where competition is allowed. If outright prohibition is unacceptable, then at least there should be requirements for separate accounting by Public Operators and others for different services provided to facilitate monitoring by the Regulatory Authority. Alternatively, these restrictions on subsidies may be stipulated in licenses issued to telecommunication service suppliers.

4.4 Specific Obligations

These relate to market access and national treatment. They apply only to service sectors that are included in the schedules of Parties, subject to whatever conditions or qualifications that are listed that pertain to modes of supply. Other conditions that do not relate to modes of supply may apply even though not listed in commitment schedules. It is important to note that market access and national treatment are sector specific and country specific.

4.4.1 Market Access (Article XVI)

In sectors where market access commitments are undertaken, measures that a Party shall not adopt or maintain unless specified in its schedule are:

- Limitations on the number of service providers whether in the form of numerical quotas, monopolies, exclusive service providers or the requirements of an economic needs test;
- Limitations on the total value of services transactions or assets in the form of numerical quotas or the requirements of an economic needs test;
- Limitation on the total number of service operations or on total quantity of services;
- Limitations on the total number of natural persons that may be employed in a particular service sector;

- Measures which restrict specific types of legal entity or limit participation of foreign capital; and

- Limitations on the participation of foreign capital in term of maximum percentage limit on foreign shareholding or the total value of individual or aggregate foreign investment

In practice, these prohibitions may be taken as goals of "progressive liberalization" rather than conditions to be realized immediately. Thus, a country may schedule a sector in its list of commitments, but maintain some or all of these limitations. However, once the sector has been listed, those limitations become subject to negotiations by other Parties.

The prohibition on the limitation on the number of service suppliers, for example, the number of cellular radio operators, may affect policies of CAPAS and other African countries in this particular area. Owing to the small size of the market for cellular mobile services, and radio frequency limitations, most CAPAS countries which have opened this service to competition are limiting the number of service providers licensed to operate country-wide or in demarcated service areas. For the same reason (i.e., market size), there may be a need to limit the number of service providers for certain services, such as basic telephony. Also, CAPAS countries have general limitations on the number of foreign personnel a foreign service supplier may employ, the minimum amount of capital required, maximum size of equity participation and type of legal entity which can be licensed.

However, certain quantitative restrictions, for instance, limitations on total value of services transactions, number of service operations or total quantity of services and severe qualitative restrictions such as participation of foreign capital, would be counter to telecommunication development objectives of CAPAS and other African countries. Hence, when scheduling commitments or negotiating them, caution needs to be exercised to ensure an appropriate balance between limitations and the realization of development objectives.

4.4.2 National Treatment: (Article XVII)

A Party may accord services or service suppliers of any other Party treatment no less favorable than that accorded to like domestic services and service suppliers subject to the limitations and conditions listed in a national schedule. The treatment accorded to foreign suppliers need not be identical to that given to domestic suppliers. Some countries provide better incentives to foreign investors in order to encourage foreign investment.

Most CAPAS countries do not have significant discriminatory requirements against foreign operators. For the telecommunications service sector, the main regulatory constraint has been limited access by new service providers, whether domestic or foreign. Therefore, market access commitments (under Article XVI) have greater significance for telecommunications than national treatment.

As in the case of market access, when making national treatment commitments, it is suggested that CAPAS and other African countries take into account the desirability of encouraging foreign suppliers where this would promote telecommunication development objectives.

4.5 The Annex on Telecommunications

4.5.1 Access to and Use of Telecommunications

Recognizing the specificities of the telecommunications service sector and, in particular, its dual role as a distinct sector of economic activity and as the underlying transport means for other economic activities, the Annex on Telecommunications addresses the measures affecting access (connection) to and use of public telecommunications transport networks and services.

4.5.2 Obligations under the Access and Use Provision

The Annex gives access to and use of public telecommunications networks (infrastructure and terminal equipment) and services, to foreign service sectors, and service suppliers granted access to a GATS Party's markets (through the schedule of commitments). For example, if a bank or insurance company is granted access to a foreign market, it can demand domestic and international telecommunications links necessary for communicating with customers and potential customers. In such cases, attachment of terminal equipment, interconnection of leased lines with public networks, and choice of operating protocols, rests with the customer, so long as no harm is caused to the network or misuse can be anticipated. Intracorporate communications, that is internal messages between branches of a commercial organization, must be permitted. Telecommunications service providers, when called upon by a foreign service supplier whose service(s) has been authorized in a Party's schedule of commitments, are required to accord access to and use on "reasonable and non-discriminatory terms and conditions".

These rights are subject to safeguards which can be exercised by the telecommunications service providers, provided that such safeguards are not used as an excuse to deny service to a customer, thus nullifying them (the rights). However, developing countries are permitted to impose reasonable conditions on the access to, and use of, telecommunications networks that they consider necessary to strengthen domestic telecommunications infrastructure and to increase their participation in international trade in telecommunications services. Thus, developing countries, including CAPAS countries, may make restrictions on resale of capacity or shared use of private telecommunication networks of foreign businesses.

4.5.3 Implications of Access and Use Obligation

A number of access and use provisions in the Annex are discretionary, which indicates that they are intended to suggest ways to fostering trade in services through telecommunications liberalization. However, Parties through their telecommunication entities are only required to provide the facilities that are available. They are not obliged to make special arrangements, such as purchasing additional equipment in order to provide service to a foreign service supplier. Nevertheless, in a bid to improve the performance of their economies through services liberalization under the GATS, governments of CAPAS countries might wish to strive to ensure, as far as practicable, the availability of adequate telecommunications not only for foreign businesses but also for domestic ones.

Most CAPAS countries lack sufficiently transparent regulations to handle requests for authorization of private telecommunication networks and facilities necessary for foreign businesses. CAPAS countries may to a large extent meet the requirements of the Annex if they improve their regulatory framework and procedures thus ensuring that domestic and foreign business users obtain those services on reasonable terms and conditions, including speedy processing of applications for authorizations where applicable.

4.5.4 Technical Cooperation

The Annex encourages technical cooperation between developed and developing countries for the purpose of assisting the latter in developing the "advanced telecommunication infrastructures essential to the expansion of their trade in services". This objective is to be implemented through the development programmes of international and regional organizations in which Parties to the General Agreement on Trade in Services (GATS) are members. Cooperation among the developing countries themselves at international, regional and sub-regional levels, is also encouraged. Furthermore, where applicable and in cooperation with relevant international organizations, developed countries which are Parties to the GATS are to make available to developing countries information on international telecommunication services and developments in information technology in order to assist in the strengthening of their domestic telecommunications industries.

4.6 Negotiations on Basic Telecommunication Services

4.6.1 Objective of the Negotiations

During the Uruguay Round negotiations, it appeared that most member countries would limit their liberalization offers to enhanced (value-added) telecommunication services. This is partly because basic telecommunications services (mainly telephony) are treated as public utility services by many countries, many of whom were concerned whether such services should be included under a multilateral trade regime. Additionally, difficulties arose in defining services to be covered and conditions which countries might place on market access and national treatment. A general decision was taken, and reflected by the concept of "universal coverage" in GATS Article I, that basic telecommunications would be treated under the multilateral trade regime.

The Negotiating Group on Basic Telecommunication (NGBT) was established on 15 December 1993 to continue the negotiations in this area up to April 30, 1996 and to make a final report. This decision and an Annex delaying the application of Article II of the GATS Agreement (MFN) for two years for basic telecommunications have, for practical purposes, suspended the application of the MFN provision to basic telecommunications. Nevertheless, if a Party had listed a specific commitment on a basic service in its schedule, no delay of Article II will apply for that service.

As of November 1995, 38 participants were members of the NGBT, 31 governments (European Community counting as one participant) and 6 regional/international organizations (including the ITU) were observers. Egypt, Mauritius, Morocco and Tunisia were the only African countries which were members of the NGBT. Madagascar and South Africa were among the observers. No CAPAS country is either a member or an observer.

The Purpose of the NGBT is to:

- advance the "progressive liberalization of trade in telecommunications transport networks and services " (basic telecommunication) ; and

- assist participants wishing to list basic telecommunications in their schedules of commitments. Request/offer negotiations on basic telecommunication commitments (usually conducted on bilateral basis) are being held under the auspices of NGBT. When created, it was expected that the NGBT would direct its primary attention to the preparation of a model schedule, together with explanatory material. This would be a practical output that could be used, as applicable, by Parties to list basic

telecommunications. Not only would the model assist in the negotiations on schedules, it also would contribute to a standardized approach in drafting schedules for this subsector.

4.6.2 Implications of the Negotiations for CAPAS Countries

The field study revealed that most CAPAS and other African countries that did not make commitments on telecommunications were unable to do so, in part, because they were (and still are) in the process of adopting policy on opening some telecommunications services subsectors to competition. Continuation of the negotiations on liberalization of basic telecommunications services provides an opportunity for the participating African countries to make market access commitments. Additionally, under Most-Favoured National treatment (Article II of the GATS) liberalization measures achieved during the voluntary negotiations will apply to all Parties to the GATS, including CAPAS countries as they may benefit from the liberalization commitments.

4.7 Progressive Liberalization

GATS envisages successive rounds of negotiations on specific commitments beginning five years from 1 January 1995, the date when the World Trade Organization (WTO) became effective. The objective of the negotiations is the achievement of a progressively higher level of liberalization (GATS Article XIX). The process of liberalization is to take place "with due respect for national policy objectives and the level of development of individual members". Developing countries are given flexibility for opening fewer sectors, liberalizing fewer types of transactions and progressively extending market access in line with their development situation.

A Party is permitted to modify or withdraw any commitment in its schedule any time after three years from the date on which the commitment entered into force. A Party is required to give three months notice to the Council on Trade of its intention to withdraw or modify a commitment and to negotiate with any Party whose interests under the commitment may be adversely affected. An "affected member" shall be entitled to compensatory adjustment in respect to a modified or withdrawn commitment. Where a "modifying member" and "an affected member" cannot agree, their differences are to be settled through arbitration. These provisions are designed to prevent "backsliding" by Parties.

In a nutshell, there are three opportunities for further liberalization of telecommunications in the context of the GATS within the next five years :

- During the ongoing negotiations on basic telecommunications scheduled to end in April, 1996;
- In April 1998, which means three years after entering into force of the commitments made at the conclusion of Uruguay Round negotiations (GATS Article XXI), when Parties may modify those commitments;
- The next round of negotiations leading to the review of the General Agreement on Trade in Services (GATS) and other WTO agreements in 2000, which means five years after entering into force of those agreements.

CAPAS and other African countries can take advantage of these opportunities to meet some of their telecommunication development objectives under multilateral liberalization.

5. LIBERALIZATION UNDER GATS AND TELECOMMUNICATION DEVELOPMENT

5.1 Introduction

In Chapter 3 the costs and benefits of competition as well as the competition policies of CAPAS countries were discussed. Chapter 4 described the multilateral liberalization regime under the General Agreement on Trade in Services (GATS) in general terms. This Chapter describes the existing enabling environment in CAPAS countries for multilateral liberalization. The costs and benefits of liberalization of telecommunication services under the GATS are then discussed, followed by proposals for possible market access offers/requests by CAPAS countries within the GATS.

5.2 The Enabling Environment for Multilateral Liberalization

The existence of a conducive enabling environment is a pre-requisite for multilateral liberalization of any service sector. CAPAS countries have embarked on creating a climate favorable, not only to private domestic investment, but also to foreign investment. Investment promotion codes have been enacted and are being improved to provide tax holidays, and other fiscal incentives such as for example, exemptions from customs duties and sales tax for imported telecommunications equipment. One-stop shops for investment, licensing and other approvals for establishing businesses is another feature of that environment. In Uganda, for example, the Investment Promotion Authority can authorize the establishment of a business in one day and can assist foreign businesses in obtaining approvals from other authorities.

In Ghana, at the time of the field study, licensing by the Investment Promotion Center had been abolished. An investor needs only to register a company and start a business. Where an operating license is required, as is the case with telecommunication services, the operator obtains it directly from the relevant ministry. New investment legislation aiming to improve investment incentives was expected to be enacted before the end of 1995.

In Guinea, the Investment code adopted in 1987 fully recognizes equitable treatment between foreign and national investors, as well as no limitation on revenue or profit transfer.

In Tanzania, the 1995/1996 Finance Bill was presented to Parliament in June, 1995. The bill replaced import duty and sales tax exemptions on materials for foreign and new domestic investments, by a low rate of 5% for all equipment for business investment. The corporation tax for foreign businesses which was 45% previously, was standardized at 35% for both domestic and foreign companies during 1995/96 fiscal year. Opening foreign currency exchange to competition, which has been adopted by almost all CAPAS countries, is another important incentives for private investment. CAPAS countries were also in the process of passing competition legislation.

A regulatory framework for the telecommunication sector is also crucial for promoting competition and particularly, multilateral liberalization. This encompasses substantive elements and the institutional set-up. The substantive aspect includes a clear policy and the instruments in which the policy is enshrined: legislation, regulations, guidelines and procedures. These measures ensure transparency and hence certainty which is a critical consideration for foreign service suppliers when planning to enter a foreign market.

A number of CAPAS countries have announced telecommunication sector policies. Nigeria and Tanzania have enacted new telecommunication legislation. Ghana and Uganda are at advanced stages of passing telecommunication reform legislation. Other countries are at varying stages of

formulating policy. The adoption of regulations, guidelines and procedures should follow soon.

The conditions of operating licenses which are legally binding instruments, can substitute for a policy and associated legislative instruments in the near term, where the latter are not yet in place. The Tanzania Communication Commission has issued a license to the Tanzania Telecommunication Company Ltd (the national operator) which contains detailed guidelines on various regulatory matters, including interconnection with other operators and also tariff-setting.

The institutional aspect of a regulatory framework should specify a clear separation of regulatory responsibilities from operations in order to ensure impartiality in dealing with authorizations and other issues pertaining to foreign and domestic telecommunication services and service suppliers. Ideally, an adequate telecommunications regulatory framework should be put in place before or in parallel with multilateral liberalization. (This is discussed further in Chapter 6.)

5.3 Costs and Benefits of Liberalization under GATS

The pros and cons of liberalizing telecommunication services have to be viewed in relation to the telecommunication development objectives and constraints identified in Chapter 2 of this report. The advantages and disadvantages of competition and unilateral liberalization identified in the preceding chapter apply to multilateral liberalization, as well. However, there are additional costs and benefits to multilateral liberalization which are summarized below.

5.3.1 Benefits

- Binding domestic policies under a multilateral agreement stabilizes them. They become less likely to change by the Government which initiated them or future governments. This is probably the most important advantage of liberalizing some telecommunication services under the GATS. Stable policy provides a favorable environment not only for foreign investors but also for local ones. In the past, domestic entrepreneurs in CAPAS and other African countries have tended to favor short-term investment opportunities, precisely because of the perceived absence of a stable policy environment. During the field study a number of business persons interviewed voiced interest in being given opportunity to invest in telecommunications. A stable policy would strengthen such interest.

- Foreign service providers guaranteed market access and national treatment under a GATS commitment bring in much needed capital in foreign exchange. They might do so under unilateral liberalization, but because of the instability in policy referred to above the prospects are better under multilateral liberalization.

- Foreign expertise associated with opening up services to foreign competition under the GATS will help alleviate the problem of shortage of human resources in the short-term as well as in the long-term through technology transfer.

- Opening telecommunications service sectors to foreign competition under GATS may encourage other countries to liberalize service sectors in which CAPAS countries have comparative advantage, such as labour services, tourism and others.

5.3.2 Costs

- In the area of telecommunications, there is a lack of balance between many developing countries -- including most sub-Saharan countries -- and developed countries. Telecom service providers from developed countries have the resources to compete in most markets, while few service providers or potential investors from developing countries do. The issue is for policy-makers to find a balance between providing windows of opportunities for domestic investors and firms to develop competitive expertise and resources in the new telecom service markets while opening up those markets to foreign firms as a means to provide a much needed injection of new capital, new technology and new managerial expertise. This may be done in part by placing limitations on foreign equity and by allowing time for domestic service providers to prepare for competition in some areas;

- Opening up domestic service markets to foreign competition through multilateral liberalization may constrain somewhat the ability of governments to set their own public policy goals, as they become subject to certain external constraints. For example, binding the liberalization of the telecommunications sector under GATS may affect the ability of a country to pursue certain universal service goals. While foreign service providers may be required to meet universal service obligations under a country's policy, they may challenge some of these obligations under the GATS dispute settlement machinery if they are unreasonable under GATS. More broadly, there may be a concern by governments of losing some degree of control over determining policy in a sector they deem "strategic";

- Repatriation of profits at the expense of reinvestment may also be a concern. This concern may be addressed through reasonable conditions in the legislation or in the licensing of new operators. It must also be noted that the WTO framework includes provisions allowing countries to take special measures in case of unsound imbalances in their balance of payments;

- Once a particular policy has been "bound" under GATS, a country may lose its ability to amend or change it, if particular unforeseen negative effects arise from it. Under unilateral liberalization, the country reserves its full ability to change any part of a policy that is deemed to have a negative result. Under GATS liberalization, the ability to do so is far more restricted.

5.3.3 Liberalization under the GATS Vs competition

Preceding chapters on costs and benefits of both competition and liberalization under the GATS show that costs and benefits of these two approaches of liberalization seem to be almost the same. This section synthesizes the major differences between the two approaches.

- GATS has a legal status of International Treaty. Therefore, the specific commitments made under the GATS are not subject to frequent or unforeseeable changes at national level without referring to the WTO procedures, including GATS provision on modification of schedules (Article XXI). In the context of developing countries, this stable environment created by the GATS makes investors more confident of the policy of a given country. This may bring in the investment (mainly foreign) to solve the lack of financial resources necessary for telecommunications development.

- Liberalization under the GATS seems to be more beneficial for developing countries than permitting competition under domestic policies only because competition (unilateral

liberalization) may lead to reciprocity, which may introduce distortive considerations such as historical relations, political influence and power of negotiation (in other words: "what you receive depends on what you can give").

- The MFN-treatment provision under the GATS creates competition between foreign investors, and developing countries may benefit as the result of such competition.

- The transparency provision under the GATS increases the confidence of investors including foreign ones. Publishing all the laws and regulations affecting trade in services (whatever their contents may be) also gives the authorities of a country the assurance that their "measures" are available at an international level and, therefore, that incoming foreign investors are aware of the measures with which they must comply.

- Liberalizing a given telecommunication service may give a foreign investor the opportunity to provide such a service in several neighboring countries, which may inhibit the emergence of regional operators among developing countries.

- In unilateral liberalization including permitting foreign service providers, there is flexibility to correct quickly deficiencies that come to light in the course of implementation. There is no possibility of such fast action under the GATS because of the requirements of the modification procedures.

5.3.4 Lessons

The introduction of competition in telecommunications in CAPAS and Sub-Saharan African countries is recent. There is some evidence from the study of the five CAPAS countries that the opening of some telecommunication service sectors to competition, including foreign competition, may be beneficial to telecommunications development objectives.

Multilateral liberalization under the GATS has just begun so there is even less evidence of its effects on telecommunications development. Nonetheless, there are assumptions on costs and benefits and it is for each country to decide in the light of its unique situation, the level at which, if at all, it will commit the opening of its telecommunication sector to foreign competition under the GATS. Countries which have already made commitments under the GATS may wish to consider whether to increase the level of commitments or to reduce them through the application of the modification procedures. In reaching a decision, the following points may be taken into account:

- Foreign investors or telecommunications service providers may be permitted through unilateral liberalization without commitment under a multilateral regime. This consideration is relevant to a country which is not yet ready to bind its liberalization policies under the GATS.

- Experience from countries which have made commitments to liberalize telecommunications services under the GATS shows that most of them have not committed sectors which are considered a public utility, for instance, national or international telephone services. This approach is attributable in part to the fact that negotiations on such and other basic services are continuing. It also reflects doubts which were expressed by some countries (probably due to risks discussed in the preceding section) as to whether public utility telecommunications services (mainly telephone) should be subjected to a multilateral liberalization regime.

- Multilateral liberalization should be undertaken gradually in CAPAS and other African countries (even more than unilateral liberalization) because of the situation of their telecommunication development and lack of regulatory framework.

- During the study questions were raised as to whether there are significant benefits to be gained by African countries from binding foreign competition in telecommunications under the GATS. It is too early to make a fruitful assessment of the actual benefits and costs of liberalization under GATS for African countries. However, experience from previous multilateral trade negotiations and arrangements (e.g. the GATT) suggest the desirability of approaching such negotiations in terms of packages rather than single items. A country may have a competitive advantage in certain items, while other negotiating partners may have such advantages in others. Therefore, liberalization negotiations of telecommunications services under the GATS should not be viewed in isolation of other services. In this regard, African countries may have missed an opportunity in the Uruguay Round by not negotiating comprehensive liberalization packages of services under the GATS. It might be advantageous for African countries to adopt this approach in the next round of negotiations under the WTO Agreements covering not only services but perhaps even goods. In the meantime adequate preparations ought to be made in terms of analyses and dissemination of information on African countries trade and development needs, and capabilities in relation to those of other trading partners and possible trade-offs in negotiations on trade.

- During the study views were also aired concerning the relatively weak negotiating positions of most African countries in multilateral trade negotiations because of small economies. That is an inescapable fact, especially where African countries negotiate individually. But if they do so as a group (region) and even join up with other developing regions they are likely to achieve greater success in negotiations as experience with the African-Caribbean Pacific group shows. Needless to say, preparations for joint consultations would need to start early for this approach to succeed during the next round of WTO negotiations.

Bearing in mind these points, the next section explores the telecommunication service sectors which CAPAS countries may consider opening to foreign competition or investment under the GATS.

5.4 Review of Telecommunication Commitments of African Countries

One hundred and twenty-five countries participated in the Uruguay Round negotiations. Of these, 48 countries made market access commitments (listed in their schedules of commitment) on the telecommunication sectors and subsectors (including the European Union which has a single schedule for the 15 members). Seven African countries (including four CAPAS countries) made commitments on telecommunications services. They are: Kenya, Mauritius, Morocco, Nigeria, Senegal, South Africa and Zimbabwe. The commitments of the CAPAS countries are summarized below:

Kenya:

- Vending (selling) and installation of telecommunications terminal equipment. Limitation only on presence of natural persons.
- Home-country direct telephone services, through cross-border supply; restricted to service suppliers operating direct voice communication routes. Market access limitation on presence of number of natural persons.

Nigeria:

- Sale/installation of terminal equipment. No limitation on market access or national treatment.
- Operating payphones. No limitation on market access or national treatment.
- Mobile communications: cellular, paging, voice and data, etc. Not bound to permit cross-border supply and consumption abroad. No other limitation with respect to market access.
- Limitation on national treatment in respect to cross-border supply and consumption abroad, i.e. nationals may provide such services through the two modes of supply.
- Value-added services. No limitation whatsoever on market access or national treatment.
- Two general qualifications are made in the schedule:

    1. That the National Carrier, NITEL, has monopoly on all public switched and international services and is charged with the responsibility of network infrastructure expansion. That there is a progressive move by Government through the National Communications Commission to introduce some element of privatization and competition in the areas listed under the offer (now commitment).

    2. The provision of any service cross-border (international services) by passing the network or diverting international traffic from NITEL is not permitted. Such measures can only be done in cooperation with NITEL.

Senegal:

- Circuit-switched voice telephone services; leased line voice services, including by satellite; mobile telephone radio services; circuit-switched data transmission services; leased-line data transmission services (including by satellite), circuit-switched telex; telegraph services; coastal services; two-way earth station; one-way earth station (other than TVRO).
- For all the foregoing networks and services, commercial presence is required and by "only public network licensee". All other modes are unbound (i.e., the country has not committed itself to permit them). For national treatment all modes of supply are unbound except that authorization is required for commercial presence.
- Value-added services (e.g., electronic mail, video-conference services, use of transmission of media of public franchise holder required for cross-border supply (international services). Commercial presence also required; unbound for presence of natural persons.
- Sale of terminals. They must be approved: no restriction on modes of supply except with regard to the presence of natural persons.
- One-way paging systems. Establishment of commercial presence. License required. Limit on number of operators.
- Telephone centers. Cross-border supply exclusively through the public switched network. Commercial presence required. As regards national treatment, authorization and security required.

Zimbabwe:

- Supply of automatic branch exchange (PABX) except for public sector buildings; facsimile, data transmission services (through leasing point-to-point transmissions of public telecommunications operator). Commercial presence required for all these service. Cross-border supply through an authorized bypass of the public telecommunication operators network not permitted.
- Market access limitations in respect to number of natural persons.
- National treatment limitation on presence of natural persons.
- Value-added services including electronic mail, voice mail, electronic data interchange, on-line information and data retrieval. No limitation on market access except for the presence of natural persons. For other modes of supply unauthorized bypass of the network of the public telecommunication operator is not permitted.

The above summary indicates that Kenya, Nigeria and Zimbabwe bound, under the GATS, the existing level of domestic liberalization. Senegal appears to have committed a higher level of liberalization than the current one. Such an approach will require adjustments in domestic legislative regulatory measures.

5.5 Proposals for Market Access Offers/Requests

Notwithstanding the potential benefits from multilateral liberalization under GATS, not all countries can be expected to adopt a standard level of market access commitments. For one thing, while there is a widespread consensus among African countries -- including the CAPAS countries -- about the necessity of involving the private sector in the development of telecommunications, there are many ways of doing so. While the various options need not be exclusive of one another, different countries may chose to emphasize different options based on their individual geographic, economic or political situation -- including the sizes of their market. For example, it may not be practical for a small country to allow more than one core telecommunication network provider.

The following paragraphs review possible approaches that might be used in preparing commitments for telecommunications services, other than services that have a significant element of public utility and universal service obligations. Many, if not all of those services, are essential to business users.

No suggestions are made here on liberalizing core network services under GATS. This is not to suggest that it might not be beneficial for a country to permit foreign firms to provide public utility services. The view put forward here, however, is that the level of development of such services is still too limited in most African countries to justify committing individual countries to multilateral liberalization under GATS.

5.5.1 Mobile Cellular Services

These services are important for business users and administrators and in some countries even for residential users. In addition, in situations of insufficient capacity in the core network, cellular phone systems can supplement the basic public utility network by adding capacity. Finally, cellular phone technology can be used to provide telephone access to remote communities.

If and when scheduling this service in its schedule of commitments, a country might want to consider the following restrictions, limitations and conditions on market access and national treatment:

- Limitations on the number of providers as the market for mobile cellular services is small relative to the market for fixed telephone services. The scarcity of radio frequency necessary for the operation of the service is another reason for such limitation.
- Limitation on foreign equity participation in order to involve the participation of domestic investors. The limitation may take the form of a requirement for foreign service providers to enter into joint-ventures with local service providers or investors.
- To ensure maximum benefits, a foreign providers should be required to interconnect their service with others and in particular, the Public Telecommunication Operators (PTO's).
- The foreign service provider might be required to provide international service through the facilities of the PTO rather than through other providers or directly. (Universal service obligations, for example to provide payphone services would be consistent with the objectives of CAPAS and other African countries.) This and the previous conditions in effect are regulatory conditions that the country might not need to explicitly mention in its schedule of commitments

(as long as the regulations do exist). However, it might be advisable to point them out to minimize the possibility of further disputes;

- The country might want to introduce a requirement that a foreign provider establish a commercial presence (through the incorporation of a local company or branch office) as well as place limitations on the number of foreign personnel it can bring into the country to manage its operation -- for example by limiting access to a certain number of senior managers and specialists; and
- The country might also want to place limitations on the number of foreign personnel that domestic cellular phone companies are allowed to employ in this case, as in the previous one, in order to minimize the impact on the domestic labor market. Depending on the policy of a country national treatment limitation may be made with respect to access to finance in the local market to ensure that the foreign investors do bring in money in foreign exchange.

5.5.2 Data Transmission Services.

These services are used mainly for business transactions and research. They may be provided in different ways, including in value-added form (e.g., electronic data exchange and on-line information).

Depending on the policy, a country's service provider may be required to lease lines from PTO(s) or be allowed to build their own networks, including using satellite facilities, or a combination of both. The service may be provided for specialized use to different types of users and has no significant universal service implications.

If and when scheduling this service in its schedule of commitments, a country might want to consider the following restrictions, limitations and conditions on market access and national treatment:

- Limitations on the number of providers are unnecessary;
  Limitations on foreign equity participation similar to those suggested for cellular telephone might be useful;
- As data services often require accessing databases located outside the country, cross-border supply of services should be allowed in addition to provision through commercial presence and the presence of natural persons;
- In the case of the commercial presence of a foreign provider or the establishment of a domestic provider, the country might want to impose a similar limitation on the number of foreign personnel that can be employed as in the case of cellular telephone.

5.5.3 Paging Services

This is an inexpensive one-way radio service. It is used to deliver numeric (e.g., telephone number) or textual messages signaled by a bip on a pocket unit similar to that of a mobile telephone system but much cheaper. The service is a good substitute in situations where ordinary telephone service is not accessible or is temporarily unavailable. As it is cheap to operate, there is no need for limitation on the number of suppliers or any other market access limitation, except the presence of natural persons.

5.5.4 Payphones

Because this is an area that offers strong opportunities for domestic entrepreneurship, a country might consider limiting access of foreign providers perhaps by limiting foreign equity participation.

Likewise, the country might want to introduce limitations on the number of foreign personnel that domestic and/or foreign providers might be able to employ to operate their facilities on grounds similar to those voiced earlier of protecting domestic employment opportunities.

5.5.5 Radiocommunication Services

Large business enterprises or groups of enterprises -- for instance, transporters, freight forwarders -- may be able to derive significant value from closed user-networks or radio telephones not only within a restricted geographical area, but also over relatively long distances. Typically the service is provided by a single user for its own use or by a group of users for their own collective use.

If and when scheduling this service in its schedule of commitments, a country might want to consider the following restrictions, limitations and conditions on market access and national treatment:

- there is no real need for placing limitations on the number of providers,
- the country might want to consider limitations on foreign equity participation and foreign personnel.

5.5.6 Value-added Services

These refer to services which use basic telecommunication services as a carrier but to which facilities are added or through which specific new telecommunication needs are satisfied. They include services transformed through computer technology such as voice-mail, electronic mail, on-line data processing and electronic data interchange. They are also called enhanced services. These services are important for business transactions and other special needs such as research. Different types of the services may be provided to cater for particular requirements.

The characteristics of those services are fundamentally the same as those of data transmission services described under Section 5.5.2. Accordingly, the same set of conditions and limitations might apply if and when a country chooses to schedule these services for market access commitments under GATS.

5.6 Preparation of Schedules of Commitments

The preparation of a schedule of commitment is a complicated exercise. It is the last step in a process of negotiation over market access liberalization between a country and its trading partners. Assistance from the WTO Secretariat is available for the finalization of Schedules of Commitments.

The preparation of a schedule of commitment assumes that a country has broadly assessed the areas and subsectors of its service sector -- including, but not limited to subsectors of the telecommunications sector -- it is willing to liberalize under the GATS, in part, in exchange for the willingness of the country's trading partners to liberalize sectors of interest to it. But the choice of sector inscribed in a country's schedule of commitments need not be a function only of what trading partners are willing to give in return. As noted earlier, it may also be based on the country's desire to send out a positive message to potential new service providers about the degree of its commitment toward reform and liberalization.

As noted earlier, under Article XIX developing countries are given flexibility in both the range of sectors and the depth of reforms they may liberalize under the GATS in accordance with their development level. Accordingly, most developing countries during the preparation of their schedules of commitments during the Uruguay Round, attached higher importance to defining the range of services they were willing to include in their schedule than on the depth of liberalization guaranteed for each subsector included in it.

6. OTHER REFORMS FOR TELECOMMUNICATIONS DEVELOPMENT

Chapters 2 and 3 reviewed the sizeable telecommunications development needs of CAPAS and other African countries, the numerous difficulties confronted by those countries in fulfilling many of those needs, and the potential usefulness of introducing and increasing competition in the sector as means to meet some of them.

Chapters 4 and 5 focused on how multilateral liberalization under the GATS was being used by CAPAS countries and could be used further by them and other African countries to strengthen the gains from market access opening to new service providers -- including foreign service providers.

This chapter addresses other areas of reform and intervention that CAPAS and other African countries may need to utilize to develop their telecommunication sector. In most cases, those other areas of reform and intervention do not stand apart from multilateral liberalization under GATS, but are likely to support it.

6.1 Need for Appropriate Regulatory Framework

Liberalization whether undertaken unilaterally or multilaterally does not mean the abolition of regulation. On the contrary, in CAPAS and other African countries, like elsewhere, the telecommunications market is imperfect. It is characterized by monopoly or dominant operators. Additionally, telecommunication development is driven not only by the profit-motivate but also by national development objectives, such as universal service provision. In such an environment liberalization requires an effective regulatory framework, not only to ensure a "level playing field" for service providers but also to achieve other national objectives. In most cases, this requires the adoption of a policy statement, legislation and the establishment of an impartial Regulatory Body. As it has been suggested in Chapter 4, a regulatory framework is important in the context of multilateral liberalization under the GATS. GATS requires the establishment of and enforcement of clear sets of transparent rules. In addition, this helps gain the confidence of investors, both domestic and foreign.

6.1.1 Establishment of an Impartial Regulatory Body

Ideally the establishment of a strong regulatory framework for telecommunications should precede the opening of the sector to competition or multilateral liberalization under GATS. Indeed, the introduction of competition before the establishment of a clear set of rules and the creation of an impartial regulatory body may hinder achievement of the intended results of liberalization. In the absence of clear rules governing investment and return on investment, private sector operators may hesitate to invest. If licensing proceeds on an ad-hoc basis with no clear rules governing bidding, the country may not get the best deal, wasting invaluable opportunities for a stronger contribution of new players to the development of the sector.

The mission of a Regulatory Body includes:

- To establish the rules for the operation of services including permitting an appropriate number and type of operators (licensing) or supervising the operators where licensing is done by another authority, for example, the sector Ministry;
- To define the relationship among operators (interconnection);
- To regulate tariffs, especially those of the dominant operator to protect the interests of users and to prevent predatory pricing in segments in which such an operator competes with others;

- To promote telecommunication development including human resources development; and
- To supervise the use of common resources (e.g. spectrum allocation and numbering).

The scope of the functions of a Regulatory Body differs among countries. In all CAPAS countries where a separate Regulatory Body has been established - Nigeria, Senegal, Guinea and Tanzania - the regulatory agency has been given licensing powers and responsibility for spectrum management. In Ghana, the draft National Communication Authority (NCA) Act is being amended to add the regulation of mass media (radio and television broadcasting) to the functions of the proposed NCA. The Tanzania Communications Commission (TCC) in Tanzania and the Directorate of Studies and Regulation of Posts and Telecommunications (DERPT) in Senegal are responsible for the regulation of telecommunication and postal services. As well, the legislation in Nigeria, Ghana and Tanzania gives the Regulatory Bodies a role in policy formulation, by requiring the Regulatory Body to advise the Minister on policy matters.

6.1.2 Options for usual types of Regulatory Bodies

In most CAPAS countries, where a separate Regulatory Body is yet to be established, regulatory functions are shared between the sector Ministry and the Public Telecommunication Operator. In another scenario they are divided among the sector Ministry, a radio frequency board and the Public Telecommunication Operator. Examples of the latter are Ghana and Uganda. There are several options for the design of telecommunication regulatory bodies depending on the policy of a country and its administrative and legal system. These options are outlined below:

a) Autonomous and Semi-Autonomous Regulatory Bodies

The Autonomous Regulatory Body has a high degree of independence in making decisions, which are revisable only by the courts. Examples include the Comisión Nacional de Telecomunicaciones (CNT) in Argentina and the Federal Communications Commission (FCC) in the United States.

There are several variations in the model of semi-Autonomous Regulatory Body. Under one type, the decisions of the Regulatory Body may be reviewed by the Government (Cabinet or the telecommunication sector Minister), but in practice most decisions are made by the Regulatory Body. An example is the Canadian Radio-television Telecommunication Commission. A second variation is the case where some regulatory decisions (for instance, granting licenses) is reserved to the Cabinet or the Telecommunication Sector Ministry but most or all other regulatory decisions are made by the Regulatory Body. Examples include the Australian Commission in Australia, the Director of Telecommunication in the United Kingdom, the Telecommunication Authority of Hong Kong, and the Telecommunication Authority of Singapore.

A further version which is popular among CAPAS countries that have established or are establishing regulatory bodies, gives the sector Minister the mandate to influence regulatory policy through issuing to the Regulatory Body general directives. These include Nigeria and its National Communication Commission and Tanzania and its recently established. Tanzania Communications Commission. The Ghanaian legislation for establishing a National Communication Authority (which had yet to be approved by Parliament and the President at the time of the field study) reserves a similar role to the Minister. Such a role also exists in the regulatory frameworks of Australia, Singapore and Mauritius.

Advantages

- The regulatory framework and approach can be stable, being founded on a legislative mandate with a relatively long life. It will not change on a day-to-day basis as the policies of the government evolve, although it will reflect longer-term policy changes as new appointments are made to the Regulatory Body, and/or new legislation is enacted or general policy guidelines are issued by the sector Minister to the Regulatory Body.
- There is lack of perceived conflict-of-interest issues in day-to-day functions of the Regulatory Body which may limit real or perceived objectivity. The Regulatory Body may be "protected" to some degree from lobbying pressures applied to the executive or legislative branches of government by special interests.
- In the version in which the sector Minister issues regulatory guidelines the Government can use its "reserve" mandate to influence the development of regulatory policy in a positive way. This is essential in the formative period of developing policy and in view of the fact that the Regulatory Body and staff will be lacking in regulatory experience for quite some time.

Disadvantages

- The financial cost of a separate regulatory organization can be substantial.
- Under this set-up, it is more difficult to secure sufficient suitable expertise to follow up a fast-changing sector than a situation where resources can be shared with other telecommunication agencies.
- In the version where the sector Minister is allowed to intervene in regulatory functions, the independence and credibility of the Regulatory Body may be reduced if the Minister's mandate is not used carefully.

b) Separate Regulatory Body Within a Telecommunication Ministry

Usually such a Regulatory Body is a Department or a Director/Director-General within the Ministry responsible for telecommunications.

Advantages

- Its financial costs are relatively low; the Regulatory Body shares existing ministry facilities.
- Information and manpower can be shared with other departments which perform telecommunication functions. This model has greater responsiveness to policy initiatives of the government because of the functional closeness to the sector Ministry.

Disadvantages

The ability of the Regulatory Body in acting impartially in matters involving competitors to the PTO(s) controlled by the same Ministry, may be questioned and because real or perceived conflicts of interest.

c) Unit Within The Main Public Telecommunications Operator (PTO)

This appears to be a case of self-regulation. In reality, the PTO does not regulate itself but, regulates others (including competitors) with respect to radio spectrum allocation and management, and

customer premises equipment approval. This is the set-up in place in most countries which have not separated regulation from operations.

Advantages

It is simple and inexpensive. The same facilities and resources are used.

Disadvantages

- There is no independent check on PTO's behavior or performance.
- There is no assurance of objectivity towards other Parties (e.g. users and Customer Premises Equipment suppliers or users of radio spectrum).

It is pertinent to note that the options of regulatory structures cited above are not mutually exclusive. Countries have been moving from one model to another. The movement is mainly towards an independent type of Regulatory Body as countries adopt policies (including competition) which call for effective and manifestly impartial regulation. Consequently, a suitable option for a Regulatory Body for CAPAS and many developing countries is likely to be one that includes one or more of the features that enhance the independence of the Regulatory Body. A sufficient degree of independence, that is freedom from intervention in day-to-day functions, enhances the impartiality of the Regulatory Body, and is therefore consistent with multilateral liberalization under the GATS.

6.1.3 Prerequisites for an effective Regulatory Body

Security of tenure is one of the elements that reinforces the effectiveness of a Regulatory Body. It is, therefore, desirable that the legislation should provide for the appointment of the members (or individual regulator) for a specified period and their removal only for cause, such as incapacity or misconduct. An independent source of funds for the Regulatory Body which it can use without excessive external bureaucratic constraints is another aspect conducive to autonomy. In order that the Regulatory Body may gain the confidence of the public, especially operators, its staff needs to be of high professional caliber and integrity. Therefore, qualified and experienced staff is a crucial resource for the Regulatory Body.

Because of shortage of expertise and particularly experienced personnel in telecommunications regulation, securing necessary human resources is a great challenge. The challenge may be met in part through intensive training via short courses, seminars, tours of mature regulatory bodies and, as a stop -gap solution, short-term consultancies (where necessary).

6.1.4 Reporting Relationship

In a few countries, including the United States, the Regulatory Body reports to the legislature directly. This arrangement is considered to maximize the independence of the Regulatory Body. In most countries which have established independent regulatory bodies, reporting is done, functionally or administratively, to the telecommunication sector Minister or another authority of the executive wing of Government. In that scenario, the Regulatory Body may report to the legislature indirectly through the submission of its report by the sector Minister.

However, in the final analysis, the degree of the autonomy of the Regulatory Body depends on the absence of intervention by the Government in the performance of the Regulatory Body's day-to-day functions.

6.2 Separation of Postal and Telecommunication Operations

In Burundi, Guinea, Nigeria, Senegal and Tanzania the postal and telecommunication services are now operated by separate postal and telecommunication entities.

In the rest of the CAPAS countries, the governments have decided, as a matter of policy, to separate the operation of postal and telecommunication services. However, implementation is at varying stages. For the rapid development of the telecommunication sector, separation is a necessary prerequisite. Not only does separation free the telecommunication operations from the financial burden of subsidizing the postal services, but it also enables the management of both services to concentrate on their specialized fields, thus increasing efficiency.

6.3 Corporatization and Commercialization of the Public Telecommunication Operator

Corporatization involves the changing of the legal status of the Public Telecommunication Operator from a Government Department or a statutory corporation to that of a commercial enterprise. This may be achieved through incorporation of a company under company legislation or other arrangements depending on a country's legal system.

In Benin, Uganda, Ghana, Kenya, and Zimbabwe, postal and telecommunication services are operated together by statutory corporations. That is to say they are partially corporatized. In Burundi, Guinea, Nigeria, Senegal and Tanzania, the PTO's have been fully corporatized through their establishment as autonomous companies -Office National des Télécommunications (ONATEL) in Burundi, Société des Télécommunications de Guinée s.a. (SOTELGUI), Nigeria Telecom (NITEL), Société Nationale des Télécommunications du Sénégal (SONATEL) and Tanzania Telecommunication Company Ltd. respectively. In Ghana, the government is planning to corporatize the telecommunications wing of Ghana Posts and Telecommunication Corporation (GPT) as Ghana Telecom.

The change of legal status is not enough to improve the performance of the Public Telecommunication Operator. Corporatization should be accompanied by giving the Public Telecommunication Operator greater financial and management autonomy. In return for increased autonomy, the governments expect greater accountability through the achievement of specified performance criteria and targets. In some countries including Ghana, Senegal and Tanzania, governments and the Public Operators have signed performance contracts defining the rights of the operators in terms of autonomy and obligations by way of achieving service development, quality and financial targets.

6.4 Privatization

Several CAPAS countries are considering privatization of the government owned Public Telecommunication Operator as one of their strategies for developing the telecommunications sector, as well as being part of macro economic policy. In Guinea, the Government has called for bidders in order to sell 40% to a foreign investor and the process of selecting the foreign investor is about to be completed. In Ghana and Uganda, decisions have been taken to privatize the Public Telecommunication Operator partly through securing a strategic investor. What remains is implementation and decisions on the extent of privatization.

Before entering a process of privatization of the PTO, governments need an objective valuation of the assets and liabilities of the PTO as a basis for negotiation with the private investors. Governments may take into account that too high a valuation might frighten away good investors

with long-term commitments, on the other hand, too low a valuation might mean loss for the Government.

6.5 Financing Arrangements

6.5.1 Build Transfer Schemes

A Build-Transfer scheme is a scenario of investing where an investor builds the facilities then transfers the ownership to the public telecommunication operator (PTO) or the Ministry in charge of telecommunications after recovering his/her investment by operating or leasing.

There are a number of build-transfer schemes : build-operate-transfer (BOT); build-transfer operate (BTO) and build lease transfer (BLT). Each type indicates the stage at which the ownership of the Build-Transfer assets change hands between the investor and the incumbent Public Telecommunication Operator. A variation of the Build-Transfer mechanism is a pure revenue-sharing scheme (i.e., a Build-Transfer also involves revenue sharing). Build-Transfer schemes have been very popular in the Asia-Pacific region. The most common form of Build-Transfer scheme, the Build-Operate-Transfer, is being used in Thailand to add 3 million lines to the country's network. In Cambodia, Telstra of Australia put up the country's digital international exchange under a BTO. Revenue-sharing schemes have been used in Indonesia for rapid expansion of the country's network. Each scheme involves the construction of 200,000 -250,000 lines. In the CAPAS countries, Capital Telecom Ltd. of Ghana has entered into a Build-Operate-Transfer arrangement with Ghana Posts and Telecommunication Corporation to install 40,000 lines in the country's Southern Sector.

6.5.2 The WorldTel initiative

WorldTel is a new organization created as a result of one of the recommendations of the Maitland Report "The Missing Link". It is a multinational organization run on commercial lines to promote telecommunication development on a vast and rapid scale. WorldTel envisages to concentrate on developing countries with penetration of less than one (1) line per 100 inhabitants (all CAPAS countries, except Zimbabwe with 1.5 lines per 100 inhabitants, are in this category). WorldTel mobilizes investment funds from a diversity of investor groups with divergent interests (commercial banks, developing banks, equipment vendors, telecommunications operators, governments/bilateral aid programmes, etc.).

6.6 Area and Local Networks

In some of the CAPAS countries, the possibility of allowing regional and local networks has been mooted. The use of a B-O-T scheme to expand the network in the southern sector of Ghana could serve as a lesson for the licensing of independent regional or local networks. In China, 30% of the current network has been built by local networks and owned by local authorities and cooperative associations. Such a mechanism has also been used successfully in South America. India has divided the country into 16 areas for the purposes of licensing independent local networks, while the incumbent Public Telecommunication Operator remains the international and long distance operator.

When implementing this scenario, a private investor is given a geographical area for providing telecommunication services on an exclusive basis (including Build-Transfer schemes). The Government or the Regulatory Body needs to take into account the geographical size of the country and the interconnection of the different networks. Measures have to be taken through the licensing

conditions to forestall the monopolistic tendencies of a private investor within the area in which it is providing services.

6.7 Private Networks

Private networks are those networks which are established and operated separately from the public network. Those networks are dedicated for use by closed groups such as banks and insurance companies or by individual large businesses. CAPAS countries encourage the use of private networks to develop telecommunications. Closed user group networks have been licensed for banking institutions in Ghana, Senegal and Tanzania. Uganda has licensed a Company called Starlight Communications to operate International Business Services (IBS) to provide voice, data and value-added service requirements of a group of businesses. Small satellite dishes called VSAT (Very Small Aperture Terminal) are being used to build up the network.

6.8 Tariffs

6.8.1 Factors Affecting Tariff Levels in CAPAS Countries

In the past, the universal service goal of PTOs has greatly influenced tariff determination. As the purchasing power of users, particularly residential ones, in CAPAS countries is relatively low compared to developed or advanced developing countries, tariffs for national services have been kept to a minimum, while those for international or leased circuits have been high. This is evident from the sections on tariffs in the annexes on the field studies. In some CAPAS and other Sub-Saharan African countries, revenues from international services provided by the Public Telecommunication Operator account for 70% to 90% of total revenues. This means that international services heavily subsidize national services - trunk calls, local calls and line and terminal rentals. Devaluation of national currencies arising from inflation and external factors, for example conditionalities associated with economic adjustment programs, has, in some CAPAS countries, aggravated the price differentials because of the pegging of their rates to the dollar.

Government fiscal measures and long tariff approval procedures contribute to the level of tariffs and delays in tariff adjustments. A number of countries including Ghana, Senegal and Tanzania, levy consumption tax on telecommunications services. In some cases higher tax rates are imposed on international services than on national services. For example in Tanzania, the rates are 10% and 5% respectively. Where tariff changes are approved by Government, the approval process is lengthy-between three and nine months.

6.8.2 Tariff Reforms

During the field studies in the five CAPAS countries, telecommunications users interviewed commented on the high international services tariffs. Those users suggested that the tariffs are disproportionately high compared to the quality of service. Some users indicated use of call-back services for their business purposes.[2]

There is a need for a measure of tariff re-balancing in order to address the dissatisfaction of international service users. Some CAPAS countries have already started this re-balancing effort. For example, in Tanzania, where tariffs for international services have been very high, there have been cuts for charges for those services in 1992 (40%) and in early 1995 (20%), while national tariffs are being adjusted upwards. Similarly, in Uganda, international tariffs were reduced in 1994. The tariff

[2] Call-back communications refers to calls which are activated through computers located abroad as a means to partially by-pass the national public network of the country from which the calls originate.

situation in Senegal is different. The Public Telecommunication Operator (SONATEL) has been reducing tariffs for both international and national by about 5 % to 10 % in the past four years. The international tariff between Dakar and some countries in Europe, for example France, are almost the same for incoming and outgoing calls. SONATEL has a commercial goal of being among the first 30 countries in the world with the lowest tariffs. Rates for national services have been kept low for a long time in most CAPAS countries, because of social considerations and other constraints mentioned earlier. Frequent steep rises may be counter-productive as customers, especially residential ones, may be unable to pay their bills. Equally, rapid re-balancing, may adversely affect the public operators' revenues and government fiscal revenues if rates for international services decline substantially and, finally, the ability of residential users to pay.

Therefore, the tariff re-balancing needs to be gradual and may take into account the objective of universal service and maintaining affordability.

Tariff reform carried out in an ad-hoc manner will not address the problem of tariffs effectively. There is need for comprehensive tariff reform in CAPAS and other African countries, which should take into account the need for meeting the objectives of service availability, commercialization of the public operator, and the needs of various users, including business customers and international environment. An appropriate regulatory mechanism, which does not inhibit timely tariff review at the same time protecting customers, needs to be instituted. For example, a price cap based on a basket of services could be adopted instead of the operators submitting their tariff revision proposals to the Regulatory Authority every time tariff adjustment is undertaken. A number of factors have to be considered in tariff reform including costs, elasticity of demand and the needs of different categories of users. For example, business users would be more prepared than residential customers to pay higher charges for better quality of service. It is advisable that tariff reforms be based on a comprehensive study taking into account all the relevant factors including the international competitive environment.

To foster economic regional integration, it is also advisable that tariff reforms in CAPAS and other African countries, take into account the harmonization of national tariff policies at the sub-regional and regional levels.

6.9 Regional Cooperation and Integration

6.9.1 Need for Cooperation in Developing Telecommunications among African Countries

The constraints to telecommunication development discussed in Chapter 2 are common to African countries - shortage of finance and human resources, lack of technology and policies that aggravate these problems. As a result, the telecommunication network in Sub-Saharan African countries is grossly underdeveloped. According to a recent ITU Report, two Sub-Saharan countries have only one percent of the world's telephone lines but 12 percent of its population.[3] Similarly, there is a commonality in the solutions being adopted to address the problem of under provision of telecommunication services. There is increasing recognition among African countries, including CAPAS countries, of the need for greater cooperation and integration, if the problems are to be tackled effectively. There is evidence of the potential benefits of cooperation among developing and African countries in securing common goals. For example, during the Uruguay Round negotiations, the joint efforts of developing countries were instrumental in ensuring that their concerns were taken into account by the developed countries.

[3] World Telecommunication Development Report, ITU, Geneva 1994, P.80

The Organization of African Unity (OAU) has declared its intention to create an African Economic Community by the year 2035. Given its strategic significance in economic development and particularly in promoting regional and international trade and other relations, telecommunication will play a key role in making the aspiration of economic unity a reality. Already, there are many examples at the regional and sub-regional levels of cooperation in promoting economic development. CAPAS countries are Parties to these initiatives.

6.9.2 Regional and Sub-regional Communications Projects

In Sub-Saharan Africa up to the early 1970's most of the regional telecommunications traffic did not pass directly between those countries but transited through developed countries, mainly former colonial powers. Inter-country links remained non-existent. This resulted in higher costs since African countries had to pay the transit countries with foreign exchange. Two regional projects have been established in order to alleviate this problem. The Panafrican Telecommunication Network (PANAFTEL) was established in the early 1970's to connect African countries directly through terrestrial links. The African Regional Satellite Communication System (RASCOM) was established in 1993 to promote telecommunication development through appropriate and low-cost satellite solutions in the Region. Already, RASCOM has secured a 14% discount for the hire of transponders for its members from the International Telecommunications Satellite Organization (INTELSAT). All CAPAS countries are members of the two organizations.

Parts of the PANAFTEL Project were implemented as sub-regional projects by groups of countries which jointly negotiated and obtained the funds. The Southern African Transport and Communications Commission (SATCC) implemented segments linking some of its members, for example, Tanzania, Malawi and Zimbabwe. The Kagera Basin Organization (KBO) consisting of Burundi, Rwanda, Tanzania and Uganda implemented sections linking these countries. The defunct East African Community comprising Kenya, Tanzania and Uganda, executed links among those countries. Although that Community broke up in 1977, the three countries' national telecommunication operators continue to cooperate on informal basis on operational and technical issues including maintaining a uniform numbering system.

The portion of PANAFTEL links between Benin, Burkina Faso, Mali, Niger and Senegal is working well and those countries have established an annual meeting to take care of technical and commercial matters on a business basis.

In 1982, Burkina Faso, Mali and Niger implemented a joint telecommunication project under the Liptako-Gourma Authority. This joint project of microwave links and switching system has cut down the cost of purchasing the equipment for the benefit of each country because of economies of scale.

A lot remains to be done to improve African regional and sub-regional networks and services. During the field study, business users in nearly all countries expressed the difficulties experienced in communicating with other African countries (e.g., from Uganda to Zaire and Sudan, even to Tanzania or between Ghana and Burkina Faso). In part, this is due to the malfunctioning of existing facilities that require rehabilitation. The difficulty in communication is acute between East and West Africa, particularly between English and French speaking countries.

6.9.3 Human Resources Development

The specialized nature of telecommunications and the rapid changes in technology call for continuous training. Regional training institutions not only reduce costs but also foster a

coordinated approach in network planning and maintenance. The African Regional Training Institute in Nairobi which is open to trainees from English-speaking African countries and the Multinational High School of Telecommunications in Dakar for French-speaking countries cater for training needs at advanced levels. What remains is ensuring the highest levels of standards for these institutions and their full use by members or non-members. Furthermore, CAPAS countries would do well to supplement these facilities by sufficiently equipping their national training institutes for medium training and use of facilities, for example, the INTERNET or teleconferencing for distant learning.

6.9.4 Policy Harmonization

The preceding chapters indicate different speeds and approaches in the reforms undertaken by CAPAS countries, reflecting the larger African picture. Harmonization of policies through regional and sub-regional meetings not only would improve the understanding of the various policy options; it would also assist in increasing the benefits of the changes to all the countries of the region at an early date. For example, it would enhance the attraction of investors interested in undertaking projects on a regional basis in order to maximize on economies of scale or to be linked regionally and internationally.

6.9.5 Strengthening Regional Cooperation and the GATS

The GATS does not prevent its Parties from entering into agreements liberalizing trade in services between or among such Parties provided that the agreement covers several service sectors, and provides for or substantially eliminates discrimination in terms of national treatment (Article V). Where developing countries are Parties to such an agreement they are given the flexibility on the introduction of more discriminatory measures and in giving more favourable treatment to their legal persons operating within each others' territories.

These provisions give African countries the leeway to strengthen their regional and sub-regional economic organizations. It is advisable that African governments utilize the opening provided by the GATS:

- to strengthen regional and sub-regional economic cooperation organizations;
- to support regional and sub-regional telecommunications projects in order to improve communications links among African countries; and
- to harmonize through their regional or sub-regional economic organizations their positions during the next round of negotiations under the GATS and other WTO agreements in order to strengthen their negotiating leverage.

7. OTHER FINDINGS AND LESSONS FROM THE FIELD STUDIES

7.1 Information Technology Development

7.1.1 Current Situation in CAPAS Countries

As stated earlier in this Report none of the CAPAS countries have adopted definite policies or plans for information technology development. They are preoccupied at present with the development of infrastructure for basic telecommunications services. Information technology development initiatives are being undertaken in an ad-hoc manner spearheaded by international agencies, non-government organizations, the private sector and the research communities including universities.

Informatics is essential for all business and in particular for businesses in information (e.g., intensive industries such as banking, insurance, and airlines, etc.). Improvement in information infrastructure will enhance business efficiency and competitiveness at the firm and country levels.

While the benefits of information infrastructures are gradually being appreciated, governments of developing countries are also concerned about the negative effects, particularly of multimedia services. They are worried, for example, about the erosion of their culture and possible infringement of their sovereignty by the infrastructures being implemented or proposed by foreign organizations and operators.

7.1.2 Guiding Information Technology Development

It appears there is no way a country can stop the tide of the information technology and multimedia revolution, even if it wanted to do so. The alternative is to guide or participate in guiding this development and, thus, maximizing its benefits while possibly minimizing its costs.

The costs of governments not seizing the initiative in guiding information infrastructure development include being left behind, disorderly development and the inability to minimize unwanted effects of the information technology, especially multimedia services.

7.2 The CAPAS Project

The field study undertaken in the five selected countries reveal that:

- The service providers in general are insufficiently aware of what is going on in the international trade arena. All the issues regarding international trade negotiations are generally considered as the business of the Ministry of Trade and, too often, there is insufficient dissemination of information by those Ministries and by governments.
- Executive personnel of the Public Telecommunication Operators and the private operators remain insufficiently informed of what is going on under the GATS.
- The private sector is willing to play a major role in the development of their countries.
- There is a need to strengthen the CAPAS project and for greater involvement of the ITU in future actions of that project in the area of telecommunications.

7.3 The Role of ITU

The field study and the answers from some African countries to the BDT (Telecommunication Development Bureau) Study Group 1 questionnaire reveal that:

- There is a need for assisting developing countries in establishing regulatory agencies. As telecommunications development in a liberalized environment cannot be properly managed without taking into account regulatory matters, BDT may pay greater attention to these new needs for assistance.
- The Public Telecommunication Operators and sector Ministries of the countries visited have different understandings of some new terms, such as "basic services" and "value-added-services". These differences of understanding exists from one country to another and even within the same country. These countries are looking to ITU for a standardized definition. Although this issue may appear minor it is becoming critically controversial when considering opening some telecommunication services to competition. Therefore, there is a need for ITU to issue a standardized definition of these new terms or at least guiding recommendations for defining them.
- ITU needs to work closely with countries to help them evaluate opportunities and challenges of multilateral liberalization under GATS.

8. CONCLUSIONS

African governments recognize the indispensable role of telecommunications, today, in promoting economic, social and cultural development. In particular, African governments recognize the urgency of meeting the needs of business customers for efficient and modern telecommunications services, as a means to enhance efficiency in the domestic commercial sector and competitiveness in the regional and international marketplace.

This report has reviewed the important efforts taking place in Africa, in general, and in the CAPAS countries, in particular, for improving telecommunications services. Governments must find ways of removing critical bottlenecks that account for the dismal state of telecommunications services throughout most of the continent, specifically shortages of financial, technological and human resources. Unprecedented levels of investment and technologies, as well as sizable injection of new managerial and technical skills are needed to raise telecommunications services to a reasonable level of development. Opening the domestic telecommunications market to private sector participation through competition is one major way in which African governments are trying to remove some of those bottlenecks. The extent of opening of the domestic market to competition varies, but encompasses the supply and installation of terminal equipment, data transmission and value added services, cellular mobile services, paging and radio services, as well as, in some cases, basic network services. This study has reviewed both the costs and benefits of opening telecommunications services markets in Africa to competition, suggesting that, when properly managed, competition can result in significant gains for achieving development objectives of the sector.

The introduction of market opening for private sector investment and competition is being accompanied by a reassessment of the most optimal ways to meet goals of universal services while giving strategic priority to the urgent needs of business users. For example, to meet universal service objectives, telecommunications policy-makers in a number of countries are trying to speed up access to services through rapid expansion of access to community phone lines, made available through payphones and telecenters operated by the private sector.

This study has shown that a number of African countries have also attempted to make use of the opportunities created by the entry into force of the General Agreement on Trade in Services to consolidate some of their telecommunications sector reforms through "binding" their level of market access opening in their schedules of service commitments: Seven African countries, including four of the CAPAS countries, have tabled specific market access commitments in telecommunications subsectors under the GATS. This study has reviewed the kinds of commitments presented by those countries and suggested some guidelines for other countries that might want to follow in their footsteps.

Other measures undertaken for reforming telecommunications sectors in Africa include the separation of public sector postal and telecommunications operations and the corporatization of the national telecommunications operators. There is also a keen concern for the need to enact transparent regulatory regimes and independent Regulatory Bodies as tools to manage the new competition within the sector. This study has shown that, in quite a few cases, reform of the regulatory environment -- including the creation of a Regulatory Body -- has lagged behind the opening of the market to competition. In most cases, such a situation needs to be remedied rather promptly, short of which policy-makers shall lack the tools needed to manage the new competition, including the new competition resulting from market access commitments made under the GATS.

Based on the review of the various experiences and ongoing reforms in the CAPAS and other African countries, this study arrives at the recommendations presented in the executive summary.

ANNEXES

ANNEX A

GLOSSARY

Analog network: A telecommunication network in which information is conveyed as a continuously varying electrical signal.

Basic Services (Basic telecommunications): For the purpose of the negotiations under the GATS, basic telecommunications refer to any telecommunication network or service involving real-time transmission of customer-supplied information between two or more points without any end-to-end change in the form or content of the customer's information. These include, *inter alia*, telegraph, telephone, telex, and data.

Build-Operate-Transfer (BOT): A project whereby a private company is awarded a concession to build a telecommunications network or service and operates it for a certain period of time before handing over ownership to the national telecommunication administration or PTO.

Build-Lease-Transfer (BLT): A project whereby a private company is awarded a concession to build a telecommunications network or service and leases it for a certain period of time before handing over ownership to the national telecommunication administration or PTO.

Build-Transfer-Operate (BTO): A project whereby a private company is awarded a concession to build a telecommunications network or service, hands over ownership to the national telecommunication administration or PTO, and operates it for a certain period of time.

Commitment: Under the GATS, each Party commits itself to liberalizing access to its service markets. The specific commitments for individual service sectors are written in a "schedule of commitments" which legally binds the Party not to regress from the level of market access and national treatment guaranteed in it.

Competition: As used in this report, refers to introducing competition among national service suppliers and/or foreign suppliers without any commitment under the GATS.

Core-network: As used in some countries, refers to public networks for providing fixed telephone services, telex and leased lines.

Core services: As used in some countries, refers to the international and national telephone, telex and leased lines.

Cream-skimming: Refers to only operating the most profitable telecommunication business.

Data transmission service: Transfer of information usually between computers.

Digital network: A telecommunication network in which information is coded in numerical (digital) form, converted into a series of binary electronic pulses and then transmitted as a bitstream.

Internet: The world-wide network through which computer systems can be interconnected using protocols defined by the Internet Engineering Task Force (IETF).

Licensing: An administrative procedure for selecting operators and awarding franchises for the operation of particular telecommunication services, for instance mobile cellular service.

Mobile cellular service: A communication service in which voice or data is transmitted by radio frequencies. The service area is divided into *cells*, each served by a transmitter. The cells are connected to a controlling switching exchange which is connected to the worldwide telephone network.

Multilateral Liberalization: under the GATS refers to the commitment given by a Party to allow foreign operators of other Parties to provide services in its territory with the guarantee that conditions of their market access and national treatment will not be changed (except, possibly, to be liberalized further during new rounds of negotiations among Parties).

Multimedia: The presentation of more than one medium, typically images (moving or still), sound and text in an interactive environment. Multimedia requires a significant amount of data transfer and invariably requires computational facilities.

Paging: A mobile radiocommunication service offering transmission — usually one-way — of numeric or textual information to small pocket terminals.

Party: Refers to a Member of the Word Trade Organization which has made commitments under the General Agreement on Trade in Services (GATS).

Private network: A network based on the use of leased lines or other facilities in order to provide telecommunication services within an organization or within a closed user group as a complement or a substitute to the public network.

Public Telecommunication Operator (PTO): The telecommunication corporate body providing public telecommunication services often under exclusive and special rights (reserved services). The use of the term "public" refers to the services and in no way implies the ownership of the corporate body. The PTO may be in public or private ownership. All other telecommunication operators are referred to as telecommunication service providers or telecommunication service suppliers.

Schedule of commitments (schedule of specific commitments): The list of service sectors or sub-sectors where a Party to the GATS undertakes commitments of multilateral liberalization. This list specifies the terms and limitations on market access and national treatment as well as other additional commitments. The schedules of commitments are annexed to the GATS and form an integral part thereof.

Telecommunications: Any form of transmission, broadcast or reception of signs, signals, texts, images, sounds or data by wire, optical means, microwave or other electromagnetic means.

Telecommunication Services: Any service, including the transmission or routing of signals or a combination of these functions, using telecommunications processes.

Teledensity: Number of main telephone lines per 100 inhabitants.

Telephone Service: The commercial provision to the public of a system of direct, real-time voice transmissions between users connected to termination points of a telecommunications network.

Telex Service: The commercial provision to the public of a system of direct, real-time typed message transmissions, in the form of telegraphic signals, between users connected to termination points of a switched telecommunications network.

Terminal equipment: Any user-premise equipment designed to be connected directly or indirectly to a network termination point for the transmission, processing or reception of information.

Type approval: An administrative procedure of technical tests and vetting applied to items of telecommunication equipment before they can be sold or connected to the public network. Also known as *homologation.*

Value-added Services: Are those services that use the basic services of a carrier and add facilities in order to satisfy specific new telecommunication needs. These include such services as voice mail, electronic mail, on-line data processing.

Virtual cycle: A cycle of cause and effect generating economic growth and prosperity (as opposed to a vicious cycle of decline and poverty).

ANNEX B

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ANNEX C

SELECTED EXCERPTS FROM THE WTO

ANNEX C.1

ANNEX ON TELECOMMUNICATIONS

1. *Objectives*

Recognizing the specificities of the telecommunications services sector and, in particular, its dual role as a distinct sector of economic activity and as the underlying transport means for other economic activities, the Members have agreed to the following Annex with the objective of elaborating upon the provisions of the Agreement with respect to measures affecting access to and use of public telecommunications transport networks and services. Accordingly, this Annex provides notes and supplementary provisions to the Agreement.

2. *Scope*

(a) This Annex shall apply to all measures of a Member that affect access to and use of public telecommunications transport networks and services.[4]

(b) This Annex shall not apply to measures affecting the cable or broadcast distribution of radio or television programming.

(c) Nothing in this Annex shall be construed:

(i) to require a Member to authorize a service supplier of any other Member to establish, construct, acquire, lease, operate, or supply telecommunications transport networks or services, other than as provided for in its Schedule; or

(ii) to require a Member (or to require a Member to oblige service suppliers under its jurisdiction) to establish, construct, acquire, lease, operate or supply telecommunications transport networks or services not offered to the public generally.

3. *Definitions*

For the purposes of this Annex:

(a) "Telecommunications" means the transmission and reception of signals by any electromagnetic means.

(b) "Public telecommunications transport service" means any telecommunications transport service required, explicitly or in effect, by a Member to be offered to the public generally. Such services may include, *inter alia*, telegraph, telephone, telex, and data transmission typically involving the real-time transmission of customer-supplied

[4]This paragraph is understood to mean that each Member shall ensure that the obligations of this Annex are applied with respect to suppliers of public telecommunications transport networks and services by whatever measures are necessary.

information between two or more points without any end-to-end change in the form or content of the customer's information.

(c) "Public telecommunications transport network" means the public telecommunications infrastructure which permits telecommunications between and among defined network termination points.

(d) "Intra-corporate communications" means telecommunications through which a company communicates within the company or with or among its subsidiaries, branches and, subject to a Member's domestic laws and regulations, affiliates. For these purposes, "subsidiaries", "branches" and, where applicable, "affiliates" shall be as defined by each Member. "Intra-corporate communications" in this Annex excludes commercial or non-commercial services that are supplied to companies that are not related subsidiaries, branches or affiliates, or that are offered to customers or potential customers.

(e) Any reference to a paragraph or subparagraph of this Annex includes all subdivisions thereof.

4. *Transparency*

In the application of Article III of the Agreement, each Member shall ensure that relevant information on conditions affecting access to and use of public telecommunications transport networks and services is publicly available, including: tariffs and other terms and conditions of service; specifications of technical interfaces with such networks and services; information on bodies responsible for the preparation and adoption of standards affecting such access and use; conditions applying to attachment of terminal or other equipment; and notifications, registration or licensing requirements, if any.

5. *Access to and use of Public Telecommunications Transport Networks and Services*

(a) Each Member shall ensure that any service supplier of any other Member is accorded access to and use of public telecommunications transport networks and services on reasonable and non-discriminatory terms and conditions, for the supply of a service included in its Schedule. This obligation shall be applied, *inter alia*, through paragraphs (b) through (f).[5]

(b) Each Member shall ensure that service suppliers of any other Member have access to and use of any public telecommunications transport network or service offered within or across the border of that Member, including private leased circuits, and to this end shall ensure, subject to paragraphs (e) and (f), that such suppliers are permitted:

(i) to purchase or lease and attach terminal or other equipment which interfaces with the network and which is necessary to supply a supplier's services;

[5]The term "non-discriminatory" is understood to refer to most-favoured-nation and national treatment as defined in the Agreement, as well as to reflect sector-specific usage of the term to mean "terms and conditions no less favourable than those accorded to any other user of like public telecommunications transport networks or services under like circumstances".

(ii) to interconnect private leased or owned circuits with public telecommunications transport networks and services or with circuits leased or owned by another service supplier; and

(iii) to use operating protocols of the service supplier's choice in the supply of any service, other than as necessary to ensure the availability of telecommunications transport networks and services to the public generally.

(c) Each Member shall ensure that service suppliers of any other Member may use public telecommunications transport networks and services for the movement of information within and across borders, including for intra-corporate communications of such service suppliers, and for access to information contained in data bases or otherwise stored in machine-readable form in the territory of any Member. Any new or amended measures of a Member significantly affecting such use shall be notified and shall be subject to consultation, in accordance with relevant provisions of the Agreement.

(d) Notwithstanding the preceding paragraph, a Member may take such measures as are necessary to ensure the security and confidentiality of messages, subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on trade in services.

(e) Each Member shall ensure that no condition is imposed on access to and use of public telecommunications transport networks and services other than as necessary:

(i) to safeguard the public service responsibilities of suppliers of public telecommunications transport networks and services, in particular their ability to make their networks or services available to the public generally;

(ii) to protect the technical integrity of public telecommunications transport networks or services; or

(iii) to ensure that service suppliers of any other Member do not supply services unless permitted pursuant to commitments in the Member's Schedule.

(f) Provided that they satisfy the criteria set out in paragraph (e), conditions for access to and use of public telecommunications transport networks and services may include:

(i) restrictions on resale or shared use of such services;

(ii) a requirement to use specified technical interfaces, including interface protocols, for inter-connection with such networks and services;

(iii) requirements, where necessary, for the inter-operability of such services and to encourage the achievement of the goals set out in paragraph 7(a);

(iv) type approval of terminal or other equipment which interfaces with the network and technical requirements relating to the attachment of such equipment to such networks;

(v) restrictions on inter-connection of private leased or owned circuits with such networks or services or with circuits leased or owned by another service supplier; or

(vi) notification, registration and licensing.

(g) Notwithstanding the preceding paragraphs of this section, a developing country Member may, consistent with its level of development, place reasonable conditions on access to and use of public telecommunications transport networks and services necessary to strengthen its domestic telecommunications infrastructure and service capacity and to increase its participation in international trade in telecommunications services. Such conditions shall be specified in the Member's Schedule.

6. *Technical Cooperation*

(a) Members recognize that an efficient, advanced telecommunications infrastructure in countries, particularly developing countries, is essential to the expansion of their trade in services. To this end, Members endorse and encourage the participation, to the fullest extent practicable, of developed and developing countries and their suppliers of public telecommunications transport networks and services and other entities in the development programmes of international and regional organizations, including the International Telecommunication Union, the United Nations Development Programme, and the International Bank for Reconstruction and Development.

(b) Members shall encourage and support telecommunications cooperation among developing countries at the international, regional and sub-regional levels.

(c) In cooperation with relevant international organizations, Members shall make available, where practicable, to developing countries information with respect to telecommunications services and developments in telecommunications and information technology to assist in strengthening their domestic telecommunications services sector.

(d) Members shall give special consideration to opportunities for the least-developed countries to encourage foreign suppliers of telecommunications services to assist in the transfer of technology, training and other activities that support the development of their telecommunications infrastructure and expansion of their telecommunications services trade.

7. *Relation to International Organizations and Agreements*

(a) Members recognize the importance of international standards for global compatibility and inter-operability of telecommunication networks and services and undertake to promote such standards through the work of relevant international bodies,

including the International Telecommunication Union and the International Organization for Standardization.

(b) Members recognize the role played by intergovernmental and non-governmental organizations and agreements in ensuring the efficient operation of domestic and global telecommunications services, in particular the International Telecommunication Union. Members shall make appropriate arrangements, where relevant, for consultation with such organizations on matters arising from the implementation of this Annex.

ANNEX C.2

ANNEX ON NEGOTIATIONS ON BASIC TELECOMMUNICATIONS

1. Article II and the Annex on Article II Exemptions, including the requirement to list in the Annex any measure inconsistent with most-favoured-nation treatment that a Member will maintain, shall enter into force for basic telecommunications only on:

(a) the implementation date to be determined under paragraph 5 of the Ministerial Decision on Negotiations on Basic Telecommunications; or,

(b) should the negotiations not succeed, the date of the final report of the Negotiating Group on Basic Telecommunications provided for in that Decision.

2. Paragraph 1 shall not apply to any specific commitment on basic telecommunications which is inscribed in a Member's Schedule.

ANNEX C.3

DECISION ON NEGOTIATIONS ON BASIC TELECOMMUNICATIONS

Ministers decide as follows:

1. Negotiations shall be entered into on a voluntary basis with a view to the progressive liberalization of trade in telecommunications transport networks and services (hereinafter referred to as "basic telecommunications") within the framework of the General Agreement on Trade in Services.

2. Without prejudice to their outcome, the negotiations shall be comprehensive in scope, with no basic telecommunications excluded a priori.

3. A Negotiating Group on Basic Telecommunications (hereinafter referred to as the "NGBT") is established to carry out this mandate. The NGBT shall report periodically on the progress of these negotiations.

4. The negotiations in the NGBT shall be open to all governments and the European Communities which announce their intention to participate. To date, the following have announced their intention to take part in the negotiations:

Australia, Austria, Canada, Chile, Cyprus, European Communities and their member States, Finland, Hong Kong, Hungary, Japan, Korea, Mexico, New Zealand, Norway, Slovak Republic, Sweden, Switzerland, Turkey, United States.

Further notifications of intention to participate shall be addressed to the depositary of the Agreement Establishing the World Trade Organization.

5. The NGBT shall hold its first negotiating session no later than 16 May 1994. It shall conclude these negotiations and make a final report no later than 30 April 1996. The final report of the NGBT shall include a date for the implementation of results of these negotiations.

6. Any commitments resulting from the negotiations, including the date of their entry into force, shall be inscribed in the Schedules annexed to the General Agreement on Trade in Services and shall be subject to all the provisions of the Agreement.

7. Commencing immediately and continuing until the implementation date to be determined under paragraph 5, it is understood that no participant shall apply any measure affecting trade in basic telecommunications in such a manner as would improve its negotiating position and leverage. It is understood that this provision shall not prevent the pursuit of commercial and governmental arrangements regarding the provision of basic telecommunications services.

8. The implementation of paragraph 7 shall be subject to surveillance in the NGBT. Any participant may bring to the attention of the NGBT any action or omission which it believes to be relevant to the fulfilment of paragraph 7. Such notifications shall be deemed to have been submitted to the NGBT upon their receipt by the Secretariat.

ANNEX C.4

ANNEX ON ARTICLE II EXEMPTIONS

Scope

1. This Annex specifies the conditions under which a Member, at the entry into force of this Agreement, is exempted from its obligations under paragraph 1 of Article II.

2. Any new exemptions applied for after the date of entry into force of the WTO Agreement shall be dealt with under paragraph 3 of Article IX of that Agreement.

Review

3. The Council for Trade in Services shall review all exemptions granted for a period of more than 5 years. The first such review shall take place no more than 5 years after the entry into force of the WTO Agreement.

4. The Council for Trade in Services in a review shall:

   (a) examine whether the conditions which created the need for the exemption still prevail; and

   (b) determine the date of any further review.

Termination

5. The exemption of a Member from its obligations under paragraph 1 of Article II of the Agreement with respect to a particular measure terminates on the date provided for in the exemption.

6. In principle, such exemptions should not exceed a period of 10 years. In any event, they shall be subject to negotiation in subsequent trade liberalizing rounds.

7. A Member shall notify the Council for Trade in Services at the termination of the exemption period that the inconsistent measure has been brought into conformity with paragraph 1 of Article II of the Agreement.

ANNEX C.5

SELECTED ARTICLES OF THE GATS

Article I: Scope and Definition
Article II: Most-Favoured Nation Treatment (MFN)
Article III: Transparency
Article IV: Increasing Participation of Developing Countries
Article V: Economic Integration
Article VI: Domestic Regulations
Article VIII: Monopolies and Exclusive Service Suppliers
Article IX: Business Practices
Article XV: Subsidies
Article XVI: Market Access
Article XVII: National Treatment
Article XIX: Negotiation of Specific Commitments
Article XX: Schedules of Specific Commitments
Article XXI: Modification of Schedules

Article I

Scope and Definition

1. This Agreement applies to measures by Members affecting trade in services.

2. For the purposes of this Agreement, trade in services is defined as the supply of a service:

   (a) from the territory of one Member into the territory of any other Member;
   (b) in the territory of one Member to the service consumer of any other Member;
   (c) by a service supplier of one Member, through commercial presence in the territory of any other Member;
   (d) by a service supplier of one Member, through presence of natural persons of a Member in the territory of any other Member.

3. For the purposes of this Agreement:

   (a) "measures by Members" means measures taken by:
      (i) central, regional or local governments and authorities; and
      (ii) non-governmental bodies in the exercise of powers delegated by central, regional or local governments or authorities;

In fulfilling its obligations and commitments under the Agreement, each Member shall take such reasonable measures as may be available to it to ensure their observance by regional and local governments and authorities and non-governmental bodies within its territory;

(b) "services" includes any service in any sector except services supplied in the exercise of governmental authority;

(c) "a service supplied in the exercise of governmental authority" means any service which is supplied neither on a commercial basis, nor in competition with one or more service suppliers.

Article II

Most-Favoured-Nation Treatment

1. With respect to any measure covered by this Agreement, each Member shall accord immediately and unconditionally to services and service suppliers of any other Member treatment no less favourable than that it accords to like services and service suppliers of any other country.

2. A Member may maintain a measure inconsistent with paragraph 1 provided that such a measure is listed in, and meets the conditions of, the Annex on Article II Exemptions.

3. The provisions of this Agreement shall not be so construed as to prevent any Member from conferring or according advantages to adjacent countries in order to facilitate exchanges limited to contiguous frontier zones of services that are both locally produced and consumed.

Article III

Transparency

1. Each Member shall publish promptly and, except in emergency situations, at the latest by the time of their entry into force, all relevant measures of general application which pertain to or affect the operation of this Agreement. International agreements pertaining to or affecting trade in services to which a Member is a signatory shall also be published.

2. Where publication as referred to in paragraph 1 is not practicable, such information shall be made otherwise publicly available.

3. Each Member shall promptly and at least annually inform the Council for Trade in Services of the introduction of any new, or any changes to existing, laws, regulations or administrative guidelines which significantly affect trade in services covered by its specific commitments under this Agreement.

4. Each Member shall respond promptly to all requests by any other Member for specific information on any of its measures of general application or international agreements within the meaning of paragraph 1. Each Member shall also establish one or more enquiry points to provide specific information to other Members, upon request, on all such matters as well as those subject to the notification requirement in paragraph 3. Such enquiry points shall be established within two years from the date of entry into force of the Agreement Establishing the WTO (referred to in this Agreement as the "WTO Agreement"). Appropriate flexibility with respect to the time-limit within which such enquiry points are to be established may be agreed upon for individual developing country Members. Enquiry points need not be depositories of laws and regulations.

5. Any Member may notify to the Council for Trade in Services any measure, taken by any other Member, which it considers affects the operation of this Agreement.

Article IV

Increasing Participation of Developing Countries

1. The increasing participation of developing country Members in world trade shall be facilitated through negotiated specific commitments, by different Members pursuant to Parts III and IV of this Agreement, relating to:

(a) the strengthening of their domestic services capacity and its efficiency and competitiveness, *inter alia* through access to technology on a commercial basis;

(b) the improvement of their access to distribution channels and information networks; and

(c) the liberalization of market access in sectors and modes of supply of export interest to them.

2. Developed country Members, and to the extent possible other Members, shall establish contact points within two years from the date of entry into force of the WTO Agreement to facilitate the access of developing country Members' service suppliers to information, related to their respective markets, concerning:

(a) commercial and technical aspects of the supply of services;

(b) registration, recognition and obtaining of professional qualifications; and

(c) the availability of services technology.

3. Special priority shall be given to the least-developed country Members in the implementation of paragraphs 1 and 2. Particular account shall be taken of the serious difficulty of the least-developed countries in accepting negotiated specific commitments in view of their special economic situation and their development, trade and financial needs.

Article V

Economic Integration

1. This Agreement shall not prevent any of its Members from being a party to or entering into an agreement liberalizing trade in services between or among the parties to such an agreement, provided that such an agreement:

(a) has substantial sectoral coverage[6], and

[6]This condition is understood in terms of number of sectors, volume of trade affected and modes of supply. In order to meet this condition, agreements should not provide for the *a priori* exclusion of any mode of supply.

(b) provides for the absence or elimination of substantially all discrimination, in the sense of Article XVII, between or among the parties, in the sectors covered under subparagraph (a), through:

(i) elimination of existing discriminatory measures, and/or

(ii) prohibition of new or more discriminatory measures,

either at the entry into force of that agreement or on the basis of a reasonable time-frame, except for measures permitted under Articles XI, XII, XIV and XIV bis.

2. In evaluating whether the conditions under paragraph 1(b) are met, consideration may be given to the relationship of the agreement to a wider process of economic integration or trade liberalization among the countries concerned.

3. (a) Where developing countries are parties to an agreement of the type referred to in paragraph 1, flexibility shall be provided for regarding the conditions set out in paragraph 1, particularly with reference to subparagraph (b) thereof, in accordance with the level of development of the countries concerned, both overall and in individual sectors and subsectors.

(b) Notwithstanding paragraph 6, in the case of an agreement of the type referred to in paragraph 1 involving only developing countries, more favourable treatment may be granted to juridical persons owned or controlled by natural persons of the parties to such an agreement.

4. Any agreement referred to in paragraph 1 shall be designed to facilitate trade between the parties to the agreement and shall not in respect of any Member outside the agreement raise the overall level of barriers to trade in services within the respective sectors or subsectors compared to the level applicable prior to such an agreement.

5. If, in the conclusion, enlargement or any significant modification of any agreement under paragraph 1, a Member intends to withdraw or modify a specific commitment inconsistently with the terms and conditions set out in its Schedule, it shall provide at least 90 days advance notice of such modification or withdrawal and the procedure set forth in paragraphs 2, 3 and 4 of Article XXI shall apply.

6. A service supplier of any other Member that is a juridical person constituted under the laws of a party to an agreement referred to in paragraph 1 shall be entitled to treatment granted under such agreement, provided that it engages in substantive business operations in the territory of the parties to such agreement.

7. (a) Members which are parties to any agreement referred to in paragraph 1 shall promptly notify any such agreement and any enlargement or any significant modification of that agreement to the Council for Trade in Services. They shall also make available to the Council such relevant information as may be requested by it. The Council may establish a working party to examine such an agreement or enlargement or modification of that agreement and to report to the Council on its consistency with this Article.

(b) Members which are parties to any agreement referred to in paragraph 1 which is implemented on the basis of a time-frame shall report periodically to the Council for Trade in Services on its implementation. The Council may establish a working party to examine such reports if it deems such a working party necessary.

(c) Based on the reports of the working parties referred to in subparagraphs (a) and (b), the Council may make recommendations to the parties as it deems appropriate.

8. A Member which is a party to any agreement referred to in paragraph 1 may not seek compensation for trade benefits that may accrue to any other Member from such agreement.

Article VI

Domestic Regulation

1. In sectors where specific commitments are undertaken, each Member shall ensure that all measures of general application affecting trade in services are administered in a reasonable, objective and impartial manner.

2. (a) Each Member shall maintain or institute as soon as practicable judicial, arbitral or administrative tribunals or procedures which provide, at the request of an affected service supplier, for the prompt review of, and where justified, appropriate remedies for, administrative decisions affecting trade in services. Where such procedures are not independent of the agency entrusted with the administrative decision concerned, the Member shall ensure that the procedures in fact provide for an objective and impartial review.

(b) The provisions of subparagraph (a) shall not be construed to require a Member to institute such tribunals or procedures where this would be inconsistent with its constitutional structure or the nature of its legal system.

3. Where authorization is required for the supply of a service on which a specific commitment has been made, the competent authorities of a Member shall, within a reasonable period of time after the submission of an application considered complete under domestic laws and regulations, inform the applicant of the decision concerning the application. At the request of the applicant, the competent authorities of the Member shall provide, without undue delay, information concerning the status of the application.

4. With a view to ensuring that measures relating to qualification requirements and procedures, technical standards and licensing requirements do not constitute unnecessary barriers to trade in services, the Council for Trade in Services shall, through appropriate bodies it may establish, develop any necessary disciplines. Such disciplines shall aim to ensure that such requirements are, *inter alia*:

(a) based on objective and transparent criteria, such as competence and the ability to supply the service;

(b) not more burdensome than necessary to ensure the quality of the service;

(c) in the case of licensing procedures, not in themselves a restriction on the supply of the service.

5. (a) In sectors in which a Member has undertaken specific commitments, pending the entry into force of disciplines developed in these sectors pursuant to paragraph 4, the Member shall not apply licensing and qualification requirements and technical standards that nullify or impair such specific commitments in a manner which:

(i) does not comply with the criteria outlined in subparagraphs 4(a), (b) or (c); and

(ii) could not reasonably have been expected of that Member at the time the specific commitments in those sectors were made.

(b) In determining whether a Member is in conformity with the obligation under paragraph 5(a), account shall be taken of international standards of relevant international organizations[7] applied by that Member.

6. In sectors where specific commitments regarding professional services are undertaken, each Member shall provide for adequate procedures to verify the competence of professionals of any other Member.

Article VIII

Monopolies and Exclusive Service Suppliers

1. Each Member shall ensure that any monopoly supplier of a service in its territory does not, in the supply of the monopoly service in the relevant market, act in a manner inconsistent with that Member's obligations under Article II and specific commitments.

2. Where a Member's monopoly supplier competes, either directly or through an affiliated company, in the supply of a service outside the scope of its monopoly rights and which is subject to that Member's specific commitments, the Member shall ensure that such a supplier does not abuse its monopoly position to act in its territory in a manner inconsistent with such commitments.

3. The Council for Trade in Services may, at the request of a Member which has a reason to believe that a monopoly supplier of a service of any other Member is acting in a manner inconsistent with paragraph 1 or 2, request the Member establishing, maintaining or authorizing such supplier to provide specific information concerning the relevant operations.

4. If, after the date of entry into force of the WTO Agreement, a Member grants monopoly rights regarding the supply of a service covered by its specific commitments, that Member shall notify the Council for Trade in Services no later than three months before the intended implementation of the grant of monopoly rights and the provisions of paragraphs 2, 3 and 4 of Article XXI shall apply.

5. The provisions of this Article shall also apply to cases of exclusive service suppliers, where a Member, formally or in effect, (*a*) authorizes or establishes a small number of service suppliers and (*b*) substantially prevents competition among those suppliers in its territory.

Article IX

Business Practices

[7]The term "relevant international organizations" refers to international bodies whose membership is open to the relevant bodies of at least all Members of the WTO.

1. Members recognize that certain business practices of service suppliers, other than those falling under Article VIII, may restrain competition and thereby restrict trade in services.

2. Each Member shall, at the request of any other Member, enter into consultations with a view to eliminating practices referred to in paragraph 1. The Member addressed shall accord full and sympathetic consideration to such a request and shall cooperate through the supply of publicly available non-confidential information of relevance to the matter in question. The Member addressed shall also provide other information available to the requesting Member, subject to its domestic law and to the conclusion of satisfactory agreement concerning the safeguarding of its confidentiality by the requesting Member.

Article XV

Subsidies

1. Members recognize that, in certain circumstances, subsidies may have distortive effects on trade in services. Members shall enter into negotiations with a view to developing the necessary multilateral disciplines to avoid such trade-distortive effects.[8] The negotiations shall also address the appropriateness of countervailing procedures. Such negotiations shall recognize the role of subsidies in relation to the development programmes of developing countries and take into account the needs of Members, particularly developing country Members, for flexibility in this area. For the purpose of such negotiations, Members shall exchange information concerning all subsidies related to trade in services that they provide to their domestic service suppliers.

2. Any Member which considers that it is adversely affected by a subsidy of another Member may request consultations with that Member on such matters. Such requests shall be accorded sympathetic consideration.

Article XVI

Market Access

1. With respect to market access through the modes of supply identified in Article I, each Member shall accord services and service suppliers of any other Member treatment no less favourable than that provided for under the terms, limitations and conditions agreed and specified in its Schedule.[9]

2. In sectors where market-access commitments are undertaken, the measures which a Member shall not maintain or adopt either on the basis of a regional subdivision or on the basis of its entire territory, unless otherwise specified in its Schedule, are defined as:

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[8]A future work programme shall determine how, and in what time-frame, negotiations on such multilateral disciplines will be conducted.

[9]If a Member undertakes a market-access commitment in relation to the supply of a service through the mode of supply referred to in subparagraph 2(a) of Article I and if the cross-border movement of capital is an essential part of the service itself, that Member is thereby committed to allow such movement of capital. If a Member undertakes a market-access commitment in relation to the supply of a service through the mode of supply referred to in subparagraph 2(c) of Article I, it is thereby committed to allow related transfers of capital into its territory.

(a) limitations on the number of service suppliers whether in the form of numerical quotas, monopolies, exclusive service suppliers or the requirements of an economic needs test;

(b) limitations on the total value of service transactions or assets in the form of numerical quotas or the requirement of an economic needs test;

(c) limitations on the total number of service operations or on the total quantity of service output expressed in terms of designated numerical units in the form of quotas or the requirement of an economic needs test;[10]

(d) limitations on the total number of natural persons that may be employed in a particular service sector or that a service supplier may employ and who are necessary for, and directly related to, the supply of a specific service in the form of numerical quotas or the requirement of an economic needs test;

(e) measures which restrict or require specific types of legal entity or joint venture through which a service supplier may supply a service; and

(f) limitations on the participation of foreign capital in terms of maximum percentage limit on foreign share-holding or the total value of individual or aggregate foreign investment.

Article XVII

National Treatment

1. In the sectors inscribed in its Schedule, and subject to any conditions and qualifications set out therein, each Member shall accord to services and service suppliers of any other Member, in respect of all measures affecting the supply of services, treatment no less favourable than that it accords to its own like services and service suppliers.[11]

2. A Member may meet the requirement of paragraph 1 by according to services and service suppliers of any other Member, either formally identical treatment or formally different treatment to that it accords to its own like services and service suppliers.

3. Formally identical or formally different treatment shall be considered to be less favourable if it modifies the conditions of competition in favour of services or service suppliers of the Member compared to like services or service suppliers of any other Member.

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[10]Subparagraph 2(c) does not cover measures of a Member which limit inputs for the supply of services.

[11]Specific commitments assumed under this Article shall not be construed to require any Member to compensate for any inherent competitive disadvantages which result from the foreign character of the relevant services or service suppliers.

Article XIX

Negotiation of Specific Commitments

1. In pursuance of the objectives of this Agreement, Members shall enter into successive rounds of negotiations, beginning not later than five years from the date of entry into force of the WTO Agreement and periodically thereafter, with a view to achieving a progressively higher level of liberalization. Such negotiations shall be directed to the reduction or elimination of the adverse effects on trade in services of measures as a means of providing effective market access. This process shall take place with a view to promoting the interests of all participants on a mutually advantageous basis and to securing an overall balance of rights and obligations.

2. The process of liberalization shall take place with due respect for national policy objectives and the level of development of individual Members, both overall and in individual sectors. There shall be appropriate flexibility for individual developing country Members for opening fewer sectors, liberalizing fewer types of transactions, progressively extending market access in line with their development situation and, when making access to their markets available to foreign service suppliers, attaching to such access conditions aimed at achieving the objectives referred to in Article IV.

3. For each round, negotiating guidelines and procedures shall be established. For the purposes of establishing such guidelines, the Council for Trade in Services shall carry out an assessment of trade in services in overall terms and on a sectoral basis with reference to the objectives of this Agreement, including those set out in paragraph 1 of Article IV. Negotiating guidelines shall establish modalities for the treatment of liberalization undertaken autonomously by Members since previous negotiations, as well as for the special treatment for least-developed country Members under the provisions of paragraph 3 of Article IV.

4. The process of progressive liberalization shall be advanced in each such round through bilateral, plurilateral or multilateral negotiations directed towards increasing the general level of specific commitments undertaken by Members under this Agreement.

Article XX

Schedules of Specific Commitments

1. Each Member shall set out in a schedule the specific commitments it undertakes under Part III of this Agreement. With respect to sectors where such commitments are undertaken, each Schedule shall specify:

(a) terms, limitations and conditions on market access;

(b) conditions and qualifications on national treatment;

(c) undertakings relating to additional commitments;

(d) where appropriate the time-frame for implementation of such commitments; and

(e) the date of entry into force of such commitments.

2. Measures inconsistent with both Articles XVI and XVII shall be inscribed in the column relating to Article XVI. In this case the inscription will be considered to provide a condition or qualification to Article XVII as well.

3. Schedules of specific commitments shall be annexed to this Agreement and shall form an integral part thereof.

Article XXI

Modification of Schedules

1. (a) A Member (referred to in this Article as the "modifying Member") may modify or withdraw any commitment in its Schedule, at any time after three years have elapsed from the date on which that commitment entered into force, in accordance with the provisions of this Article.

(b) A modifying Member shall notify its intent to modify or withdraw a commitment pursuant to this Article to the Council for Trade in Services no later than three months before the intended date of implementation of the modification or withdrawal.

2. (a) At the request of any Member the benefits of which under this Agreement may be affected (referred to in this Article as an "affected Member") by a proposed modification or withdrawal notified under subparagraph 1(b), the modifying Member shall enter into negotiations with a view to reaching agreement on any necessary compensatory adjustment. In such negotiations and agreement, the Members concerned shall endeavour to maintain a general level of mutually advantageous commitments not less favourable to trade than that provided for in Schedules of specific commitments prior to such negotiations.

(b) Compensatory adjustments shall be made on a most-favoured-nation basis.

3. (a) If agreement is not reached between the modifying Member and any affected Member before the end of the period provided for negotiations, such affected Member may refer the matter to arbitration. Any affected Member that wishes to enforce a right that it may have to compensation must participate in the arbitration.

(b) If no affected Member has requested arbitration, the modifying Member shall be free to implement the proposed modification or withdrawal.

4. (a) The modifying Member may not modify or withdraw its commitment until it has made compensatory adjustments in conformity with the findings of the arbitration.

(b) If the modifying Member implements its proposed modification or withdrawal and does not comply with the findings of the arbitration, any affected Member that participated in the arbitration may modify or withdraw substantially equivalent benefits in conformity with those findings. Notwithstanding Article II, such a modification or withdrawal may be implemented solely with respect to the modifying Member.

5. The Council for Trade in Services shall establish procedures for rectification or modification of Schedules. Any Member which has modified or withdrawn scheduled commitments under this Article shall modify its Schedule according to such procedures.

ANNEX D

COUNTRY ANNEXES

ANNEX D. 1

GHANA

CONTENTS

ACRONYMS
PREFACE

1. OVERVIEW OF EXISTING SITUATION 91

1.1 KEY FACTS 91
1.2 CONSTRAINTS 91
1.3 TOWARDS A NEW REFORM POLICY 92

2.ORGANIZATIONAL RESTRUCTURING 92

2.1 SEPARATION OF POSTAL AND TELECOMMUNICATION OPERATIONS 92
2.2 SEPARATION OF POLICY, REGULATION AND OPERATIONS 93
2.3 NEW REGULATORY ORGANIZATION 94
2.4 EVALUATION OF ORGANIZATIONAL REFORMS 95

3. ECONOMIC REFORM THE TELECOMMUNICATION SECTOR 97

3.1 PRIVATIZATION OF GHANA TELECOM 97
3.2 OPENING SERVICES TO COMPETITION 97
3.3 COMPETITION IN FIXED NETWORKS 99
3.4 BUILD OPERATE TRANSFER SCHEMES (BOT) 99
3.5 EVALUATION OF PRIVATE-SECTOR PARTICIPATION POLICY 99

4. TARIFFS 100

5. REGIONAL COOPERATION 101

5.1 REGIONAL COOPERATION OBJECTIVES 101
5.2 MEMBERSHIP OF REGIONAL/SUBREGIONAL ORGANIZATIONS 101
5.3 PARTICIPATION IN REGIONAL/SUB-REGIONAL PROJECTS 102
5.4 COMMUNICATION WITH NEIGHBORING COUNTRIES 102
5.5VIEWS ON REGIONAL COOPERATION 102

6. OBLIGATIONS AND MARKET ACCESS REQUESTS/OFFERS UNDER GATS 102

6.1 ACCESS TO AND USE OF TELECOMMUNICATIONS 102
6.2 MARKET ACCESS REQUESTS/OFFERS 102

7. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS 103

7.1 CONCLUSIONS 103
7.2 RECOMMENDATIONS 104

APPENDIX 1 PERSONS MET DURING THE FIELD STUDY IN GHANA

ACRONYMS AND ABBREVIATIONS

Africom - African Communication Limited

AGP - Accelerated Growth Programme

ALCATEL - Alcatel S.A

AMPS - American Mobile Phone System

AT&T - American Telephone and Telegraph

BOT - Build-Operate-Transfer (an arrangement for project financing)

BT - British Telecom

CAPAS - Coordinated African Programme of Assistance on Service

CPE - Custom Premises Equipment

ECOWAS - Economic Association of West African States

EDI - Electronic Data Interchange

GATS - General Agreement on Trade in Services

GFRCB - Ghana Frequency Registration and Control Board

GII - Global Information Infrastructure

GPT - Ghana Posts and Telecommunications Corporation

GSM - Global System Mobile Communication

GT - Ghana Telecom (a Company incorporated to operate telecommunications services now being provided by the Ghana Posts and Telecommunications Corporation)

IDD - International Direct Dialing

NCA - National Communication Authority

PABX - Private Automatic Branch Exchange

PATU - Pan African Telecommunication Union

RASCOM - Regional African Satellite Communication

SNNO - Second National Network Operator

TACS - Total Access Communication System

WTO - World Trade Organization

PREFACE

The main report on this study addresses the general telecommunications concerns and constraints of CAPAS countries and, to a lesser extent, of Sub-Saharan African Countries. Also in the main report, ongoing and planned telecommunication sector reforms in CAPAS countries are outlined and, on the basis of international experience and lessons from the studies in the five CAPAS countries, proposals of general application are made as inputs into the ongoing reforms. Furthermore, regional cooperation and multilateral liberalization are considered and general recommendations on market access offers/requests, under GATS, for CAPAS countries made in that report.

In this Annex (1), the same issues as those in the main report are addressed against the background and particular circumstances of Ghana and where appropriate, observations and recommendations are made as inputs to ongoing reforms. Finally, suggestions on market access requests/offers are made that are consistent with the telecommunication sector development policies in Ghana.

1. OVERVIEW OF EXISTING SITUATION

1.1 Key Facts

The population of Ghana is about 16 million. About 25% live in urban areas, while the rest are in rural areas. In 1993 GDP was 6252 million US Dollars and GDP per capita US$ 390. Teledensity is 0.3 main telephone lines for every 100 inhabitants compared with the sub-Saharan African average of 0.5 main lines for every 100 people. The estimated current demand is 200,000 lines. Estimated demand to the year 2000 is in the range of 310,000 - 500,000 lines[1]. The quality of service is low. Business customers interviewed complained of long waiting periods for the provision of telephone service and inadequate availability due to frequent outages and network congestion. Some centers, let alone villages, have no telephone service. Ghana Posts and Telecommunications Corporation (GPT) provides telephones, telegraph, telex, facsimile services and leased circuits. It does not as yet provide data service or value added services. Large business customers who can afford leased circuits for data and enhanced (value-added) services are dissatisfied with the quality of service of the lines. Most of the telephone exchanges and transmission facilities are analogue and, therefore, have limitations for data transmission and value added services due to low speed and reliability. Because of these limitations, some potential business customers have refrained from leasing private circuits, preferring to wait for improvement in the network.

Mobile voice services are provided by Millicom (Ghana) Limited (Mobitel) and Celtel. Being more expensive than the fixed service, the mobile services are used mainly by large businesses, diplomatic missions and international organizations.

1.2 Constraints

Finance and human resources are among the constraints contributing to the poor performance of the telecommunication sector. Other impediments to the efficiency are technology and inappropriate organizational structure of the sector. These constraints are considered briefly below:

(a) Financing sources

The main sources of financing telecommunications services provided by GPT are multilateral and bilateral loans and internally-generated funds.

The first telecommunications expansion project financed by the World Bank and completed in 1986 increased the number of main telephone lines by 10,000 from 35,000 to 45,600. The second (ongoing) Project funded by a World Bank loan is expected to be completed in 1995 and will increase the number of lines from 52,000 to 79,000[2]. It takes 4 years from initiation of a project to first disbursement of a World Bank Loan. Bilateral loans have been provided by some developed countries including Japan and France and are tied to purchase of equipment from the donor country. At present, only US$ 10 million is available

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[1] Source: "Report on the Future Development of the Telecommunication Sector in Ghana", Anderson International, 1993.

[2] Source: Memorandum on the Short Term Plan for the Supply of 100,000 New Telephone Lines, Ghana Post and Telecommunication Corporation, October, 1994.

from internal sources (Ghana Posts and Telecommunications Corporation) for network expansion.

(b) Human Resources

The lack of skilled manpower is a significant constraint on telecommunication development. According to the Ghana Posts and Telecommunications Corporation (GPT), there is a shortage of qualified senior staff necessary for preparing plans and projects and other tasks which require high skills. GPT staffing deficiencies are aggravated by the loss of personnel to the private sector or institutions outside the country due to unattractive terms of service.

(c) Technology

The existing fixed network is predominantly analogue. GPT has decided that all new equipment will be digital.

(d) Organizational structure

Postal and telecommunication services are operated by a single entity, GPT. The Ministry of Transport and Communications is responsible for policy. Regulatory functions are shared among the Ministry, the Ghana Frequency Registration and Control Board (GFRCB) and GPT. The Ministry issues licenses to privately-owned operators, and approves GPT tariffs. The GFRCB is responsible for radio-spectrum regulation and management. GPT assists the Ministry in evaluating licensing proposals and type-approves terminal equipment.

1.3 Toward a New Reform Policy

The Government of Ghana has launched an Accelerated Growth Programme (AGP) which aims to raise real growth to 8% p.a. by the end of the century. Also, the Government is implementing a decentralization policy whereby Regional and District authorities will be given greater powers on decisions affecting development and administration in their respective areas. Finally, it is Ghana's goal to be part of the Global Information Infrastructure planned by the International Community. All these major objectives call for adequate and modern telecommunication facilities. The Government announced a new telecommunication policy which aims to achieve rapid expansion and improved quality of telecommunication services in the country through increased private sector participation, the abolition of the monopoly of GPT over the provision of terminal equipment (that is equipment installed in users' premises); allowing competition in non-basic services and the establishment of an appropriate regulatory framework. Ghana has set short-term, medium-term and long-term targets for expansion of telephone services. It is planned to achieve penetration rates of 1 telephone line per 100 inhabitants by the end of 1996 and 13 telephone lines by the year 2000. The long-term target is 25 lines for 100 inhabitants[3].

2. ORGANIZATIONAL RESTRUCTURING

2.1 Separation of Postal and Telecommunication Services

[3] Source: Ministry of Transport and Communications.

A decision to separate postal and telecommunication services operations was taken in 1988. Currently postal and telecommunication operations are carried out by separate departments. Support services and common facilities, for example, branch offices, have not been separated. The groundwork for the separation is being done in-house (by GPT). Activities, for example, valuation of assets, which require expertise not available within GPT will have to be contracted out. The establishment of a task force consisting of officials from relevant departments of GPT including Finance, Posts and Telecommunications would speed up the split.

The Government has decided that a company, Ghana Telecom (GT) incorporated under the Companies Code, 1963 (Act 179) will take over the telecommunication operations of GPT. The postal services will be run by a posts corporation to be established by an Act of Parliament.

2.2 Separation of Policy, Regulation and Operations

2.2.1 Under the present set-up the Ministry of Transport and Communications is responsible for policy and aspects of telecommunication regulation, including licensing privately-owned operators and approval of tariffs for services provided by the Ghana Posts and Telecommunications Corporation (GPT). The Ghana Frequency Registration and Control Board (GFRCB) assigns radio frequencies and monitors the use of the radio frequency spectrum. GPT also exercises regulatory functions. They include type-approval of equipment and recommendations to the Minister concerning license applications by other telecommunication operators. The regulatory role of GPT is inappropriate. It creates a conflict of interest. This has been an unavoidable transitional arrangement.

2.2.2 The ongoing organizational reforms of the telecommunications sector in Ghana envisage:

(a) complete separation of policy and regulation from operations. Operators will have no powers of policy formulation or regulation.

(b) Substantial separation of policy-making and regulatory functions. Under the proposed National Communication Authority Act (NCA Bill 1994 version) the Ministry of Transport and Communications will be responsible for telecommunication policy. Regulatory oversight will be exercised by a National Communications Authority (NCA) which is being established under the Act. (More about this in Section 2.3 below) However, the Minister will also have a significant role over regulatory policy. The proposed Act gives the Minister the mandate to give the NCA directions of a general nature regarding the performance of its functions. Also, the Minister will have powers to receive and determine appeals from operators against decisions of the NCA in respect of refusal to grant licenses, suspension, modification or cancellation of licenses. On the other hand, the NCA will have substantial influence over policy. Advising the Minister on policy formulation and development strategies for the communications industries, is the first item in the list of responsibilities of the NCA[4].

[4] Section 3(a) of National Telecommunication Act (Bill) 1994.

2.3 New Regulatory Organ

2.3.1 A very important feature of the organizational reform of the telecommunication sector is the establishment of a substantially independent Regulatory Organ. In the context of the policies of privatization and the lowering of barriers to entry by service providers in selected service sub-sectors, this is a very essential move. The significance of the proposed National Communication Authority (NCA) and the scope of its mission are reflected in the statement of purpose at the beginning of the Act. The objective of the Act is "..... to regulate communications by wire, cable, radio, television, satellite and any other means of technology for the orderly development and operation of efficient communications in Ghana and for related purposes"[5]. The mission of the NCA encompasses:

(a) the promotion of universal service goals as far as is practicable;
(b) the achievement by operators of the highest level of efficiency and responsiveness to customer and community needs;
(c) the promotion of fair competition among communications services providers;
(d) the protection of customers and operators from the unfair conduct of other operators with regard to the quality of services and tariffs;
(e) the protection of the interest of customers;
(g) the promotion of research into and development of new technologies; and
(h) the development of adequate human resources in collaboration with other government departments and agencies.

The responsibilities of the National Communications Authority (NCA) in relation to carrying out its mission include:

(a) advising the Minister on Policy formulation and development strategies for the communications industry;
(b) granting licenses and the regulation of communication systems other than mass communication systems;
(c) allocation, assignment and regulation of the use of radio frequencies;
(d) representing Ghana internationally in respect of communications;
(e) designating standards of communications equipment;
(f) providing guidelines on tariffs; and
(g) providing, where practicable, assistance and advice to operators [6].

The NCA Bill prescribes broad procedures for the processing, modification, renewal, suspension and cancellation of licenses. They include acknowledgment by the NCA of an application within five days and notification of the decision of the NCA to the applicant within 60 days. The NCA is empowered to modify licenses after consultation with the affected licensees. More importantly, the NCA has the mandate, under the proposed Act, to make regulations concerning these matters. The NCA Bill gives an operator dissatisfied with the decision of the NCA regarding licensing the right to appeal to the Minister, and to the High Court if also aggrieved by the decision of the Minister.

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[5] Preamble to the National Communication Authority Bill 1994.

[6] During the visit to Ghana the Consultants learnt that the bill is to be amended to extend the scope of the functions of the NCA to the regulation of broadcasting, radio and television operations.

The Act makes interconnection between the systems of operators mandatory. The role of the NCA in this matter is to arbitrate when operators cannot agree on the terms of interconnection.

2.3.2 According to National Communications Authority (NCA) Bill, the National Communications Authority (NCA) shall be governed by a Board which shall consist of five members, including a Chairman and a Director General who shall be the Chief Executive of the Authority. All the members will be appointed by the President in consultation with the Minister. Appointees shall be persons of integrity, with expertise, experience and knowledge, and, in particular, knowledge relevant to the functions of the NCA.

The NCA Bill requires the operation and provision of communication services to be licensed. Communications for private (including business) use and for security services are exempt from this requirement. Also, the NCA is empowered, by means of legislative instruments, to exempt other communication systems.

In addition to the Director General the NCA will have other officers and employees as may be necessary for the performance of its functions. The officers will be appointed by the President on the advice of the Board given in consultation with the Public Service Commission. The Bill gives the President discretion to delegate this power.

2.3.3 The NCA's finances will consist of funds provided by Parliament, loans from the Government or other sources and gifts and donations. Fees and other charges collected by the NCA will go into Government revenue.

2.3.4 The NCA bill does not state when the NCA will be established. But the Consultants were given to understand that the Regulatory Organ would be operational as soon as practicable after the enactment of the legislation.

2.4 Evaluation of Organizational Reforms

2.4.1 Separation of regulation from operations

The establishment of the NCA is not linked to the separation of telecommunication operations from postal operations. The proposed NCA Act will not repeal the whole of the Posts and Telecommunication Decree 1975, (N.R.C.D. 311). Only section 62 of the Decree which relates to regulatory functions will be repealed by the NCA Act. This means that once arrangements (including the enactment of the Act) for the launching of the NCA are complete, it can start functioning without waiting for the completion of separation of the postal and telecommunication operations. With the substantial opening of telecommunication services to competition, so far, of the telecommunication sector in Ghana, it is desirable for effective regulation, that the National Communications Authority (NCA) becomes functional as soon as possible. At the same time, speeding up the split of postal and telecommunication operations would lead to a more effective management of the new national telecommunication operator, Ghana Telecom. The Board and Management of the company would be placed in a position to concentrate on internal reorganization and other activities for the improvement of the performance of the company.

2.4.2 Policy formulation and regulation

One of the responsibilities of the NCA, under section 3 of the NCA Bill is to ".... advise the Minister on policy formulation and development strategies for the communication industry".

Two approaches to the handling of policy formulation are possible in the context of this stipulation.

(a) The Minister could rely almost exclusively on the advice of the NCA for policy and development strategies instead of having a unit in the Ministry which would also handle policy formulation. This option promotes economy in the use of human resources.

(b) Establishing a separate policy unit in the Ministry to be manned by a small number of staff including an expert on telecommunications. In a rapidly changing communications environment it is desirable that the Minister and senior officials of the Ministry continually review policy. The clause in the proposed NCA Act giving the Minister the mandate to give directions to the NCA envisages this activity. The NCA being a regulatory organ could be tied down to day-to-day regulatory matters. This is a very likely possibility under the constraint of the shortage of human resources. The presence of a policy unit in the Ministry working in collaboration with the NCA would contribute to the effectiveness of policy formulation. The unit would also provide independent analyses pertaining to appeals to the Minister against the decisions of the NCA on licensing.

2.4.3 The National Communication Authority (NCA)

The NCA is being established at "arms-length" from the sector Ministry - as a separate legal entity. This approach enhances the perception of independence and, consequently, contributes to the effectiveness of regulation. The mission of the NCA has been stated clearly. The inclusion of radio-spectrum regulation, currently under the Ghana Frequency Registration and Control Board, in the functions of NCA, facilitates a coordinated approach to regulation of the telecommunication. The reported amendment to the NCA Bill to bring the regulation of mass media communication under the ambit of the NCA's mission will complete this desirable aspect of coordination. This is essential in the era of convergence of computer, voice and video communications. The wide scope of the mission of the NCA goes a long way in ensuring effective regulation and development of the communications sector. Nevertheless, a few more issues need to be addressed administratively concerning the NCA:

(a) **Financing**

Financial autonomy is one of the essential prerequisites of an effective regulatory body. Primarily, this involves having assured sources of finance and freedom to utilize funds without many bureaucratic procedures which characterize civil service organizations. The proposed Act does not expressly make the NCA self-financing since its funds are to be provided partly by Parliament and partly through Government or other loans. Revenues from the NCA's activities are to be paid into the Consolidated Fund. Still, the NCA can be made self-financing, in effect, if it uses its powers under the proposed Act, to collect sufficient fees and other charges from operators to finance its activities. The process of appropriation by Parliament would be followed but it is recommended that, after approval, the NCA be given the flexibility to utilize funds with minimum bureaucratic procedures.

(b) **Staffing**

For the NCA to carry out its functions effectively, it is essential that it attracts and retains staff of high caliber. NCA's salaries and other conditions should, therefore, as far as practicable, be comparable to those of the private telecommunication sector. In this regard, it is advisable to bear in mind that, with more opening to competition of the sector, vying for qualified communication personnel will intensify.

(c) **Regulations and guidelines**

Transparency is becoming an increasingly important element of regulation. The proposed Act lays down broad principles and procedures. The formulation and adoption of detailed guidelines and procedures should be one of the priority tasks for the NCA. It is recommended that the NCA launches an intensive exercise in this regard.

3. ECONOMIC REFORM OF THE TELECOMMUNICATION SECTOR

The Government's new policy for the development of the telecommunication sector aims to achieve rapid expansion and improved quality of services through increased private sector participation. This diversification of the telecommunications industry is considered essential by the Government not only for attracting private sector finances, but also for the ability of that sector to efficiently and profitably meet demand and adopt new technologies. The various ways of promoting private sector involvement are considered in this section.

3.1 Privatization of Ghana Telecom (GT)

The privatization policy has been implemented successfully in other sectors of the Ghanaian economy. The privatization of Ghana Telecom is planned. The Government intends to secure a Strategic Investor in order to bring into the company needed financial, technological and human resources into GT. Some of the shares of the company will also be offered to Ghanaians through a public sale. Apart from contributing necessary management and technical expertise, a strategic investor, likely to be a foreign telecommunication operator, will bring in foreign exchange or the equivalent in equipment.

The Government has been talking to prospective strategic investors, including American Telephone and Telegraph Company (AT & T) and British Telecoms (BT). After these exploratory discussions, tenders inviting bids from investors will be floated.

According to the Ghana Stock Exchange, sufficient funds could, over time, be raised through the local capital market. This would not be a viable option for improving the performance of GT unless other arrangements were used to secure external human resources support, such as through a management contract with an experienced telecommunication operator.

3.2 Opening Services to Competition

(a) **Terminal Equipment**

In 1987 Ghana abolished the Ghana Posts and Telecommunication Corporations (GPT's) monopoly over the provision, installation and maintenance of all telecommunication equipment which is installed in users' premises. Such equipment, also known as customers premises equipment (CPE) includes, telephone receivers, fax machines, teleprinters, private automatic branch exchanges (PABX's), modems and jacks.

(b) **Mobile Cellular Services**

In 1992 Millicom (Ghana) Ltd., operating under the trade name Mobitel, were licensed to provide mobile cellular telephone service. Mobitel is wholly owned by Millicom, a US-based company. By the end of 1994, Mobitel had 4000 subscribers and expects to increase the number to 5000 by the end of 1995 and to 20,000 in the next 5 years. The company initially provided services in Accra only, but is currently branching out to Kumasi and other urban centers. Mobitel has plans to install a domestic satellite station which, in addition to mobile services, can be used to provide fixed cellular services in selected areas of the country. Mobitel uses the Total Access System (TACS) technology which is analogue, but plans to change to the Global System Mobile Communications (GSM) technology which is digital.

A second mobile cellular operator, Celtel, started operations in March 1995. Celtel, which is owned 95% by Ghanaians and 5% by AT&T, has plans to serve 20,000 customers by the year 2000. Also, it intends to provide fixed cellular service if it is authorized to do so. Celtel's network, which uses American Mobile Phone System (AMPS) digital technology has the facilities to provide circuits for data and various value added services.

A third cellular service license has been issued to a joint venture between GPT and Cyncom, a US-based company. Service is not yet operational.

(c) **Data communication**

Data transmission services have been opened to provision by privately owned operators. Following the new policy, applications for X-25 public data services are under consideration by the Ministry. This reform is very important in promoting trade. Business transactions depend heavily on data communications in their simple (basic) form as well as in the enhanced form, for example, electronic data interchange (EDI).

(d) **Paging**

Paging services have been opened to competition. There were firms operating paging services in Accra at the time of the visit in Ghana in May 1995.

(e) **Payphones**

There are telephone and fax bureaus in Accra. They have been tolerated by GPT. The new government policy includes the opening of payphones and fax services to competition.

(f) **Value-added services**

These services which are also known as enhanced services have been fully opened to competition.

3.3 Competition in fixed network

Competition involves allowing users a choice of services and providers. However, it is the policy of the Government of Ghana that limited competition will be introduced into the fixed network by initially creating a duopoly, i.e. licensing a second national network operator, with similar rights and obligations as Ghana Telecom (GT).

3.4 Build-Operate-Transfer Schemes (BOT)

Capital Company Ltd, a wholly Ghanaian owned company has entered into a build-operate-transfer (BOT) scheme with Ghana Posts and Telecommunication Corporation (GPT) to build a network in the Southern sector of Ghana. The project will cover five regions: Western, Central, Accra, Eastern and Volta regions and will provide 40,000 lines. Originally GPT planned to use suppliers credit to finance the project but it appeared that the cost would be very high. It was decided to use the BOT mechanism. The BOT is for a 10 year duration. Cellular technology is being used for the project. The service that will be provided is fixed cellular, but mobile cellular service could also be provided within 10 kilometers of cell sites. Service was planned to be operational in September 1995, starting with the Volta Region. In areas where GPT network is non-existent the BOT will build facilities, for example, microwave transmission systems and switches. The BOT network will interface with the existing GPT network. At the end of the contract period the network will be turned over to GPT or its successor.

The BOT owner is confident of the profitability of this network whose coverage includes rural areas. A discriminatory tariff in favor of rural users will be applied. Charges will increase with distance from rural to urban areas. Revenue is expected to come predominantly from urban dwellers calling back to rural homes. As part of marketing strategy, the BOT will encourage urban dwellers to install telephones in their rural areas.

3.5 Evaluation of Private Sector Participation Policies

Implemented as fully as possible, the policies cited above should ensure rapid expansion and modernization of telecommunication services in Ghana. The following are among the issues that could be taken into account to ensure successful implementation.

3.5.1 Completion of organizational reform

The privatization of Ghana Telecom (GT) cannot be progressed sufficiently without the completion of the separation of postal operations and telecommunication operations including the division of assets between GT and the new postal entity. The assets and liabilities relating to the telecommunication operations of Ghana Posts and Telecommunications Corporation (GPT) need to be determined as they have to be shown in invitations for proposals from prospective strategic investors and prospectus for public offers of shares. It is advisable that the activities leading to separation be intensified.

The other policies relating to involvement of the private sector and, in particular, the introduction of competition in some segments of telecommunication services call for regulation by a body well equipped for the task. It is recommended that the National Communications Authority (NCA) be established and made functional as soon as practicable.

3.5.2 Restriction on Cross-subsidization

In Ghana, as in many developing countries, some of the services provided by the national telecommunication operator are charged at rates much higher than the cost of provision in order to subsidize uneconomic services. For example, international telephone services subsidize domestic services where both services are provided by the same operator. This is the situation in Ghana and most African countries at present. In segments where competition has been permitted, as in mobile services, data transmissions, payphones and value-added services, Ghana Telecoms should not be allowed to cross-subsidize. To do so would amount to permitting unfair competition. The proposed National Communication Authority Act does not prohibit cross-subsidies in competitive service segments. In order to ensure a 'level playing field', an operating license should be issued to Ghana Telecoms requiring it, among things, to desist from cross-subsidizing services which it provides in competition with other operators and to maintain separate accounts for all services. On its part, Ghana Telecoms would show its *bona fides* in complying with such requirements if it established subsidiary companies for services that it operates in competition with other service providers, such as data transmissions and mobile services.

The Government has in its policy statement declared its intention not to allow private operators to "cream-skim" the public network which has been financed by public funds. This refers to operators who use the existing public telecommunication infrastructure in providing services. For example, cellular mobile operators inter-connect with the network of the Ghana Telecoms to transmit or receive international or long- distance calls. They should contribute equitably to the cost of constructing, maintaining and operating that network through appropriate interconnection charges.

3.5.3 Second National Network Operator (SNNO)

The planned introduction of competition in the basic network through the licensing of a Second National Network Operator (SNNO) is a significant milestone in telecommunication development policy in a CAPAS country. The timing and manner of its implementation is equally important in view of its possible implications on other strategies for the development of the telecommunication sector.

3.5.4 BOT's Regional and Local Networks

If the BOT for the southern sector takes off successfully it will be a good precedent. This mechanisms is not necessarily inconsistent with the introduction of an SNNO. It can be used by the national operators to develop areas in which they are unlikely to introduce service soon. Nor is the mechanism inherently inconsistent with privatization through a strategic investor. To the extent that a BOT accelerates the development of the existing network, it is likely to be perceived as enhancing the value of the incumbent operator. Also, the successful implementation of the BOT would be a good basis for permitting independent regional or local networks as way of accelerating expansion of telecommunication services. To be viable any such networks would need to have exclusivity in their areas of operation because demand in outlying regional and rural areas is usually smaller than in Accra or other large urban centers.

4. TARIFFS

4.1 The tariffs for services provided by the Ghana Posts and Telecommunications Corporation (GPT) are approved by the Sector Minister. Approval takes a long time as the process is long.

Proposals by Management have to go through the Board of Directors, then to the Minister and finally to the Attorney General to prepare a statutory instrument for publishing the tariffs. The long-winded procedure inhibits timely tariff changes. Tariffs were last revised in January 1993. The previous revision was in 1990. Due to the long interval in the last revision rates rose by up to 200% in some services. Such a large rise is not good for customer relations.

Some business customers interviewed said that the rates for international telephone services were too high. Others were more concerned about quality and availability of service than the rates. Telephone call charges are on the basis of groups of countries. For example, to the U.S.A., U.K. and Germany the rate is 1300 cedes or about US$ 1.2 per minute for International Direct Dialing (IDD) calls. This compares favorably with other countries visited for example, Tanzania (US$ 6.00 per minute) and Uganda US$ 6 per minute). However, all business customers interviewed found mobile cellular telephone tariffs too high and said they use the service only when absolutely necessary. Initially Mobitel charged outgoing as well as incoming calls. The charge for incoming calls was dropped after customers complained and upon Ghana Posts and Telecommunications Corporation (GPT) agreeing to give Mobitel a share (50%) of revenue from incoming calls.

The BOT investor indicated that charges for the fixed cellular telephone service which will be provided under the scheme will be higher than those applicable to the GPT telephone service but will be considerably lower than mobile cellular service rates.

According to the National Communications Authority Bill, the National Communications Authority (NCA) will issue guidelines on tariffs. It will not fix tariffs. This approach will provide flexibility to operators in fixing their tariffs. The policy announced by the Minister did not touch on tariffs. The policy should explicitly be reflected in the guidelines that will be issued by the NCA. Elements of such policy should include partly cost, efficiency and public service obligations, in the case of national network operators. As rate-of-return based tariffs are complicated to formulate, price-caps would be a good starting point of guidelines to be issued by the NCA in respect of national network operations and services.

5. REGIONAL COOPERATION

5.1 Regional Cooperation objectives

Ghana aspires to be a business and communications centre in Western Africa. Accordingly, Ghana will support all legitimate initiatives for intensifying integration at the sub-regional and regional levels in Africa.

5.2 Membership of Regional/Sub-regional Organizations

Ghana is an active member of the Pan African Telecommunication Union (PATU) and the Regional African Satellite Communication (RASCOM). She is also a member of the Economic Association of West African States (ECOWAS) which has an economic fund for telecommunication projects. As a member of the Organization of African Unity she participates in regional integration initiatives taken at the levels of the OAU Heads of State and Ministerial Councils. One such initiative submitted to the OAU Summit held in Addis Ababa in June 1995 is the participation of the African continent in the Global Information Infrastructure (GII).

5.3 Participation in Regional/Sub-regional Projects

Ghana participated in the Pan African Telecommunication Network (PANAFTEL) whose objective was to link African countries, directly through telecommunication instead of going through former metropolitan countries. Consistent with its objective of being part of the GII Ghana is talking to companies which have indicated their intention to establish facilities for the infrastructure round the African continent. The companies include AT&T, ALCATEL and AFRICOM.

5.4 Communication with neighboring countries

Business customers voiced dissatisfaction with communication with neighboring countries which they said was difficult and at times impossible. Lack of agreed accounting rates had been one of the obstacles to the exchange of communication with neighboring countries. This impediment has been removed following negotiation of accounting rates with neighboring telecommunication administrations. The remaining obstacles to sub-regional communications lack adequate and modern infrastructure. They will be addressed through the ongoing and planned telecommunication development programmes.

5.5 Views on Regional Cooperation

Both the Government and the public are for intensified regional integration and cooperation. However, there is a feeling that sub-regional and regional organizations are not effective. They lack financial resources. Member countries do not pay their contributions regularly.

6. OBLIGATIONS AND MARKET ACCESS REQUESTS/OFFERS UNDER GATS

6.1 Access to and use of Telecommunications

Ghana did not make commitments under the General Agreement on Trade in Services (GATS) for market access in respect of telecommunications or, for that matter, communications. Commitments where not made because by the end of the Uruguay Round Negotiations, the policy on the reform of the telecommunication sector was still under formulation. Ghana made commitments on construction and related engineering services, educational services, financial services, tourism and related travel services as well as transport services. Having made such commitments, Ghana has an obligation under Annex III (Telecommunications), to give nationals of other Parties who provide those services in Ghana, access to and use of telecommunication services for their operations. That means making available to such providers leased circuits and other facilities at reasonable and non discriminatory terms and in accordance with transparent procedures. The reforms instituted by the Government of Ghana substantially meet this obligation.

6.2 Market access requests/offers

The benefits that accrue from making market access commitments under GATS in respect of telecommunications have been discussed in the main report. In brief, permitting foreign investors to participate in selected segments of telecommunications sector gives a developing country like Ghana access to needed finance in hard currency as well as managerial and technical expertise. Also, binding existing market access reforms under the GATS makes then irreversible, thus providing stability. Committing planned market access policies under the GATS provides an incentive for carrying them through.

In segments where Ghana has permitted competition in telecommunications, there is no discrimination between foreign and domestic operators in licensing. There are, however, minimum capital requirements for foreign operators under the Investment Promotion Centre Act. Generally, foreign operators have to put up a minimum capital of US$ 250,000 for a wholly foreign owned business and US$ 50,000 for a business established as a joint venture with Ghanaians. Accordingly, service segments in which competition has been permitted have been liberalized in the sense that the foreign providers are allowed to operate services in competition with local providers. Therefore, the reform policies adopted by Ghana place her in a position to make significant commitments on telecommunications.

6.2.1 Basic Telecommunication Services

(a) Ghana has or will, under the policy announced recently, allow competition in the following basic telecommunication services:

- Mobile telephony
- Operation of payphones
- Data transmissions (Packet switched and circuit-switched)
- Operation of facsimile services
- Paging and two-way radio services

In Ghana and some other countries, especially developing ones, these services are considered as value added. They are "new services" in that, in Sub-Saharan African countries, they have been introduced recently. Nevertheless, in the "Questionnaire on Basic Negotiations" prepared by WTO and circulated to parties to the GATS, these services are classified as basic. It is probable that these "new services" will also be included in the final classification of basic telecommunication services to be adopted by the WTO for the purposes of the GATS. It is therefore recommended that Ghana makes offers and requests for market access for these services.

(b) According to the new policy, Ghana intends to introduce limited competition into the fixed network, by initially allowing a duopoly. As the GATS provides for progressive liberalization of services, it is not desirable to commit foreign competition via the GATS the introduction of a Second National Operator early in view of the universal service implications of such a strategy. The flexibility of unilateral liberalization is desirable for such an important service sector.

6.2.2 Value added services

Market access offers and requests may be made for value-added services as they have been opened to competition.

7. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

7.1.1 Ghana has launched wide-ranging reforms for the development and modernization of the telecommunication sector. The reforms have a two-pronged approach: organizational restructuring and involvement of the private sector in the development of telecommunications.

7.1.2 Organizational reform encompasses separation of postal and telecommunication operations; corporatization of the telecommunication wing of the government-owned Ghana Posts and Telecommunications Corporation (GPT) and the establishment of a semi-independent regulatory body, the National Communications Authority (NCA). These reforms are in advanced stages of implementation.

7.1.3 Private sector participation in the development of telecommunications is the thrust of the reform policies of the Government of Ghana. The privatization of Ghana Telecom (GT) through securing a strategic investor and a public offering of some of the shares of the company is meant to bring into GT the needed finance and human resources and to broaden its ownership by giving Ghanaians investment opportunities. Domestic reforms which started with the abolition of the monopoly of the Ghana Telecommunication Corporation over terminal equipment in 1987, has been extended to permitting competition in certain basic networks and services such as mobile telephony, data transmissions, payphones as well as all value-added services. As part of the strategy of private sector participation GPT has been allowed to use a BOT mechanism to expand services in the southern sector of the country. If the BOT arrangement becomes successful, it would be useful to try it in other areas of the country. Alternatively, independent regional networks should be licensed.

It is Ghana's declared policy that limited competition will be introduced in the basic services by licensing a Second National Network Operator. However, in view of the relatively small present and projected customer-base for telephone services and of the other strategies for private sector participation, it is advisable that the Government pays close attention to the timing and method of the implementation of this strategy.

7.1.4 The degree of domestic reforms now existing and planned together with the proposed regulatory framework place Ghana in a position to make significant market access offers and requests under GATS in respect of telecommunications.

7.2 Recommendations

Implemented successfully, the reforms should ensure rapid expansion and modernization of facilities and services. This subsection of the report recommends a number of actions and approaches which the Consultants consider will contribute to timely and effective implementation of the reforms.

(a) The establishment of a task force consisting of the Ghana Posts and Telecommunications Corporation (GPT) officials to progress groundwork on the separation of postal and telecommunication operations would speed up the completion of the split.

(b) The introduction of competition into the telecommunication sector requires regulation by a body suitable for the task. It is recommended that the National Communication Authority (NCA) be established and be functional as soon as practicable.

(c) Assured sources of finance is an essential condition for independence and hence effectiveness of the NCA. It is recommended that NCA's funding comes from contributions by operators in the form of license fees and other charges for services rendered by the NCA. The adoption of this recommendation will not require modification to the proposed NCA Act as the Act already provides for payment of fees and other charges. Equally essential for

the effectiveness of the NCA is staff of a high caliber. It is proposed that in order for the NCA to attract and retain staff of the appropriate caliber their terms of service should be comparable to those of personnel in the private telecommunication sector.

(d) The proposed NCA Act lays down broad policies and procedures concerning the regulation of the telecommunication sector. These should be translated into guidelines and detailed procedures for licensing, tariffs, interconnection of network, cross-subsidies and other regulatory matters. It is recommended that the NCA gives priority to the formulation and adoption of guidelines and procedures.

(e) Consideration be given to the use of Build-Operate-Transfer (BOT) mechanisms for the expansion of networks to more under-served and unserved areas. Alternatively, the possibility of using the experience of the BOT mechanism in the Southern Sector of Ghana to allow the establishment of independent regional and local networks should be examined.

(f) The timing and method of implementation of the Second National Network Operator strategy are important in view of possible implications on the other private investment strategies.

(g) It is recommended that Ghana supports all measures for the strengthening of sub-regional and regional (Africa) organizations of which Ghana is a member. Also, it would be consistent with Ghana's telecommunication development objectives to intensify its participation in the establishment of sub-regional and regional (African) networks and facilities in order to improve communications in Africa.

(h) It is recommended that subject to such limitations as explained in the chapter in the main report on "Liberalization under the GATS and Telecommunications Development" Ghana makes market access offers/requests under the GATS for the following services:

- mobile cellular services;
- data transmissions;
- operation of pay phones and facsimile services
- paging and two-way radio services
- value-added services.

APPENDIX

PERSONS MET DURING THE FIELD STUDY IN GHANA

Hon. E.K. Salia	Minister of Transport and Communications.
Dr. W. Adote	Chief Director, Ministry of Transport and Communications, (MOT)
Mr. Ada - Nusa	Advisor to the Minister, MOT.
Mr. E.A. Kwakye	Director of Planning, MOT.
Mr. K. Agyepong	Director, Foreign Trade, Ministry of Trade and Industry.
Mr. Hazen	Director, Ministry of Trade and Industry.
Mr. Richter	Director, Ministry of Trade and Industry.
Mr. S.R. Mills - Robertson	Deputy Director General, Ghana Posts and Telecommunications Corporation (GPT).
Mr. M. K. Apewokin	Director, Marketing and Commercial, GPT.
Mr. M. Ajebu	Director, Planning, GPT.
Mr. N.T. Apotsi	Deputy Chief Executive, Ghana Investment Promotion Centre.
Mr. T. Henso	Capital Telecom Ltd.
Mr. Y. Amoa	Managing Director, Ghana Stock Exchange.
Mrs. Helen Lokho	Managing Director, Commercial Bank of Ghana.
Ms. Patience R. King	Bank of Ghana.
Mr. S.D. Amegavie	Deputy Executive Secretary, Ghana National Chamber of Commerce.
Mr. T.V. Bragaw	General Manager/Director, CELLTEL LTD.
Mr. M.J. Payne	Managing Director, Milicom Ghana Ltd. (Mobitel)
Mrs. Amponsah - Adal	Deputy Director, Marketing, Ghana Airways.

ANNEX D.2

GUINEA

CONTENTS

Page

1. INTRODUCTION AND ACCOUNT OF THE MISSION 109

1.1 GOVERNMENTAL SECTOR 109
1.2 TELECOMMUNICATION SERVICES OPERATORS 109
1.3 BUSINESSES 109

2. GENERAL INFORMATION ON GUINEA 109

3. OVERVIEW OF THE TELECOMMUNICATION SECTOR 110

3.1 TELECOMMUNICATION NETWORK 110
3.2 SERVICES 110
3.3 OPERATORS 111
3.4 HUMAN RESOURCES 112

4. ORGANIZATIONAL STRUCTURE OF THE SECTOR 113

4.1 MINISTRY RESPONSIBLE 113
4.2 SECTORAL POLICY STATEMENT 113
4.3 TELECOMMUNICATION ACT 114
4.4 SEPARATION OF THE POSTAL AND TELECOMMUNICATION SERVICES 115
4.5 OBSERVATIONS ON THE ORGANIZATIONAL STRUCTURE 115

5. ECONOMIC REFORM OF THE SECTOR 116

5.1 GENERAL 116
5.2 INTRODUCTION OF COMPETITION 117

6. TARIFFS 117

7. FINANCING OF TELECOMMUNICATIONS 118

8. REGIONAL INTEGRATION 118

8.1 MEMBERSHIP OF REGIONAL ORGANIZATIONS 118
8.2 PARTICIPATION IN REGIONAL PROJECTS 118

9. OTHER COMMENTS AND SPECIFIC OBSERVATIONS 119

9.1 IMPORTANCE OF TELECOMMUNICATIONS 119
9.2 TARIFFS 119
9.3 QUALITY OF SERVICES OFFERED 119
9.4 COMPETITION AND LIBERALIZATION 119
9.5 GENERAL AGREEMENT ON TRADE IN SERVICES 119

10. LIST OF SPECIFIC COMMITMENTS 119

11. CONCLUSIONS AND RECOMMENDATIONS 120

APPENDIX - **PERSONS MET DURING THE FIELD STUDY IN GUINEA**

1. INTRODUCTION AND ACCOUNT OF THE MISSION

The main report in the study deals with the general problems of telecommunications in the countries participating in the CAPAS project (Coordinated African Programme for Assistance in Services), and more generally in the countries south of the Sahara. The main part of the report emphasizes the reforms being undertaken in the countries participating in the CAPAS project and makes recommendations on the basis of international and regional experience and information from the five CAPAS countries that were the subject of the regional telecommunication study (Ghana, Guinea, Senegal, Tanzania and Uganda). These recommendations of a general nature apply to all the CAPAS countries, and, to some extent, to many countries south of the Sahara. They relate in particular to national reforms, regional integration and concessions on market access within the framework of the General Agreement on Trade in Services (GATS).

This annex, in line with the terms of reference of the study, is not an exhaustive report on Guinea, but rather a concise exposition of the information which formed the basis for the general recommendations in the report. However, in the last chapter of the annex, those general recommendations are supplemented by additional recommendations relating to Guinea's particular circumstances.

The mission visited Conakry (Guinea) from 3 to 7 July to gather information. During the week, working meetings were organized with institutions and with a representative sample of the various parties involved in the telecommunication sector.

1.1 Governmental sector

The mission was received by the Minister of Posts and Telecommunications together with members of his staff, and working meetings were held with the National Department of Posts and Telecommunications and the Office of Studies and Strategy.

1.2 Telecommunication services operators

(a) SOTELGUI s.a. (Société des Télécommunications de Guinée): the public network and basic services operator.

(b) Spacetel and Telecel: two private cellular mobile telephone operators.

1.3 Businesses

(a) Société Navale de Guinée: a company under private law 100% owned by the Guinean State and operating in maritime transport.

(b) Guinée Air Service: a private air company under Guinean law.

(c) HANN et Compagnie: a company primarily operating in import-export and insurance. The Chairman and Managing Director of the Company is also Chairman of the Council of the Guinean Employers' Association.

(d) The Grand Hôtel de l'Amitié: a company operating in the hotel and tourist industry.

2. GENERAL INFORMATION ON GUINEA

Guinea, which has an area of 245 860 km^2, has common frontiers with Côte d'Ivoire, Guinea-Bissau, Liberia, Mali, Sierra Leone and Senegal. The population was estimated at 6.5 million at the end of 1994, with a growth rate of 2.5% per year. The proportion of the population living in urban

areas was 28% at the end of 1993[1]. In 1990, 87% of the urban population lived in the capital, Conakry. The great majority of Guineans (72%) live in rural areas, which raises the issue of telephone coverage in these areas and the problem of a universal service discussed in the main part of the report.

In 1994 the rural sector contributed 23.96% of gross domestic product (GDP), mining 18.94% and the other sectors 56.70%. Guinea's GDP recorded a growth of 4% in real terms in 1994. The primary sector accounted for 24% of GDP, the secondary sector 31.1% and the tertiary sector 44.9%. Commercial services covered by the General Agreement on Trade in Services (GATS) are very important in Guinea, having accounted for 37.2% of GDP in 1994.

Telephone density is 0.14 main lines per 100 inhabitants. This density is the lowest in the ten countries participating in the CAPAS project.

3. OVERVIEW OF THE TELECOMMUNICATION SECTOR

3.1 Telecommunication network

(a) **Public switched telephone network**. The telephone network had 9 307 subscribers at the end of 1994. The waiting list in Conakry is estimated at more than 50% of the total number of subscribers. The situation in Guinea is comparable to that in the other countries of the subregion, where 60 to 75% of telephone lines are concentrated in the capital, which accounts for less than 25% of the population. The quality of the telephone service, despite constant improvement, remains unsatisfactory, owing to the age of the installations. Some installations in local networks are more than 30 years old.

(b) **The telex network** is declining, in line with the worldwide trend, but the decline is less significant than in other countries in the subregion because the facsimile service is not available, owing to the condition of the installations.

(c) **Two analogue cellular mobile telephone networks** operated by two private companies. One of the networks is independent, while the other is linked to the switched public network. (d) **The closed networks** for maritime navigation, air navigation and official communications are not covered by this report.

3.2 Services

The public switched telephone network offers essentially the basic service, i.e. the telephone. The two electronic exchanges brought into service in 1994 with capacity for 2 000 and 3 000 subscribers in Conakry have made it possible to dispose of part of the waiting list. Subscribers connected to these new exchanges enjoy the supplementary services of electronic switching (itemized invoicing, automatic wake-up, temporary call forwarding, etc.). The telephone service remains inadequate for international calls, and especially for national trunk calls. SOTELGUI's management are aware of this and doing everything possible to remedy the situation.

The cellular mobile telephone service helps to fill the gap with regard to international and urban communications in Conakry, the networks of the two private companies operating the cellular

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[1] Source: World Bank, *World Development Report 1995*.

telephone service being restricted to the city of Conakry. It can only do so to a partial extent, since the two cellular mobile telephone networks are not interconnected and thus operate like two closed networks.

Table 1 below shows the distribution of incoming and outgoing traffic with certain countries. As can be seen, traffic with Senegal, a neighbouring country, is quite low, while with France and the United States it is very high. Incoming traffic with these two countries is practically double the outgoing traffic. This situation can partly be explained by the presence of a large Guinean community in those countries, but it would be worth carrying out an investigation to see whether the imbalance between incoming and outgoing traffic is due to the high tariffs.

TABLE 1

Incoming and outgoing traffic by minutes charged (March 1995)

	Outgoing traffic	**Incoming traffic**	**Ratio incoming/outgoing traffic**
Belgium	26 801	16 982	0.63
France	143 116	274 242	**1.91**
Senegal	36 405	23 188	0.63
United States	105 732	201 132	**1.90**

3.3 Operators

3.3.1 SOTELGUI s.a. (Société des télécommunications de Guinée)

SOTELGUI is the historical public telecommunication operator in Guinea. It came into being as a result of the restructuring of the post and telecommunication sector in 1991. The restructuring gave birth to the following two legal entities:

(a) the Guinean Post Office (OPG), which is a public industrial and trading establishment with financial and management autonomy;

(b) SOTELGUI, which is a limited company. When the company was created in 1992, it was 100% owned by the Guinean State, but the principle of transferring 40% of the capital to a private foreign partner was already established at that time, and it was necessary to prepare the conditions governing the choice of the partner.

In practice, after a transition period planned to end in December 1993, SOTELGUI was to operate on the basis of capital shared with the selected foreign company or group of companies. At the time of the information-gathering mission, analysis of the offers for the choice of partner was well underway. In the course of various meetings with the Guinean authorities, it became apparent that the Guinean State might be prepared to reduce its capital share from 60 to 51% in a subsequent phase, which would be offset by an increase in the private sector's share from 40 to 49%.

3.3.2 Spacetel Guinée s.a.

Spacetel is a private company under Guinean law, the majority of whose capital is held by the Guinean partner (chairman and managing director of the company) and the rest by a partner from the United States of America. Spacetel has been offering the mobile cellular telephone service since March 1994. The base stations of the Spacetel network cover a radius of 40 to 45 km around Conakry. Spacetel has an earth station which operates independently of the public switched network, and the network's mobile switching centre is located in New York in the United States. At present Spacetel is only operating the telephone service with some 200 subscribers. Local calls cost 0.60 US dollars per minute and international calls from 2.90 to 5.20 US dollars per minute. The customer needs 2 000 US dollars to access the service (purchase of the terminal and deposit).
Spacetel has submitted a joint offer with a foreign partner for participation in SOTELGUI's capital.

3.3.3 Telecel Guinée

Telecel Guinée is a private company under Guinean law with 60% of its capital held by Telecel-international and 40% by private Guinean partners. Telecel-international is a partner in the mobile cellular telephone networks in Zaire, Burundi, Rwanda, the Central African Republic and Madagascar. Telecel started its cellular telephone service in January 1994. At present Telecel is only operating the telephone service, with some 100 to 150 subscribers. Local calls cost from 0.35 to 0.55 US dollars per minute, depending on whether the call is mobile-to-mobile or mobile-to-fixed (SOTELGUI subscriber). International calls cost between 3.7 and 5.7 US dollars per minute. The Telecel network is connected to the public switched network. This has the advantage for its subscribers that they can reach the public switched network's fixed subscribers, but the service is subject to disruption and at times the public international transmission network in not available.
Telecel has also requested and obtained authorization to install its own earth station like Spacetel and is preparing to do so.

3.3.4 Telecentre operators

SOTELGUI has embarked on a policy of granting licenses to private operators to operate public telephone booths. Private telecommunication centres known as telecentres are set up and operated by private entities, with a mark-up in the range 0 to 50% of the basic SOTELGUI tariff, but competition has very rapidly tended to stabilize private telecentre's tariffs at around 25% above the base tariff. This policy will no doubt contribute to the aim of universal service as well as creating jobs, but the development of private telecentres has been slowed by the general saturation of the network and the low level of availability of national and international links.

3.4 Human resources

In order to have a better understanding of SOTELGUI's human resources problem, it should be remembered that telecommunications used to be managed by the Guinean Administration without any financial or management autonomy. Under such conditions telecommunication staff training needs were included under the overall financial allocation set aside in the national budget for the training of all public employees. This was very much to the disadvantage of workers in telecommunications, which is an area of high technology and very rapid change. Thus SOTELGUI has plenty of skills at the basic training level, but most staff, including managers, have not undergone advanced training or retraining for 10 to 15 years. This state of affairs is partly responsible for the rather low level of staff productivity, which is 94 employees per 1 000 lines. By way of example, staff productivity in SONATEL (Senegal) is 25 employees per 1 000 lines.

4. ORGANIZATIONAL STRUCTURE OF THE SECTOR

4.1 Ministry responsible

The Ministry responsible for the telecommunication sector is the Ministry of Posts and Telecommunications. The Ministry is organized in accordance with ordinance No. 030/PRG/SGG/83 of 15 June 1988 on the fundamental principles for the creation, organization and control of government service departments. This ordinance sets out the standard organization of all ministries.

The role of the Ministry of Posts and Telecommunication is to design, develop, implement, coordinate and monitor government policy for postal and telecommunication services.

To that end, it is specifically charged with:

(a) formulating a development strategy for the postal and telecommunication sector;

(b) drawing up and implementing regulations for postal and telecommunication services;

(c) monitoring the application of the legislation and regulations by public and private operators within the area of its competence;

(d) planning, promoting, coordinating and monitoring activities in the postal and telecommunication services;

(e) coordinating the activities of broadcasting transmitters and coast stations;

(f) managing the frequency spectrum.

These responsibilities of the Ministry are defined in Decree No. 94/110/PRG/SGG of 3 November 1994. Under the decree the following services and bodies are directly involved in managing the telecommunication sector, as departments coming under the Ministry:

- the National Department of Posts and Telecommunications;
- the Broadcasting Transmitters and Coast Stations Operating Service;
- the Consultative Committee for Post Office and Telecommunication Users (a consultative body);
- the National Telecommunications Coordinating Committee (a consultative body);
- the Office of Studies and Strategies.

At the time of the data-gathering mission, the process of adopting the ministerial orders defining the responsibilities of these services and bodies was well advanced, but the texts were not yet available. The Ministry of Posts and Telecommunications is thus in the middle of being restructured.
In the future it can be envisaged that the functions of general policy-making and regulation will be shared between the National Department of Posts and Telecommunications and the Office of Studies and Strategies, which are departments of the Ministry. As far as the regulatory body is concerned, the analysis in the main part of the report weighing the advantages and disadvantages of having a body within the Ministry applies in the case Guinea.

4.2 Sectoral policy statement

The restructuring of the post and telecommunication sector has been the subject of a general policy statement. The reforms being implemented in the sector are being undertaken in application of that statement. If explicitly announced the Guinean State's intention to call on foreign private partners

for the provision of telecommunication services. The statement also clearly indicated those responsibilities which would remain the exclusive domain of the State, namely:

(a) determining sectoral policy and ensuring its implementation;

(b) regulating the sector and ensuring application of the regulations;

(c) determining tariff policy and approving tariffs for basic services within the framework of this policy;

(d) determining the service quality indicators for operations and the financial yield expected from operating bodies, and monitoring execution (programme contract);

(e) allocating frequencies and managing the radio spectrum (the technical management and supervision of radio frequencies and management and supervision of licenses will represent only a small volume of work. Initially, this work may be entrusted to the telecommunication company to be set up, under the supervision of an inter-ministerial committee);

(f) granting licenses for links, private networks, new, specialized or value-added services operated by private companies;

(g) granting licenses for subscriber installations, networks and equipment to qualified private operators, approving subscriber equipment and terminals and authorizing sale and connection to the network by private licensees;

(h) with the other government services concerned, considering all questions involving national security and defense and other State priorities related to postal services and telecommunications;

(i) drawing up programme contracts with enterprises under its supervision and monitoring the application of the terms of the contracts;

(j) participating in regional and international post and telecommunication conferences on questions of general sectoral policy and adopting treaties, agreements and conventions and international regulations related thereto.

4.3 Telecommunication Act

Act 492/016/CTRN of 2 June 1992 is the basic legal text governing the operation of telecommunication services.

The principal features of the Act are:

(a) the Guinean State holds the monopoly of telecommunications within its national territory and its spectral and submarine space, by virtue of the treaties and conventions signed by the Republic of Guinea and international law;

(b) licenses for the establishment, development, operation and maintenance of the public network and the supply of all public telecommunication services may be granted to a legal person under Guinean law in accordance with the conditions set out in the Act;

(c) the basic services are managed by the legal person to whom a license has been granted for the operation of the public network, or exclusively by the State;

(d) new and value-added services are managed by the legal person under Guinean law to whom a license has been granted for the operation of the public network or, failing that, by the State. The services may be managed by legal persons under Guinean law other than the operator of the public network under a license granted following competitive bidding under

conditions fixed by the minister responsible for telecommunications and in accordance with the provisions of the Act and the specifications of the public network operator;
(e) the supply, connection to the public network and maintenance of the different categories of telecommunication terminals or private exchanges may be undertaken by any enterprise subject to type approval of equipment under article 15 of the Act.

4.4 Separation of the postal and telecommunication services

The separation of the postal and telecommunication services in Guinea came about at the end of 1991 in application of the sectoral policy statement. SOTELGUI (the public telecommunications operator) enjoys a legal status (as a company) which has given it greater autonomy vis-à-vis the State than the Guinean Post Office (OPG). A license agreement granting a monopoly of public telecommunication services was signed on 31 August 1993 between the Guinean State and SOTELGUI for a period of ten years which may be renewed. Under the terms of the agreement, SOTELGUI is the exclusive operator of basic services (telephone, telegraph and telex between fixed points regardless of the media used).

The Telecommunication Act also authorizes SOTELGUI to engage in the following activities under competitive conditions:

- supply of new and value-added telecommunications, open to competition, such as networks with shared resources, telematics, video communications, data transmission, cellular networks, mobile radiocommunication, etc.;
- supply and maintenance of private terminals and exchanges;
- participation in the implementation of all national, regional and international networks.

4.5 Observations on the organizational structure

The organizational structure of the Ministry of Posts and Telecommunications is currently going through the adoption process, but it is already outlined by the Telecommunication Act, which provides for:

(a) clear separation of the regulatory and operational functions;
(b) exercise of the regulatory function by the supervising ministry.

4.5.1 Transparency

Pending the adoption of the texts defining the responsibilities of the Ministry's bodies and services, we may note the spirit of transparency apparent in the Telecommunication Act. The whole process of sectoral reform has been well organized and planned since the sectoral policy statement, and all the reforms, give or take a few delays, are being introduced in accordance with that statement.

4.5.2 Liberalization

The Telecommunication Act is explicit in those provisions which allow the State to transfer its monopoly to a legal person under Guinean law. The Act thus contains liberal provisions, which have made it possible to begin the process of opening up SOTELGUI's capital, and also to open up the cellular mobile services to competition by granting cellular telephone operating licenses to private companies.

The Telecommunication Act emphasizes competition at the national level, since it refers to the State giving up its monopoly to natural or legal persons under Guinean law. However, it is important to note that the provisions of the Act do not basically contradict those of the GATS.

4.5.3 Financial resources of the regulatory body

In all likelihood, the National Department of Posts and Telecommunications will be the regulatory body, since the National Telecommunications Coordinating Committee has the status of a consultative body. In any event, the regulatory body (whatever it is called) ought to have financial autonomy, since its effectiveness will depend on its capacity to meet the expectations of the private sector without being held up by the administrative procedures of the ministry responsible for finance.

Given that the regulatory body has the task of promoting the telecommunication sector (under the Telecommunication Act), it will be required to organize activities (seminars and workshops) for all parties involved on subjects of common interest such as the General Agreement on Trade in Services (GATS), new technologies, etc. These promotional activities should not suffer from a lack of financing.

The regulatory body should also be able to offer working conditions, including remuneration which are sufficiently appealing to attract staff with the highest levels of skill and avoid exposing them to undue strain on their moral integrity in the course of their duties.

Given that the regulatory body will mainly work for public and private operators, it should not simply be a source of cost, but also a source of revenue. Its financial resources could come wholly or partly from the issue of operating licenses, fees for the use of the radio spectrum, etc.

As the organization of the ministry is based on a standard model, it is probable that the regulations will not allow the supervising ministry to have a supplementary budget. This could be a problem, the solution of which should be based on the special nature of the telecommunication sector. Several specific solutions are possible, including the evolution of the regulatory body into an institution with independent management responsible to the supervising ministry.

5. ECONOMIC REFORM OF THE SECTOR

5.1 General

Under the programme of economic and financial reform undertaken by the Guinean State it is recognized that one of the important roles of the telecommunication sector, which enjoys the advantage of modern technologies, will be to open Guinea up to the outside world and facilitate the integration of its economy into regional and international markets.[2]

The reforms currently in progress in Guinea follow the spirit of the new national policy. They are supported by a number of basic legal texts, such as the investment code and the code on economic activities. The investment code, adopted in 1987, contains provisions on liberalization and the need to attract the national and foreign private sector, covering such matters as:

(a) freedom of enterprise;

(b) equality between public and private enterprises;

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2 Source: Sectoral policy statement

(c) equality of treatment between foreign and Guinean natural and legal persons;
(d) guarantee of transfer of currency for foreign investors.

5.2 Introduction of competition

On the basis of the sectoral policy statement, backed up by the investment code, the telecommunication sector has been subjected to a process of economic reform, which can be summed up under two headings:

- opening up of value-added services and new services to competition;
- operation of basic services by a public operator whose capital will be open to the foreign private sector.

In principle, operation of services other than basic services is open to competition. In practice, there are only the two companies operating the analogue cellular mobile telephone service in the competitive market. These two companies networks essentially provide an answer to the problems of international telecommunications, but this opening up to competition took place prior to the introduction of explicit regulation and the establishment of specifications, so that some negative aspects of openness to competition can be seen:

- one of the networks is totally independent of SOTELGUI's public switched network and there are no arrangements for the operator of this network to contribute to the universal service;
- given the size of the market, neither of the two companies can, in the near future, achieve the number of subscribers generally required to ensure profitability of cellular networks at reasonable tariffs;
- the two networks are not interconnected, so that two subscribers to the two companies cannot communicate with each other, which means that a customer would have to subscribe to both networks if he wished to have access all his correspondents.

The economic reform undertaken in the telecommunication sector is nevertheless in accordance with the spirit of international trade and the provisions of the General Agreement on Trade in Services (GATS) with regard to the trend towards progressive liberalization.

6. TARIFFS

SOTELGUI's tariffs are relatively high, in particular the fixed charges, such as deposits. This is a restricting factor on telephone expansion. For example, the fixed charges for connection to the network come to 100 000 Guinean francs, or about three times the guaranteed universal minimum wage. In order to access the automatic international service, it is necessary to pay a deposit of 1 million Guinean francs (about 1 000 US dollars). The main advantage of this weeding out process is that the collection rate which is over 90%.

With the globalization of telecommunication operation and technological evolution, telecommunication tariffs are increasingly becoming a trade weapon at the regional and international levels. Foreign investors tend to set up in countries where electricity and telecommunication services offer the best value for money. In other words, as well as the financial interests of SOTELGUI, the national policy for attracting foreign investment is also to some extent at stake.

Furthermore, the convergence between telecommunications and informatics has given birth to services such as "call-back" which have a negative influence on telecommunication enterprises in developing countries. The level of tariffs remains the most effective trade weapon, all the more so in that the debate on the legality or illegality of call-back has only just begun, with the declaration by the United States Federal Communication Commission (FCC), which considers that the service does not contravene the International Telecommunication Regulations.

7. FINANCING OF TELECOMMUNICATIONS

Telecommunications were managed for quite a long time by the ministry department, and the financial management ultimately fell to the public treasury. The telecommunication sector is a large consumer of capital and, in the case of developing countries, a very large consumer of foreign exchange. The combination of these two factors has meant that the telecommunication network in Guinea has been very backward with regard to investment.

It is envisaged that a programme contract will be concluded between SOTELGUI and the Guinean State, defining for a determined period the obligations of the State and SOTELGUI in developing basic telecommunications. Since the reform has not yet been completed (opening up of SOTELGUI's capital to a foreign partner), the programme contract will be signed after the foreign partner has been designated.

Bearing in mind the scale of the investment needs, it is clear that the foreign partner's input will not be sufficient in the immediate future to cover all the needs, and other scenarios such as Build-Operate-Transfer should be examined by the Guinean authorities.

8. REGIONAL INTEGRATION

8.1 Membership of regional organizations

Guinea is a country with a tradition of regional integration, having been one of the founder members of the OAU. Guinea is also a member of the following organizations which are exclusively or partly concerned with telecommunications: PATU, ECOWAS, CAPTEF and RASCOM.

8.2 Participation in regional projects

As is specifically indicated in the sectoral policy statement, the Guinean Government assigns telecommunications the task of opening Guinea up to the outside world and facilitating the integration of its economy into regional and international markets. Within this framework, Guinea participated in the PANAFTEL project and is taking part in the ECOWAS project for radio-relay links with the neighbouring countries: Sierra Leone, Guinea-Bissau and Senegal. At a meeting held in Dakar in April 1995, SOTELGUI also agreed in principle to participate in a subregional submarine fibre-optic cable project.

9. OTHER COMMENTS AND SPECIFIC OBSERVATIONS

9.1 Importance of telecommunications

Businessmen recognize better than anyone the importance of telecommunications, because lack of them seriously undermines their competitiveness. Services such as tourism cannot be developed because of communication problems. Businessmen 's main complaints are about the national network, since they do manage to reach the outside world by paying a very high price to the cellular telephone companies.

9.2 Tariffs

The people with whom I spoke were unanimous in considering that SOTELGUI's tariffs were excessively high, but in the short term they would be prepared to pay if the services were available and of good quality. Businessmen consider that the tariffs of the two cellular telephone companies are very high, but feel that they have no choice because of the non-availability of the public network.

9.3 Quality of services offered

The users with whom I met complain of SOTELGUI's services with regard to availability and quality in Conakry, national links and international links. They nevertheless recognize that there have been improvements in the last three years, but consider that SOTELGUI's tariffs are relatively high in relation to the quality of service.

9.4 Competition and liberalization

The basic texts which define the regulatory framework of economic activities in Guinea contain in general the WTO's fundamental precepts. The private sector is generally favourable to the idea of opening up the operation of telecommunications to competition. Some people consider that the status of the public operator is of little importance provided that they have access to telecommunications of acceptable quality. The majority consider that the State, through the Ministry of Posts and Telecommunications, should play a more central role in arbitration, tariffs and quality of service.

9.5 General Agreement on Trade in Services

All the people with whom I spoke, particularly in the private sector, showed great interest in the negotiations and agreements of the World Trade Organization (WTO). They mostly recognized the efforts made by the CAPAS team, but still think they need more information.

10. LIST OF SPECIFIC COMMITMENTS

Guinea is among those States which have not submitted any concessions on market access with regard to services during the data collection mission. However, the basic texts governing economic activity in Guinea are advanced in comparison with other African countries. It is important to note that these texts favour liberalization and that the provisions of the texts are almost entirely in accordance with the main principles, obligations and discipline of the General Agreement on Trade in Service (GATS). Articles 17 and 20 of the code of economic activities, may be cited as an example:

(a) Article 17 of the code of economic activities provides that: "A foreign national may exercise an economic activity in the Republic of Guinea to the extent that a Guinean may himself exercise that activity in the country of which the foreigner is a national";

(b) Article 20 provides that: "A foreign national exercising an economic activity enjoys the same rights and is subject to the same obligations as a Guinean exercising the same economic activity, subject to the following reservations:

- he must comply with regulations on the entry and residence of foreign nationals in the Republic of Guinea;
- some activities may be prohibited for him or may be subject by law to special conditions".

If Article 20 is complying with the rules of specific commitments notably national treatment, Article 17 is related to reciprocity which is not conforming with the Most Favored Nation clause (one of the basic principles of the GATS). If Guinea was to submit a list of specific commitments to GATS, she would have to modify Article 20 of the code of economic activities in order to avoid conflicts between the international treaty GATS and national reference texts.

Guinea's national reforms place it in a good position to make concessions on market access concerning services. If Guinea does not in the short term wish to make over-optimistic commitments to future liberalization, it can offer the current situation as evidence of a commitment to that course.

With regard to telecommunications in particular, Guinea should be able to reflect the content of the Telecommunication Act in its list of specific commitments, because of the advantages described in the main report. The offer, which would reflect the current situation, would be based on:

- exclusive provision of basic services by the public telecommunication operator;
- liberalization of terminal equipment;
- liberalization of cellular telephones (with the necessary restrictions);
- liberalization of value-added services (even if for the moment there is no operator).

11. CONCLUSIONS AND RECOMMENDATIONS

The information collected shows that Guinea is at a fairly advanced level of unilateral liberalization of the operation of telecommunication services, being one of the rare countries where a cellular telephone operator has a network which is totally independent of the public switched telephone network. It is true that this presents a problem for the overall development of the network, but it shows a clear policy of liberalization. Guinea is thus in a good position to make concessions on market access with regard to telecommunications. The following actions are recommended:

1. Guinea should make concessions on market access with regard to services, taking into account the very advanced national reforms concerning:

- liberalization, which is embodied in those reforms, and respect for the provisions of the General Agreement on Trade in Services (GATS);
- the quite explicit and transparent formulation of the legal and regulatory texts.

2. Guinea should be able to make concessions on market access with regard to telecommunications given the degree of liberalization already achieved in the operation of those services and because of the various advantages described earlier in this report.

3. The Ministry of Trade should organize information seminars and workshops for the various sectors on the content of the WTO agreements and more particularly on the General Agreement on Trade in Services (GATS) in collaboration with the competent international organizations, notably UNCTAD and WTO.

4. These seminars and workshops should be followed up by sectoral workshops to examine in depth the implications of the GATS for each sector, particularly the telecommunication sector, and involving all the parties (the Ministry, SOTELGUI, the other operators and consumers).

5. The Ministry of Trade must involve the other parties concerned, particularly the private sector, more closely in all phases of subsequent negotiations, including them in future negotiations as members of the Guinean delegation.

6. In view of the problems of regulation in the telecommunication sector, it is desirable that the institutions of the Ministry should be set up fairly quickly and that the financial autonomy aspect of the regulatory body should be addressed in order to allow it to play its role in the most efficient manner.

APPENDIX

LIST OF PERSONS MET (GUINEA)

Dr. Younoussa KOITA	National CAPAS Coordinator
Mr. Seyni CAMARA	National Director of Posts and Telecommunications, Ministry of Posts and Telecommunications
Mr. Koly CAMARA	Director-General, Office of Studies and Strategies, Ministry of Posts and Telecommunications
Dr. Fodé SOUMAH	Deputy Managing Director, SOTELGUI s.a.
Mr. Moussa KEITA	Production Director
Mrs. Fanta Odette TOURE	Director of Commercial Affairs, SOTELGUI s.a.
Mr. Sekoumar THIAM	Head, Independent Management Organization and Planning Service, SOTELGUI s.a.
Mr. Guy Abraham KOUMBASSA	Head, Independent Litigation and Legal Affairs Service, SOTELGUI s.a.
Dr. Abdoul BAH	Head, CAPAS Research Team
Mr. Boubou KEITA	Office of Strategy and Development, Ministry of Transport
Cdt Ibrahima KOUYATE	Chairman and Managing Director, Guinée Air Service
El Hadj Ahmed DIALLO	Deputy Managing Director, Guinée Air Service
Mr. Almamy Kabele CAMARA	Commercial and Operations Director, Sté Navale Guinénne
Mr. Saleh S. Tannir MBA	Director, Spacetel Guinea s.a.
El Hadj Boubacar HANN	Chairman, Council of the Guinean Employers' Association, Chairman and Managing Director, Hann et Cie
Mr. Alpha O. BAH	Executive Director, Telecel Guinée

ANNEX D.3

SENEGAL

CONTENTS

1. INTRODUCTION AND ACCOUNT OF THE MISSION 125

1.1 GOVERNMENTAL SECTOR 125
1.2 OPERATORS 125
1.3 PRIVATE SECTOR 125
1.4 CONSUMERS 126

2. GENERAL INFORMATION ON SENEGAL 126

3. OVERVIEW OF THE TELECOMMUNICATION SECTOR 126

3.1 TELECOMMUNICATION NETWORK 126
3.2 TELECOMMUNICATION SERVICES 126
3.3 OPERATORS 127
3.4 HUMAN RESOURCES 128

4. ORGANIZATIONAL STRUCTURE OF THE SECTOR 128

4.1 GENERAL 128
4.2 SEPARATION OF THE POSTAL AND TELECOMMUNICATION SERVICES 129
4.3 SONATEL'S COMPANY STATUS 129
4.4 MINISTRY RESPONSIBLE 129
4.5 POST AND TELECOMMUNICATION RESEARCH AND REGULATION DEPARTMENT (DERPT) 129
4.6 NATIONAL TELECOMMUNICATION COORDINATING COMMITTEE (CNCT) 130
4.7 TELECOMMUNICATIONS ACT 131
4.8 SONATEL MANAGERIAL STAFF ASSOCIATION 131
4.9 OBSERVATIONS ON THE ORGANIZATIONAL STRUCTURE 131

5. ECONOMIC REFORM OF THE SECTOR 132

6. TARIFFS 133

7. FINANCING TELECOMMUNICATION DEVELOPMENT 133

8. OTHER COMMENTS AND SPECIFIC OBSERVATIONS 134

8.1 IMPORTANCE OF TELECOMMUNICATIONS 134
8.2 TARIFFS 134
8.3 COMPETITION AND LIBERALIZATION 134
8.4 GENERAL AGREEMENT ON TRADE IN SERVICES 134

9. SCHEDULE OF SPECIFIC COMMITMENTS ON TELECOMMUNICATION SERVICES 135

9.1 CIRCUIT-SWITCHED TELEPHONE SERVICES AND LEASED-LINE VOICE TELEPHONE SERVICES (INCLUDING BY SATELLITE) 135
9.2 MOBILE RADIO TELEPHONE SERVICES 135
9.3 CIRCUIT-SWITCHED DATA TRANSMISSION SERVICES AND LEASED-LINE DATA TRANSMISSION SERVICES (INCLUDING BY SATELLITE) 135
9.4 CIRCUIT-SWITCHED TELEX 135
9.5 TELEGRAPHY SERVICES 135
9.6 ELECTRONIC MAIL AND ELECTRONIC MAIL WITH AUTOMATIC TRANSLATION 135
9.7 ONE-WAY PAGING SYSTEM SERVICES 135
9.8 VIDEO-CONFERENCING, AUDIOGRAPHIC TELE-CONFERENCING AND TELEX TRAFFIC SWITCHING 136
9.9 SALE OF TERMINALS 136
9.10 COMMUNICATION SYSTEMS ENGINEERING SERVICES 136

10. CONCLUSIONS AND RECOMMENDATIONS 136

APPENDIX - PERSONS MET DURING FIELD STUDY IN SENEGAL

1. INTRODUCTION AND ACCOUNT OF THE MISSION

The main report in the study deals with the general problems of telecommunications in the countries participating in the CAPAS project (Coordinated African Programme for Assistance in Services), and more generally in the countries south of the Sahara. The main part of the report emphasizes the reforms being undertaken in the countries participating in the CAPAS project and makes recommendations on the basis of international and regional experience and information from the five CAPAS countries that were the subject of the regional telecommunication study (Ghana, Guinea, Senegal, Tanzania and Uganda). These recommendations of a general nature apply to all the CAPAS countries, and to some extent to many countries south of the Sahara. They relate in particular to national reforms, regional integration and concessions on market access within the framework of the General Agreement on Trade in Services (GATS).

This annex, in line with the terms of reference of the study, is not an exhaustive report on Senegal, but rather a concise exposition of the information which formed the basis for the general recommendations in the report. However, in the last chapter of the annex, these general recommendations are supplemented by additional recommendations relating to Senegal's particular circumstances.

The mission visited Dakar (Senegal) from 5 to 9 June 1995 in order to gather information. During the week, working meetings were organized with institutions and with a representative sample of the various parties involved in the telecommunication sector.

1.1 Governmental sector

The mission met the National Telecommunication Coordinating Committee (CNCT), which is a body attached to the Office of the President of the Republic.

1.2 Operators

(a) SONATEL (Société nationale des télécommunications du Sénégal) is the State company operating the telecommunication network and services under a State monopoly.

(b) Société TELECOM-PLUS: a subsidiary of SONATEL, created as a joint venture with a foreign partner.

(c) ANATEL (National Association of Telecentre Operators), the activities of whose members have a considerable economic impact.

1.3 Private sector

The mission had working meetings with the following employers' organizations, representing the major users of telecommunication services and actual and potential private operators offering telecommunication services:

(a) National Employers' Council (CNP), composed of 17 trade associations operating in various sectors of the Senegalese economy;

(b) National Employers' Confederation of Senegal (CNES), 60% of whose members are industrialists, with a combined turnover of 400 billion CFA francs (800 million US dollars), who provide more than 20 000 jobs.

1.4 Consumers

The mission met ADEETEL (Association of Water, Electricity and Telecommunication Services Consumers), whose job is to defend the interests of consumers of the basic public services - water, electricity and telecommunications.

2. GENERAL INFORMATION ON SENEGAL

Senegal, which has an area of 196 192 km^2, is bounded on the west by Mali, on the north by Mauritania and on the south by Guinea and Guinea-Bissau. It also has common frontiers with the Gambia. The population of Senegal was estimated at 8.1 million at the end of 1994, with a growth rate of 2.7% and a population density of 41 inhabitants per km^2. The proportion of the population living in urban areas has grown rapidly, from 33% in 1970 to 41% in 1993[1]. Senegal's population is subject to significant migratory flows, mainly to Europe and North America.

In 1991 the tertiary sector accounted for 51.6% of GDP, compared with 29% for the secondary sector and 19.4% for the primary sector. The services sector is the most important in the process of wealth creation in Senegal's economy. The sector is therefore very sensitive for the Senegalese economy, and the authorities are aware of this.

Telephone density was 0.89 main lines per 100 inhabitants in May 1995. This figure, which is relatively high compared with many other countries in Africa south of the Sahara, is due to a well-sustained rate of investment since the creation of SONATEL.

3. OVERVIEW OF THE TELECOMMUNICATION SECTOR

3.1 Telecommunication network

(a) **Public switched telephone network**, which is 96% digitized, was providing a telephone service to 72 024 subscribers in May 1995;

(b) **Telex network** is declining, in line with the worldwide trend, being increasingly replaced by facsimile (fax);

(c) **SENPAC data transmission network** uses the X-25 link. This network was brought into service in 1988 and had 418 subscribers at the end of 1994;

(d) **MERCURE cellular telephone network**. The MERCURE cellular telephone network is operated by SONATEL. It was brought into service in April 1994 and had 84 subscribers at the end of 1994. It is an analogue network, but SONATEL has issued an invitation to tender for a GSM system (a digital system).

(e) **Closed networks** for maritime navigation, air navigation and official communications are not covered by this report.

3.2 Telecommunication services

The above-mentioned networks allow the provision of a wide range of services in addition to the traditional ones.

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[1] Source: World Bank, *World Development Report 1995*.

3.2.1 Public switched telephone network

Supplementary services

The high level of digitization of telephone exchanges allows SONATEL to offer the following supplementary services to subscribers in the main urban centres: itemized billing, temporary call forwarding, automatic wake-up, three-way conferencing, call waiting, abbreviated numbering, controlled restricted service and direct incoming selection.

Value-added services

(a) **The "Infotel" service** is a public voice messaging service. It allows users to leave and receive voice messages in public booths. These public booths are also used by customers to access bank information and broadcasts recorded by private radio stations. Invoicing is done by SONATEL, which is responsible for remunerating the providers of these value-added services (bank, radio, betting).

(b) **One-way radio messaging service (paging)** is offered by the private company Access-Telecom.

3.2.2 Data transmission network

The following value-added services are offered through the basic packet data network:

(a) **Videotex**. The videotex service is accessible through Minitel terminals and allows subscribers access to external databanks, local bank information and betting information. A private company uses the videotex service for remote training on computer software.

(b) **Videotel service**. Following the Infotel model, Videotel is a public videotex service accessible to users from a public videotex booth. The service allows exchanges of messages in written form and consultation of a database. As with the Infotel voice service, Videotel billing is done by SONATEL, which reimburses the providers of value-added services (databases, etc.).

3.3 Operators

Telecommunication services are provided by several categories of operators, ranging from the State company to the private individual.

3.3.1 SONATEL (Société nationale des télécommunications du Sénégal)

SONATEL is a company under private law which came into being as a result of the restructuring of the post and telecommunication sector in 1985. The State holds 100% of SONATEL's capital, and SONATEL has a State monopoly over basic services and networks (telephone, telex, dedicated and data transmission links). As the main telecommunication operator in Senegal, SONATEL had a turnover of 57 billion CFA francs at the end of 1994 (114 million US dollars), of which 81% was generated by the telephone service. Seventy-one per cent of the turnover comes from business customers, who account for 37% of subscribers. If we consider this in relation to the tertiary sector's contribution to GDP (51.6%), it can be seen how important telecommunications are in promoting the Senegalese economy.

3.3.2 Telecom-Plus

Telecom-Plus is an operator with mixed (public and private) capital and a subsidiary of SONATEL. Telecom-Plus was set up in 1991 as a joint venture with a foreign partner and provides services in the following areas:

- studies, advice, engineering and training;
- telematics (development of servers, electronic messaging and access to external databanks);
- telephone peripherals (fax machines, Minitels, cellular radiotelephone terminals);
- one-way messaging (paging) and management of telephone booths.

In providing its services, Telecom-Plus calls on SONATEL personnel for specific jobs. Telecom-Plus has regional aspirations and has just completed a service contract in Guinea.

3.3.3 Access Telecom

Access Telecom is a wholly private operator, which has been operating the public one-way radio messaging and paging service through the public switched telephone network since 1993.

3.3.4 Telecentre operators

These are private individuals who manage public booths to offer telephone, telex and fax services to users. They are authorized by SONATEL to resell the services with a margin of up to 75% over the basic SONATEL tariff, but in practice competition has tended to stabilize the margin at a much lower level. Operation of these public booths by private operators has undergone considerable expansion, so that in May 1995 there were about 1 500 private telecentre operators, generating more than 3 000 jobs, i.e. more than half as many again as SONATEL.

3.4 Human resources

SONATEL does not have any particular problem with regard to a lack of skilled staff. Managing and developing human resources is one of the SONATEL management's central concerns. Under its operating plan for 1993-1998 SONATEL aims to reach a position by 1998 where 33.5% of the staff are managerial and to allocate to staff training a budget rising from 2.8% of the total wage bill in 1994 to 4.8% in 1998. Since its establishment, SONATEL has adopted a policy of freezing the number of staff despite the steady increase in the number of telephones. These measures, along with others, should allow SONATEL to increase staff productivity from 25 employees per 1 000 telephone lines in 1994 to 17 employees per 1 000 lines in 1998.

In the future, SONATEL hopes to create research and development expertise, and a programme of recruitment of high-level staff is now being introduced.

4. ORGANIZATIONAL STRUCTURE OF THE SECTOR

4.1 General

The telecommunication sector in Senegal has undergone a qualitative reform since 1984, resulting in:

- separation of postal and telecommunication services;
- operation of the national and international telecommunication networks by a single company, namely, SONATEL.

This reform has also been the point of departure for separating the operational and regulatory functions, with the reorganization of the National Telecommunication Coordinating Committee (CNCT).

4.2 Separation of the postal and telecommunication services

Prior to the 1984 reform, the telecommunication service was provided by two entities. The Senegal International Telecommunication Company (TELESENEGAL) was responsible for managing the international telecommunication network and thus operated all international circuits and traffic via submarine cable and satellite. The second operator was the Post and Telecommunication Office (OPT), which was responsible, in addition to postal services, for operating the national telecommunication network. The reform brought all telecommunications (national and international) under a single entity called the Société Nationale des Télécommunications du Sénégal (SONATEL). The reform also separated postal from telecommunication services by creating the Post and Savings Bank Office (OPCE).

Since it was set up, SONATEL has had the legal status of a company, which gives it more autonomy vis-à-vis the State than OPCE. The separation was accompanied by transitional measures to allow OPCE to continue its activities, generally considered to be non-profitable, on a sound financial basis. Thus SONATEL paid subsidies to OPCE for its first three years of operation.

4.3 SONATEL's company status

The company status which SONATEL has enjoyed since it was established has allowed it all the autonomy necessary for it to develop its telecommunication services. Thus from 1986 SONATEL implemented development programmes called Telecom-2 and Telecom-3 with a total cost of 65 billion CFA francs (130 million US dollars), 50% financed from its own resources. Among other things, the two programmes allowed the digitization of the network, with a significant emphasis on rural telephone services. SONATEL's target for the year 2000 is that the telephone density should be higher than 1 telephone per 100 inhabitants and that it should no longer be possible to go more than five kilometres anywhere in the country without having access to the telephone service (accessibility).

4.4 Ministry responsible

The Ministry responsible for the telecommunication sector is the Ministry of Communication. It is the Ministry's task to prepare and implement the Senegalese State's policy for postal services, telecommunications, the press, radio and television and the cinema.

4.5 Post and Telecommunication Research and Regulation Department (DERPT)

The DERPT, which was set up in 1994, is a department of the responsible ministry whose main tasks are[2]:

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[2] Source: Decree No. 94-896/MICOM/SAGE of 5 September 1994.

(a) creating and maintaining conditions for active and fair competition through the issue of operating licenses, management of the radio spectrum, consumer protection, standardization and equitable access to common resources;

(b) exercising economic control over operators by monitoring tariff policies, service quality, specifications and operators' economic and financial management;

(c) ensuring respect for public service responsibilities by supervising operators to ensure they meet their responsibilities in that regard;

(d) ensuring Senegal's representation at the international level in the post and telecommunication sectors.

The tasks of the DERPT clearly separate the operational and regulatory functions. Such separation, which is recommended in the African Green Book on telecommunications policy for Africa, is an essential condition for introducing healthy and fair competition in the operation of telecommunication services.

The functions of the DERPT are clearly defined as regulatory functions within the responsible ministry. In this connection, the advantages and disadvantages of this type of organization are those described in the main part of the report concerning the body within the ministry.

4.6 National Telecommunication Coordinating Committee (CNCT)

The CNCT, which has existed since Senegal's independence (1960), was reorganized in 1963 and 1974 in order to adapt it to the changing telecommunication environment. The last reorganization was the result of Decree 84-350 of 26 March 1984, which attached the CNCT to the General Secretariat of the President of the Republic with the following functions:

- To study questions of common interest to several ministerial departments and related bodies, and in particular:
  - To arbitrate all disputes arising in the telecommunication field, particularly with regard to use of frequencies or codes;
  - To study certain questions concerning staff recruitment and training;
  - To study documentation about equipment, installations and foreign telecommunication bodies;
- To study and give an opinion, subject to the provisions of Articles 2, 3 and 38 of Act No. 72-39 of 26 May 1972, on any request submitted to the Senegalese authorities regarding the installation and operation of telecommunication equipment outside the general network, when it causes particular problems.

The CNCT is thus in some ways a consultative body and in others an arbitration authority. In order to carry out these tasks, it has set up a national commission to evaluate Senegal's options in the field of telecommunications, with the task of:

- evaluating the extent to which the State's telecommunication priorities are being met;
- evaluating the aggregate operating surplus for the services subject to monopoly;
- studying the classification of telecommunication services and the extent to which they need to be regulated, taking into account the foreseeable technical developments.

4.7 Telecommunications Act

Act No. 72-39 of 26 May 1972 on telecommunications is the reference text for operation of telecommunication services. It defines the responsibilities of operators, users and the State and lays down penal provisions relating to violations of its various articles. It needs to be updated, since some provisions are no longer relevant to current practice. For example, Article 6 provides that: "Any telecommunication links established, maintained and operated by administrations other than the Post and Telecommunication Administration may only be opened to private correspondence with the consent of the latter administration. Such agreement may only be given if the Post and Telecommunication Administration is not itself in a position to provide the service concerned". The reality is different, since it is the responsible ministry which issues authorizations.
The revision of the Act will have to take account of the evolution of the world telecommunication environment and the General Agreement on Trade in Services (GATS). It will also have to take into account changes in the structure of national bodies. The process of revision is currently under way.

4.8 SONATEL Managerial Staff Association

Although it is not a formal body within the administrative structure, the SONATEL Managerial Staff Association is an organization which should be taken into account in the context of reform in the sector. At the time of the data-gathering mission in the field, the SONATEL Managerial Staff Association had just held a weekend of think tanks on reform in the sector to make all managerial staff aware of what was involved in the reform and of their leading role as managers. Such initiatives are to be commended and recommended to other CAPAS member countries.

4.9 Observations on the organizational structure

4.9.1 Separation of policy and regulation

The overall structure of the bodies described above is a functional organization with two decision-making levels:

(a) The Post and Telecommunication Research and Regulation Department (DERPT), which is responsible for applying Senegalese State policy with regard to telecommunications by carrying out routine tasks and formulating regulatory proposals. As the DERPT is department of the responsible ministry, it is subject to administrative constraints. In order for it to play an active role in promoting the telecommunication sector as a whole, it is desirable that in its organization and functioning the DERPT should acquire the status of a body attached to the ministry. Functioning as a body attached to the ministry would enable the DERPT to have the flexibility of management necessary (on the administrative and financial level) for it to meet the expectations of the private sector while respecting the general directives of the responsible ministry, which will continue to have the right to oversee and monitor the DERPT.

(b) The National Telecommunication Coordinating Committee (CNCT), which is responsible for questions of general policy, formulating opinions and proposals on major national issues and the general direction to be followed by Senegalese State policy.

4.9.2 Appeal body

As the CNCT's functions indicate, it has a right to arbitrate in disputes arising from decisions of the DERPT and thus constitutes an appeal body for certain decisions, an aspect which is very important for the proper performance of the regulatory function. The possibility of appeal makes the regulatory organization more credible in the eyes of private operators.

4.9.3 Transparency

It is true that the DERPT's powers and functions cover all areas, but they remain rather general when it comes to practical implementation. They should therefore be combined with working and decision-making procedures which are sufficiently transparent and accessible to all parties concerned.

4.9.4 Financial resources

The DERPT, which works partly for the operators, ought to have enough financial resources to support its activities and give it sufficient management autonomy to enable it to meet operators' requests within a competitive period of time. Given that the DERPT works to a large extent for private and public operators, it should not simply be a source of costs, but also a source of revenue. Its financial resources could come partly or wholly from such areas as the issue of licenses and the fees for use of the radio spectrum. It is also essential that the DERPT should be able to offer working conditions, including remuneration, which are sufficiently appealing to attract staff with the highest levels of skill and avoid exposing them to undue strain on their moral integrity in the course of their duties.

5. ECONOMIC REFORM OF THE SECTOR

The Senegalese Government considers telecommunications to be a key sector in economic development. The management autonomy granted to SONATEL from its creation has been one of the determining factors in the quantitative and qualitative development of telecommunication services.

The choice made by the Senegalese Government to promote development of the private sector through the progressive withdrawal of the Government from commercial sectors has had favourable repercussions on telecommunications in Senegal:

- the sale and installation of terminal equipment are open to competition;
- all value-added services are open to competition, and these services are expanding rapidly;
- the licensing of private entities to operate public booths through private telecentres is giving highly satisfactory results.

The Senegalese State monopoly is thus limited to the basic networks and services: telephone, telex, data transmission. This monopoly is granted to SONATEL, and consideration is currently being given to the possibility of opening up SONATEL's capital to national and/or foreign private investors[3].

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[3] NB: A decision has just been taken on the principle of opening up SONATEL's capital to private investors and announced in the press, but the terms and conditions were not known by the consultant at the time when this report was drafted.

Observations

The economic reform of the telecommunication sector is assigning an increasingly important role to the private sector, in line with national policy. However, in order to comply with the principle of transparency in the General Agreement on Trade in Services (GATS), the reference texts containing these reforms should be updated in order to reflect the current situation better. The new law which is being drafted should thus redefine the limits of SONATEL's monopoly and list as explicitly and exhaustively as possible those services whose operation has been opened to national competition and/or liberalized under the multilateral regime of the General Agreement on Trade in Services (GATS). Experience shows that generic definitions such as basic services, valued-added services and new services may cover different things depending on the context, the time and the country.

6. TARIFFS

SONATEL's tariffs are fixed by ministerial order. SONATEL has a tariff policy which is moving in the direction of introducing a charging system based on true prices. SONATEL's objective is to be one of the 30 least expensive countries in the world for telecommunication services and to achieve this SONATEL envisages an average annual tariff reduction of 5%. For each of the last four years SONATEL has reduced tariffs by from 5% to 10%. It intends to continue reducing tariffs in this way by increasing productivity and generally controlling operating costs. SONATEL considers that the high rate of VAT contributes to an increase in tariffs for the final consumer and that this may, to some extent, put a brake on accessibility of the public service to the most disadvantaged categories and social strata.

7. FINANCING TELECOMMUNICATION DEVELOPMENT

There is no particular problem in financing telecommunication development in Senegal. Senegal does not have any particular foreign exchange problems, and since SONATEL is profitable, it does not experience any difficulty in finding external financial resources for its investment programme. However, with the 50% devaluation of the CFA franc in January 1994, the import price of equipment has doubled, and it could be that there will be financing problems when major investment is undertaken again in the future.

The financing of telecommunication development is planned jointly by SONATEL and the Senegalese State through a contract plan, which is revised every three years. This contract plan, which was instituted in 1988, allows SONATEL to carry out investment programmes without frequent intervention by the State.

The liberalization of the operation of value-added services and terminal equipment (without any restriction on capacity) leaves sufficient room for involvement by the private sector in financing the overall development of telecommunication services.

Regional integration

As well as belonging to regional and subregional organizations concerned with telecommunications or economic integration with a telecommunication element, the Senegalese authorities are doing everything possible to intensify South-South cooperation in the supply of services and regulation of telecommunications. SONATEL considers that links between telecommunication operators at the regional level are essential.

SONATEL has just signed a protocol of agreement in principle for a project to install a submarine fibre optic cable with the following countries: Benin, Cape Verde, Gambia and Guinea.

8. OTHER COMMENTS AND SPECIFIC OBSERVATIONS

8.1 Importance of telecommunications

The Senegalese authorities take the view that, at the macro-economic level, telecommunications are a leading factor in Senegal's economic development. At the micro-economic level, businessmen are convinced that telecommunication services are a strategic item of intermediate consumption in the development of their activities. Private investors consider that investment in telecommunications is a business opportunity in Senegal.

8.2 Tariffs

The people I met think that SONATEL's tariffs are excessive, even if they recognize that the quality of service is constantly being improved. Some think that there is a lack of information or transparency in the relations between SONATEL and its customers. SONATEL, for its part, considers that the high level of tariffs is partly due to VAT and customs duties, which considerably add to the cost of investment.

8.3 Competition and liberalization

In general, the private sector is in favour of national competition in operating telecommunication services. The people I spoke with, particularly employers' organizations, are not opposed in principle to SONATEL continuing to operate basic networks and services. They are, however, very reluctant to accept that other services, particularly the cellular telephone service, should remain a monopoly.

The Consumers' Association thinks that its influence could decline with the involvement of the private sector, for as long as services remain a monopoly, it can exercise moral pressure on the government as a group of voters.

The private sector is very hesitant about liberalization of telecommunication services under the multilateral regime of the General Agreement on Trade in Services (GATS). Some private operators think that there should be progressive liberalization so as to promote the national private sector and enable it to become an active partner as a service provider.

8.4 General Agreement on Trade in Services

The institutions I had contacts with were very interested in the negotiations and agreements of the World Trade Organization (WTO). The people with whom I spoke nevertheless highlighted the lack of information and involvement of the private sector. Concerns were expressed regarding the place of the national private sector following liberalization of world trade, because the national private sector might well disappear in the face of foreign operators from developed countries.

9. SCHEDULE OF SPECIFIC COMMITMENTS ON TELECOMMUNICATION SERVICES

Senegal is one of the countries which have made concessions on market access in relation to telecommunications. Its schedule of specific commitments takes into account limitations on market access and national treatment concerning four types of service provision. The concessions on market access concerning telecommunications cover the following services:

9.1 Circuit-switched telephone services and leased-line voice telephone services (including by satellite)

Senegal allows "only public network licensee" to have a commercial representation in Senegal, subject to authorization.

9.2 Mobile radio telephone services

Senegal allows "only public network licensee" to have a commercial representation in Senegal, subject to authorization.

9.3 Circuit-switched data transmission services and leased-line data transmission services (including by satellite)

Senegal allows "only public network licensee" to have a commercial representation in Senegal, subject to authorization.

9.4 Circuit-switched telex

Senegal allows "only public network licensee" to have a commercial representation in Senegal, subject to authorization.

9.5 Telegraphy services

Senegal allows "only public network licensee" to have a commercial representation in Senegal, subject to authorization.

9.6 Electronic mail and electronic mail with automatic translation

- cross-border supply by public network leased line is authorized;
- commercial presence is authorized but subject to prior government approval and Senegal reserves the right to restrict the number of operators. In addition, there are access fees payable to the public network licensee.

9.7 One-way paging system services

Establishment of a commercial presence is authorized, but a license is required, and Senegal reserves the right to restrict the number of operators.

9.8 Video-conferencing, audiographic tele-conferencing and telex traffic switching

- cross-border supply is authorized provided that the transmission media of the public franchise holder are used;
- commercial presence is authorized, but establishment is required.

9.9 Sale of terminals

- cross-border supply is authorized, but terminals must be approved;
- foreign consumption and commercial presence are authorized without restriction.

9.10 Communication systems engineering services

The various specific commitments undertaken are in line with the actual situation in Senegal. The actual situation and consequently these specific commitments are not reflected as explicitly in the reference texts at the national level. It is therefore desirable to carry out the necessary national reforms to reflect the actual situation and the commitments made with regard to telecommunications in the General Agreement on Trade in Services.

10. CONCLUSIONS AND RECOMMENDATIONS

The information collected shows that Senegal is at a fairly advanced stage in the multilateral liberalization of telecommunication trade, as compared with a large number of African countries. In order to consolidate this position, which reflects national policy, the following actions are recommended:

1. Information seminars and workshops should be organized in the various service sectors on the World Trade Organization agreements, and in particular the General Agreement on Trade in Services (GATS). These seminars and workshops should be followed up by sectoral workshops in order to study the implications of the GATS for each sector in greater depth.
2. It is desirable that Senegal should participate, at least as an observer, in the meetings of the Negotiating Group on Basic Telecommunications in the light of the level of its commitments on market access.
3. It is desirable that the private sector should be more closely associated with all stages of subsequent negotiations, participating in future negotiations as a member of the Senegal delegation.
4. It is desirable that the organization and functioning of the Post and Telecommunication Research and Regulation Department (DERPT) should evolve in such a way that it acquires the status of a body attached to the responsible ministry, in order to give it the administrative and financial flexibility necessary for it to fulfill its role as a driving force in promoting the telecommunication sector.
5. Given that the commitments to multilateral liberalization of telecommunications are very explicit, it is essential to carry out the necessary national reforms to reflect the international commitments. This concerns in particular:

(a) The Telecommunication Act, which predates GATS by a long way and which needs to be revised in order to take developments in the sector into account and to reflect the spirit of

GATS. The Act dates from 1972, and qualitative changes such as separation of the regulatory and operational functions and liberalization of the supply of certain services should be reflected.

(b) A more explicit formulation of the procedures and conditions for operating services open to competition.

APPENDIX

LIST OF PERSONS MET (SENEGAL)

Mr. Amadou Doudou SARR	Permanent Secretary of the CNCT, Technical Adviser to the Office of the President
Mr. Ousmane KEBE	Deputy Permanent Secretary of the CNCT
Mr. Issa MBAYE	National CAPAS Coordinator
Mr. Check Tidiane MBAYE	Managing Director, SONATEL
Mr. Pape Gorgui TOURE	Director of Studies and Development (SONATEL)
Mr. Abdoulaye KEBE	Director of Human Resources (SONATEL)
Mrs. Aïssatou DIENG	Director of Trade and External Affairs (SONATEL)
Mr. Papa Gana NBENG	Head, International Relations Unit (SONATEL)
Mr. Saliou TOURE	Head of Department, Division of Trade and External Affairs (SONATEL)
Mr. Issa MBAYA	Managing Director, Telecom-Plus
Mr. Boubacar SOUNKO	Deputy Secretary of the CNP
Mr. More Talla KANE	Professional Association of Industries of Senegal (SPIDS)
Mr. Mansour CAMA	President, National Confederation of Employers in Senegal (CNES)
Mr. Moustapha YADE	ANETEL
Mr. Cheick Moussa CAMARA	ANETEL
Mr. Balle DIOP	ANETEL

ANNEX D.4

TANZANIA

CONTENTS

ACRONYMS
PREFACE

1. OVERVIEW OF EXISTING SITUATION 143

1.1 KEY FACTS 143
1.2 CONSTRAINTS ON TELECOMMUNICATION DEVELOPMENT 143
1.3 TOWARDS REFORM OF THE TELECOMMUNICATION SECTOR 145

2. ORGANIZATION RESTRUCTURING 145

2.1 GENERAL 145
2.2 SEPARATION OF POSTAL AND TELECOMMUNICATION OPERATIONS 145
2.3 CORPORATIZATION AND COMMERCIALIZATION
OF THE NATIONAL TELECOMMUNICATION OPERATOR 146
2.4 ESTABLISHMENT OF INSTITUTIONAL REGULATORY FRAMEWORK 147
2.5 SUBSTANTIVE REGULATORY FRAMEWORK 148
2.6 EVALUATION OF REGULATORY FRAMEWORK 150

3. ECONOMIC RESTRUCTURING OF THE TELECOMMUNICATION SECTOR 151

3.1 GENERAL 151
3.2 PRIVATIZATION 152
3.3 OPENING SERVICES TO COMPETITION 152
3.4 COMPETITION IN BASIC SERVICES 153
3.5 JOINT VENTURES 154
3.6 EVALUATION OF PRIVATE-SECTOR PARTICIPATION 154

4. TARIFFS 154

4.1 TARIFF POLICY 154
4.2 TARIFF OF THE INCUMBENT NATIONAL OPERATOR 155

5. REGIONAL COOPERATION 156

5.1 GENERAL 156
5.2 MEMBERSHIP OF REGIONAL AND SUBREGIONAL ORGANIZATIONS 157
5.3 PARTICIPATION IN REGIONAL/SUB-REGIONAL PROJECTS 157
5.4 STATE OF INTER-AFRICAN COMMUNICATIONS 157

6. OBLIGATIONS AND MARKET ACCESS REQUESTS/OFFERS UNDER GATS 158

6.1 ACCESS TO AND USE OF TELECOMMUNICATIONS 158
6.2 MARKET ACCESS REQUESTS/OFFERS UNDER GATS 158

7. CONCLUSIONS AND RECOMMENDATIONS 159

7.1 CONCLUSIONS 159
7.2 RECOMMENDATIONS 159

APPENDIX 1 PERSONS MET DURING THE FIELD STUDY

APPENDIX 2 TANZANIA TELEPHONE TRAFFIC CIRCUITS

ACRONYMS AND ABBREVIATIONS

ADB	- African Development Bank
CAPAS	- Coordinated African Programme of Assistance on Services
COMESA	- Common Market for Eastern and Southern Africa
ECA	- Economic Commission for Africa
EEC	- European Economic Community
ERP	- Economic Recovery Programme
GATS	- General Agreement on Trade in Services
IDA	- International Development Association
ISD	- International Subscriber Dialing
ITU	- International Telecommunication Union
JICA	- Japan International Cooperation Agency
KBO	- Kagera Basin Organization
MOU	- Memorandum of Understanding
OAU	- Organization of African Unity
PATU	- Pan African Telecommunication Union
RASCOM	- Regional African Satellite Communication
SADC	- Southern African Development Conference
SATCC	- Southern African Transport and Communication Commission
TCC	- Tanzania Communication Commission
TPTC	- Tanzania Posts and Telecommunication Corporation
TRP	- Telecommunications Restructuring Project
TTCL	- Tanzania Telecommunication Company Limited

PREFACE

The main report on this study addresses the general telecommunications concerns and constraints of CAPAS countries and to a lesser extent, of Sub-Saharan countries. Also, in the main report, ongoing and planned telecommunication sector reforms in CAPAS countries are outlined, and, on the basis of international experience and lessons from the studies in the five CAPAS countries, proposals of general application are made as inputs to the ongoing reforms. Furthermore, regional cooperation and multilateral liberalization are considered and general market access offers/requests under GATS, for CAPAS countries are made in that report.

In this Annex (4) the same issues as those in the main report are addressed against the background and particular circumstances of Tanzania, and where appropriate, observations and recommendations are made as inputs to ongoing reforms. Finally, suggestions on market access requests/offers are made that might be consistent with the present and planned telecommunication sector development policies in Tanzania.

1. OVERVIEW OF EXISTING SITUATION

1.1 Key Facts

Tanzania has an area of 945,000 sq. km. Its population was approximately 28 million inhabitants as at end of 1994. Eighty percent of the population lives in rural areas. GDP per Capita was US$ 90 in 1991[1]. A speech made by the country's Minister's of State for Economic Planning in Parliament on 15th June 1995 says GDP per capita rose to US$ 130 at the end of 1994[2].

There were 88,000 main telephone lines in Tanzania at the end of 1994. This translates to a teledensity of 0.3 telephones per 100 inhabitants compared to the Sub-Saharan average of 0.46. Waiting applicants for telephones (expressed demand) were 145,000. The quality of service is very poor. While average fault per telephone is two per year, the calling rate for inter-urban and international telephone calls was 20% in 1994. This poor quality is largely due to congestion in the network and aged equipment.

The views of customers, particularly business users, about the quality of service are mixed. Some are highly frustrated, particularly those in Dar Es Salaam. They complain of difficulty in calling from one area of the city to another; or that their telephones are out of order for a long time without being attended. Others think the Tanzania Telecommunication Company Limited (TTCL) is trying its best in difficult circumstances. These positive views are a result of commercial orientation being adopted by TTCL in recent times including educating customers about causes of service problems and remedial action being taken. Consistent with the egalitarian policy of the Tanzanian Government (with emphasis on rural development) the little telephone service available has been spread as widely as possible over the country. All the 110 administrative district headquarters and some rural areas have telephone service. The total demand including existing connected subscribers, waiters and unexpressed demand is estimated to be 300,000 lines.

Basic telecommunication services (telephone, telex and facsimile) are provided by the TTCL. Millicom (Tanzania) Limited, operating as Mobitel, has been providing mobile cellular services since the second half of 1994, initially in Dar Es Salaam and later in the Island of Zanzibar. There are no public data or public value-added services yet. Private leased circuits are provided by TTCL for specialized services necessary for business users.

1.2 Constraints on Telecommunication Development.

The same constraints to telecommunication development that plague other African countries account for the poor state of telecommunication services in Tanzania. They are shortage of finance, human resources and technology.

(a) Financing:

The main sources of financing for telecommunications in Tanzania, as in other least developing countries, have been primarily multilateral and bilateral loans. Before the break-up of the East African Community, telecommunication services for its members, Kenya, Tanzania and Uganda, were operated by a single entity and financed by regular loans from the World Bank (International

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1 ITU, Geneva, 1995

2 Speech by the Minister of State in the President's Office and Vice-Chairman of the Planning Commission on the "State of the National Economy in 1994 and proposal for the current development plan and overview of the budget for the period 1995/96 - 1997/98 in Parliament on 15 June, 1995, p.38.

Bank for Reconstruction and Development). After the collapse of the Community in 1977, there were attendant dislocations. Common resources, for example senior management and technical staff, as well as facilities, had to be duplicated in all three countries. This took time and additional expenses. It was not until in the early 1980's that Tanzania was able to establish new sources of finances, mainly the International Development Association (IDA) Wing of the World Bank and bilateral sources including Japan, Sweden and Belgium. Even so, the amounts obtained from these sources were sporadic and small. Due to restrictive tariff policy, the Tanzania Posts and Telecommunication Corporation (TPTC), TTCL's predecessor, almost consistently made losses in the 1980's. There were not enough internally-generated funds for re-investment.

In 1993, a consortium of financiers led by the World Bank committed a total of US$ 189.7 million to finance a Telecommunication Restructuring Project (TRP) aimed at meeting current demand and modernizing the network. Total project cost is US$ 220.1 million of which TTCL is contributing US$ 30.4 million. The co-financiers of the Project and respective amounts are shown in Figure 1.

FIGURE 1:
Telecommunication Restructuring (Project Financing in US$)

Financier	Local Cost	Foreign Cost	Total Cost
1.African Development Bank (ADB)		45.9	45.9
Danish International Development Agency		8.3	8.3
European Economic Community (EEC)		17.2	17.2
International Development Agency (IDA)		74.4	74.4
Japan International Cooperation Agency (JICA)		2.2	2.2
Swedish International Development Agency		41.7	41.7
TPTC	30.4		30.4
Total	30.4	189.7	220.1

source: Tanzania Telecommunication Company Limited.

The amount required to meet demand at the end of the 5-year project (originally 1991 - 1996; but now 1993 -1998) was approximately US $ 400 million. The size of the project that the financiers thought could realistically be implemented is the project sum of US$ 220 million, about half of the amount required to meet demand. Yet, the TRP is a project of unprecedented magnitude in the history of telecommunication development in Tanzania. The size of the investment can be appreciated by comparing IDA's contribution of US $ 74.4 million with previous investments by IDA affecting telecommunication development in Tanzania. The major financier of telecommunications in Tanzania, IDA made loans of a total of US $43 million to the Tanzania Posts and Telecommunication Corporation between February 1978 and the initiation of the TRP in the early 1990's.

The TRP is part of the Tanzania's Economic Recovery Programme (ERP) which aims at sustained economic growth and improving the efficiency of the various sectors of the economy through

economic reforms and the enhancement of enabling infrastructures including telecommunications. The substantial support by the co-financiers of the TRP is an indication of the importance they attach to telecommunications in the realization of the Government's macro-economic objectives

(b) Human Resources

In common with other Sub-Saharan countries, Tanzania experiences a shortage of the skilled manpower necessary for efficient operation of telecommunication services. For example, owing to lack of in-house capacity to supervise large projects like the TRP, TTCL has employed expatriate personnel to assist in the implementation of the project.

(c) Technology

Not only is Tanzania telecommunication network predominately analogue, but 160 exchanges out of 188 are manual. The latter are mainly in rural areas. Only about 25% of the switching equipment is digital. The transmission facilities are almost entirely analogue. Tanzania does not manufacture any telecommunication equipment. All equipment is imported.

1.3 Towards reform of the Telecommunication Sector.

During the middle 1980's Tanzania embarked on a series of economic adjustment programmes aimed at improving its economy which had been in decline or stagnation during the mid 1970's to early 1980's. The reform measures adopted include trade liberalization, foreign exchange liberalization, and involving private sector participation in an economy in which most enterprises are state-owned. Reform of the management structures of various sectors of the economy to improve their efficiency has been part of the thrust of public policy. Telecommunications being a medium of transportation of many economic activities, has been among the sectors chosen by the Government for such reform. This report examines those reforms, Tanzania's regional integration objectives and makes proposals for market access under GATS that might promote those reforms and objectives.

The next chapters address the strategies taken towards achieving these objectives.

2. ORGANIZATIONAL RESTRUCTURING

2.1 General

The reorganization of the telecommunication sector has been espoused by the Tanzania authorities since the late 1980's when the issue began to feature in international meetings especially those of the International Telecommunication Union (ITU), including the Niece Plenipotentiary Conference in 1989. It received impetus during the sourcing of funds for the TRP when financiers, and the Government of Tanzania agreed on targets for implementation. For example, it was agreed in March 1992 that the separation of posts and telecommunication operations and the establishment of a regulatory body would be accomplished in March, 1994.

2.2 Separation of Postal and Telecommunication Operations

Up to the end of 1992 the postal and telecommunication services had been operated by the Tanzania Posts and Telecommunication Corporation (TPTC) as fully integrated operations.
Facilities, for instance buildings, were shared; postal counters received all payments both for postal and telecommunications and any separation of revenue and expenditure that existed was far from

being complete. Internal re-organization of the two main services including separation of facilities, such as operational buildings, revenues and expenditures, was achieved in one year.

The Tanzania Posts Corporation Act, 1993 which established a postal corporation, and the Tanzania Telecommunication Company (Incorporation) Act, 1993 which enabled the incorporation of the Tanzania Telecommunication Company Limited (TTCL) under the Companies Act, became effective on 1 January, 1994. Similarly, the Tanzania Communication Commission Act, 1993 became effective on 1st January, 1994. Thus, the main structural re-organization was completed three months ahead of the target that had been agreed with donors. The assets and liabilities relative to posts and telecommunication services, including employees, were vested in the respective entities in a general manner. But the actual apportioning of common assets and liabilities was completed six months after the establishment of the new communications entities.

2.3 Corporatization and Commercialization of the National Telecommunication Operator

2.3.1 The Tanzania Posts and Telecommunications Corporation (TPTC)) was self-financed and was required by the legislation that established it to operate on commercial principles[3]. But it had no sufficient autonomy. Development projects and budgets had to be approved by the sector Minister. So were tariffs, except for minor adjustments. Employees' terms and conditions of service were determined centrally for all parastatal organizations and were basically those of the civil service. In sum, the Corporation was civil-service oriented.

In March 1992, the Ministry of Transport and Communications signed a Memorandum of Understanding, MOU (effectively a performance contract) with TPTC which gave the latter greater autonomy in deciding terms and conditions of service of employees and in revising tariffs regularly subject only to a price cap. In return for the increased autonomy, the TPTC was required to meet operational and financial targets. The corporatization of the telecommunication wing of the posts and telecommunication services via the incorporation of TTCL in January 1994 was accompanied with a further enhancement of autonomy. The Board of Directors is now fully responsible, on behalf of the Government, for the management of the company. The Board appoints the Managing Director, with the consent of the Minister; appoints the senior staff; determines the salaries and conditions of service and approves development projects and the budget. The MOU remains as a mechanism for ensuring accountability through results.

2.3.2 Commercialization is an essential element of corporatization. It involves changing from civil-service practices and attitudes to commercial management practices. Responsiveness to customers' needs in terms of quantity, quality, variety and fair price are important elements of commercial approach. Within a year from its establishment TTCL had embarked on a number of commercialization actions. In order to improve productivity, by
reducing excess staff, the TTCL instituted an attractive premature retirement scheme. About 700 employees out of 4900 retired under the scheme. This move was accompanied with salary increases, improvements in other conditions of service and other intangible incentives that have considerably increased staff morale.

TTCL is actively engaged in implementing the TRP as the long-term answer towards meeting customer demands. Nearly all supply, installation and consultancy contracts under the project had been signed by mid June, 1995. Short-term actions include reducing the time for repairing faulty telephones, the establishment of one-stop centers for dealing with all service aspects. Educating customers on the causes of the existing unsatisfactory service situation and the remedial measures being taken is another strategy being used.

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[3] The Tanzania Post and Telecommunication Act, No 15 of 1978, Section 10.

TTCL has also embarked on internal restructuring as part of commercial orientation. The company's management structure was reorganized to make it more responsive to customers and results-oriented, with emphasis on decentralization of decision-making and the establishment of profit centers. operational procedures, including information systems, are also being streamlined. Intensified training at all levels to improve skills and to install a customer-oriented culture is another important aspect. Commercialization is a process that is bound to take time given the long tradition of civil service orientation through procedures and attitudes.

2.3.3 Financial Performance

The financial performance of Tanzania Posts and Telecommunications Corporation (TPTC) was almost consistently poor from the middle 1980's to early 1990's. This was partly attributable to low tariffs that did not match high rates of inflation, rapid devaluation of the Tanzania Shilling, and foreign exchange losses. As about 80% of TPTC's capital expenditure was financed with foreign loans, foreign exchange losses arising from currency fluctuations had a far-reaching impact on TPTC's profitability and sometimes even solvency. In 1989, TPTC had a negative net worth of Tshs. 19,456 million and accumulated foreign exchange losses of Tshs. 22,734 million. TPTC was at that point technically insolvent.

In the run-up to corporatization, various measures were taken by government to improve the public telecommunication operator. It took over some of the TPTC's foreign currency loans and negotiated with donors so that portions of the foreign loans for financing the TRP would be passed on to TPTC or its successor company as government equity. For example, out of the US $ 74,4 million loan from IDA , US $ 20 million will be equity. Progressive tariff adjustments and operational efficiency have given the Tanzania Telecommunications Company Limited (TTCL) a good start. In 1993 TPTC made a net profit of Tsh 2.825 million before tax. Thus, in 1994 TTCL inherited an enterprise with a healthy financial trend.

2.4 Establishment of Institutional Regulatory Framework

2.4.1 Policy and Regulatory Functions before Reorganization.

The sector ministry was responsible for policy and overall supervision of the sector. The Ministry also exercised a regulatory role, particularly in tariff approvals. The Tanzania Posts
and Telecommunication Corporation (TPTC) was, under legislation, responsible for spectrum management including frequency allocation and radio communication licensing but, in practice, these powers were exercised in consultation with a committee comprising the sector ministry, other relevant ministries and government security organizations. Also, TPTC type-approved terminal equipment.

2.4.2 Division of Policy and Regulatory Roles after Reorganization:

The Tanzania Communications Act, 1993 clearly delineates policy and regularity functions between the sector ministry and the Tanzania Communication Commission (TCC) established under the Act. The Act covers the regulation of both postal and telecommunication services, and vests the regulatory functions of both services in the Commission. For the purposes of this report reference is made to telecommunications only.

Under the Act, the Minister has the responsibility of determining telecommunications policy and overall supervision of the telecommunication sector. The regulatory role is vested in the Commission and is to be exercised in accordance with government policies. However, the Act gives

the Minister substantial control over regulatory oversight. The Minister is empowered to issue general or specific directions to the Commission in relation to the performance of its functions.

2.4.3 Status, Structure and Finances of the Commission

The Commission was established as a separate agency, on similar lines as a parastatal organization except that it is non-profit making. It consists of a chairman appointed by the President and not less than four or more than six members appointed by the sector Minister. Members are appointed for a term of three years, renewable and may be removed only for cause. The legislation does not specify whether the appointments are full-time or part-time. It provides flexibility by stating that the terms of appointment shall be in accordance with the instrument of appointment. For the time being, the appointments have been made on part-time basis. But there is no bar to the appointment of the chairman or other members as full-time officials if the circumstances, including the volume of work, justify.

The Commission is serviced by a secretariat headed by a Director General appointed by the President. Other staff are appointed by the Commission; their salaries and other terms of service are determined by the Commission. The Commission is self-financing. It is funded by operators' contributions through licensing fees, royalties and other charges levied by the Commission for its activities.

As regards accountability, the Commission's annual budget is approved by the Minister. After such approval, the Commission is free to spend within the approved limit. Its accounts are audited by the Tanzania Audit Corporation which audits parastatal organizations. An annual report on the activities of the Commission and its accounts are to be submitted to the sector Minister and eventually to Parliament.

2.5 Substantive Regulatory Framework

2.5.1 The broad policy and enabling mandate for the regulation of the telecommunications sector in Tanzania are enshrined in the Tanzania Communications Act. Comprehensive Policy for the sector is under formulation.

The Minister and the Commission have sufficient mandate to implement the policy objectives embodied in the Act. These objectives are reflected in the mission of the Commission. The main elements of the mission[4] are:-

(a) ensuring the provision of "good and sufficient" telecommunication services throughout Tanzania (universal service).

(b) ensuring rates for provision of services are consistent with efficiency, continuous service and financial viability of operators.

(c) regulating telecommunications through licensing and supervision of licensing conditions.

(d) promotion of competition in providing telecommunication services and to regulate tariff rates with a view to eliminate unfair business practices among operators.

(e) to further advancement of technology

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[4] Tanzania Communication Act, No 18 of 1993 Section 6.

(f) to be the national body that represents Tanzania in international organizations in telecommunication matters.

(g) to advice the Government on all telecommunication matters and on matters pertaining to the Commission.

The general mandate is complemented by a schedule to the Act which lists comprehensive enabling powers for the Commission.

The Commission is required to exercise its mission in accordance with directions which may be issued by the Minister on the following matters:

(a) conditions to be included in licenses
(b) general guidelines for determining tariffs
(c) determination of standards about network matters
(d) guidelines on issuing varying or cancellation of licenses.
(e) any other policy matter relating to the functions of the Commission.

Any such general directions are to be issued in a transparent manner, i.e. in writing and to be published in the official gazette[5].

2.5.2. According to the Communications Act, all telecommunications systems and services require licensing by the Commission. The only exceptions are systems and services for military, police and security services. Also exempted are broadcasting services which are regulated by the Broadcasting Commission.

Detailed licensing policy is yet to be decided. However the Commission is empowered to stipulate conditions in licenses concerning regulatory issues. The Commission has done so in the license it issued to the Tanzania Telecommunication Company Ltd (TTCL) in December, 1994. The license is very comprehensive: Among the matters addressed by the license are:

(a) Compulsory inter-connection of other operators and providing access to service providers.

(b) Prohibition of cross-subsidies for services in which TTCL competes with other operators.

(c) Prohibition of discrimination in the provision of services.

(d) Guidelines for negotiating inter-connection agreements.

(e) Requirement to contribute to a Rural Telecommunication Development Fund.

(f) Issuance by the Commission of Price-caps for fixing tariffs.

2.5.4 The role of operators in providing the desirable quantity and quality of services is reflected in the mission of the Commission. So are some of their rights, for example, the ability to maintain viability through appropriate tariff levels. Public telecommunication operators designated by the Commission will also have rights to enter public and private land for the purpose of constructing and maintaining telecommunication facilities including radio link installations. Also, the Act contains Provisions for the Protection of telecommunication facilities and operations and stipulates penal sanctions for infringement.

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[5] OP Cit, Section 7.

2.5.5 The Act lays down few procedural requirements in connection with the exercise of the Commission's functions. There are no guidelines, for example, on the procedure for obtaining licenses or dealing with complaints by operators against other operators or by users. However, there are provisions for applicants aggrieved by a decision of the Commission to appeal to a court of competent jurisdiction against refusal to grant a license or the cancellation of a license. The grounds of appeal are limited to non-adherence to procedure laid down by the Commission or basing a decision on extraneous factors.

The Commission is required to give an operator the opportunity to make representations against the Commission's intention to modify the conditions of a license. In case the operator objects, the Commission may go ahead with modifications subject to making appropriate compensation to the licensee.

The decision of the Commission on modification is also appealing on the same grounds as refusal to grant a license or cancellation of a license. The absence of detailed procedures is not necessarily a weakness. In a developing country where regulatory experience is lacking and appropriately qualified personnel are in short supply, flexibility is desirable. The flexibility in the Act is in the form of a mandate to the Commission to make regulations and issue guidelines on various matters concerning its functions. That includes procedures. The Commission has already issued guidelines on procedures and tariffs for the licensing of radio communications as well as for telecommunication operations[6]. The guidelines took effect on 1 May, 1994. The following are the salient features of the guidelines with regard to public telecommunication operating licenses:

(a) No licenses for basic telecommunication services were to be issued before the end of 1995, except to the incumbent operator, the Tanzanian Telecommunication Company Ltd.(TTCL). Guidelines and procedures for licensing operators were to be issued after that date. The Commission has moved faster on the licensing of other basic service operators than it had anticipated (See section 3.4 below).

(b) Apart from licenses already issued or under negotiation, new licenses for land mobile cellular services will be through open bids followed by negotiations with applicants pre-qualified under the bid system. By April, 1995 bids had been invited for provision of mobile cellular services in the country's service areas. See also section 3.3 below.

2.6 Evaluation of Regulatory Framework

2.6.1 The establishment of the regulatory framework - separate national telecommunications and postal operating entities, the regulatory Commission and the associated enabling legal instruments ahead of schedule, was possible because of a high degree of commitment. The main actors in that endeavor, who were committed to an early reorganization of the telecommunication sector, were the Government at all levels including the sector Ministry, other relevant ministries, the Cabinet and the Parliament. The then incumbent operator, TPTC, through its board and management, supervised most of the necessary groundwork. All were motivated by the desire to meet, at least in part, the intense public demand for improved service.

2.6.2 The framework that was established, both institutional and substantive, was characterized by a desire to learn from the systems and experiences of other countries, developed and developing; and to adapt them to the specific circumstances of Tanzania.

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[6] Procedure and Tariffs for Licensing Radio Communication and Postal Services. Tanzania Communication Commission, Dar es Salaam, Tanzania, May 1994.

Apart from obtaining information from various countries through documents, a group of persons representing the inter-ministerial committee that prepared reform proposals for the Government, visited a number of countries for first-hand experience on the functioning of their frameworks. The countries visited include Malaysia, Singapore, U.K. and U.S.A.

2.6.3 The following features of the Tanzania framework indicate the extent to which the desire to learn from other jurisdictions has been balanced against the circumstances of a developing country, and of Tanzania in particular:

(a) The Commission regulates both the postal and telecommunication services. The objective is to minimize costs of regulation and supervision of the postal and telecommunication sectors.

(b) The Commission is independent in all respects, except that the legislation has reserved to the Minister the mandate to intervene in the functions of the Commission through general and specific directions[7]. This power of intervention was considered desirable, in that it enables the Government to be involved in the determination of regulatory policy in the formative period. This is particularly necessary as legislation has given the Commission the all-important regulatory function of issuing operating licenses. Nevertheless, if the Minister does not exercise the regulatory mandate cautiously, the Commission's independence and, consequently, its credibility will be eroded.

(c) The substantive framework is flexible. It allows room for gradual development and adaptation.

(d) Administrative procedures for implementing the framework are simple. A mandatory "due-process" approach, which is expensive and time-consuming has been avoided. But basic rights of appeal have been incorporated in the framework.

2.6.4 Implementation of the institutional framework in the period of one and a half years since its establishment (January 1994 to June, 1995) has been significantly positive. The Commission has made good use of its administrative and financial autonomy by securing adequate facilities and resources including the nucleus of necessary senior staff and office accommodation.

The Commission used short-term external technical assistance in starting it up, especially in designing a suitable organizational structure and administrative procedures. Apart from that, the Commission embarked on an intense programme of regulatory capacity-building through tours of mature communications regulatory organizations and attendance of seminars by members and staff. This is necessarily a continuos process.

3. ECONOMIC RESTRUCTURING OF THE TELECOMMUNICATION SECTOR.

3.1 General

Since the mid 1980's Tanzania's predominantly socialist policies have steadily accommodated private sector participation in the development of the economy. While telecommunications is one of the areas reserved for public investment under the Investment Promotion Act, 1990,

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[7] Tanzania Communications Act, 1993 Section 7 .

flexibility is also provided for opening the sector to private investment on special approval. The Government recognized that the investments and human resources required to meet the large demand for telecommunications services cannot be made available from state, multilateral and bilateral sources alone. While detailed policy is under formulation the broad policy of the Government is to encourage private sector investment in telecommunications. The various modes of that participation are considered in this section.

3.2 Privatization

It is the macro-policy of Tanzania to Privatize most of the 400 public owned enterprises which have dominated economic activity in the country, since the promulgation of the socialist policy via the Arusha Declaration in 1967. The Privatization taking place may be partial or total and is effected through bids or negotiations with strategic investors.

A sale of shares by public offer has not played a significant part due to the lack of a stock exchange. A Capital Authority that is preparing for the establishment of a stock exchange was created in 1994. It will take time before a capital market becomes fully operational. However, that does not prevent the sale of shares through public subscription. The lack of a stock exchange will only limit the effectiveness of public sales due to lack of easy tradability.

The Tanzania Telecommunication Company (Incorporation) Act 1994 has enabling provisions for gradual privatization of the national telecommunication operator, the Tanzania Telecommunication Company Limited (TTCL). However, early privatization of TTCL is not likely to be an option of private sector participation in telecommunication development in Tanzania for several reasons. Firstly, the Presidential Parastatal Sector Reform Commission which is responsible for privatization of public enterprises announced in April, 1995 that public utilities, including TTCL, will not be privatized. Secondly, some of the bilateral financiers of telecommunications projects in Tanzania, especially the Telecommunication Restructuring Project (TRP) are against immediate selling of TTCL'S assets acquired partly through their contributions.
Thirdly, there is currently a strong public reaction against the privatization of financially viable public enterprises, and in particular the sale of such businesses to foreigners.

3.3 Opening Services to Competition

3.3.1 Terminal Equipment and Related services

The opening of telecommunications services to competition in Tanzania started in 1993 when subscribers were allowed to acquire terminals from suppliers of their choices provided they were type-approved. Dealers in terminals and providers of wiring and maintenance services have to be licensed, the objective being to ensure that they have necessary technical capacity and in order to protect customers.

3.3.2 Mobile Cellular Services.

In 1993 Millicom (Tanzania) Ltd, operating as Mobitel, was licensed to provide cellular mobile services in Dar Es Salaam and Zanzibar. The company is a joint-venture among Millicom International Cellular Ltd, a US-based company (51% shares); Tanzania Telecommunication Company Limited (TTCL), (25%) and Ultimate Security Ltd, a locally- incorporated company, (14%). The remaining 10% of the shares are in reserve for disposal as the partners may agree. A second operator TRI of Malaysia, was (in June 1995) in the process of being licensed.

Mobitel started with a capacity for 1500 subscribers; but with a projection of 5000 over five years. The 1500 capacity was exhausted within a year. Given the large waiting list for ordinary telephone services, including potential business customers, the service became very popular. Mobitel planned to accelerate the implementation of its development programme to cater for more customers before its competitor TRI, started offering service. The second cellular operator is wholly private-owned: 60% foreign 40% local.

The number of bids for provision of mobile cellular service in Dar Es Salaam in 1992 had been high - about 10 international companies, some with local associates, submitted bids. The Tanzania Communications Commission has taken a cue from their interest and divided the country into 4 mobile cellular services areas, in order to meet some of the demand for telephone service. Limited competition, duopoly, will be allowed in each service area in order to minimize problems of radio frequency limitation. The Commission invited bids for licenses in April, 1995 for all areas, except the coastal area (which had two licensees already). Any operator or prospective operator may bid for provision of service in one or more areas.

3.3.3 Other Non-basic Services

Data and value-added services have been partially opened to competition. They are, however, subject to licensing by the Commission. The Commission has invited proposals for the provision of public data services on competitive basis. Private networks, including closed-user group networks for large commercial concerns, are being licensed.

3.4 Competition in fixed telephone services

3.4.1 The Tanzania Communications Act envisages the possibility of competition in all services. Indeed, encouraging competition is one of the functions of the Commission under the Act. Also, the Commission is required to perform its functions in accordance with government policy. Comprehensive policy which no doubt will address short-term and long-term objectives and strategies for telecommunication development, is under formulation. The short-term policy was indicated in an announcement in the local press on 23 July 1995, in an invitation by the Commission for provision of basic telecommunications in the rural areas of Tanzania. The notice declared that, for the time being, the Tanzania Telecommunication Company Limited (TTCL) will continue being the only basic telecoms operator. But in a bid to develop telecommunications in the rural areas, the Commission would license operators who would have a strong component of local (national) participation (public or private) through joint ventures to operate basic telecommunications networks in demarcated rural areas. TTCL will, according to the notice, provide inter-connection to such networks.

The invitation left it to applicants to chose the areas in which they wish to operate. The announcement promised a number of incentives for operators in rural areas. They include negotiated license fee rebates, access to a Rural Telecommunication Fund yet to be established or even monopoly guarantees for specific periods. Operators of other infrastructures in rural areas, like railways, electricity suppliers and other interested in rural investment, were encouraged to apply. The Commission indicated in its announcement that it would be prepared to license more than one operator in any demarcated rural area.

An application by Zanzibar Telecom Limited, a joint-venture company established with the approval of the Government of Zanzibar, is under consideration by the Commission. If the company is successful in its application it will partly compete with and partly complement TTCL in the provision of telecommunication services in Zanzibar.

3.4.2 The license issued to TTCL imposes on it an obligation to provide pay phones. The license authorizes TTCL to franchise this obligation through resale of circuits to agents. The company is vigorously implementing the obligation through installation of pay phones on its own and appointment of agents through public bids.

3.5 Joint Ventures and Build-Transfer Schemes

A joint-venture is another form of private-sector participation strongly favored in Tanzania for the development of telecommunications. The Tanzania Telecommunication Company Limited (TTCL) is encouraged in its license to enter into joint-ventures. Already, TTCL has a joint-venture with Millicom International S.A. for mobile cellular services and is in the process of negotiating joint ventures for the provision of data and value added services.

Tanzania has not used Build-Transfer Schemes yet for developing the telecommunication network. Such schemes have been used successfully elsewhere, especially South East Asia (Thailand, Indonesia). In Ghana a Build-Operate-Transfer Scheme is being used to add 40,000 telephone lines to that country's network.

3.6 Evaluation of private-sector participation

3.6.1 Tanzania has moved vigorously since 1993 in involving the private sector in developing telecommunications. The preferred modes of participation are allowing significant competition in mobile cellular services and other non-traditional basic services, for example data transmission ,as well as value added services; limited competition in the provision of basic services in rural areas and joint-ventures. Given the large current and potential demand and large territory, (Tanzania is the eighth largest country in Africa) these initiatives are essential.

3.6.2. Tanzania's level of development is low and the purchasing power of the majority of the population has been in decline. Therefore, despite its large territory and sizable population, Tanzania's customer-base for the main basic telecommunication service (telephone) will remain modest. There will be no scope for more than one national operator of basic service networks, for a long time. The incumbent national operator, TTCL, should concentrate on developing basic networks for international and national trunk services. Private sector participation in telecommunication services would be involved in the other ways outlined above. In order to avoid duplication of facilities thereby increasing the cost of services to the public, it should be an obligation for TTCL to interconnect its network with networks of other operators e.g. cellular mobile, local/rural networks) and to provide lines to retailers (for operators, payphones and value-added services) as well as to private network operators.

4. TARIFFS

4.1 Tariff Policy

The fundamental principles governing the fixing of tariffs are embodied in section 5(1)(b) of the Tanzania Communications Act. The section requires the Tanzania Commission to ensure that operators provide services at "rates consistent with efficient and continuous services and the necessity for maintaining independent financial viability". That means that tariffs should be essentially cost-based, but operators should not pass the costs of their inefficiencies to customers.

4.2 Tariffs of the Incumbent National Operator

4.2.1 Before the establishment of the Tanzania Communications Commission, tariffs for the national telecommunication operator which was a complete monopoly, were approved by the sector Ministry. For social service considerations tariffs for national services have been kept low. According to a statement in the Telecommunication Tariff" published by the Tanzania Telecommunication Company Limited (TTCL) on 1 January, 1995, the telecommunication tariffs, for national services in Tanzania have for a number of years remained among the lowest in the world[8]. On the other hand, international service tariffs have been too high to the detriment of business customers and other users of the service. Also, these high rates have encouraged call-back international calls, with adverse effect on revenues. As a result of pressure from user groups and recognition by the Government and TTCL, of the need for remedial action, tariff rebalancing started in 1992. Then international rates were reduced by 40% while national rates were raised steadily as authorized by the performance contract between the Government and the national telecommunication operator. In the January 1995 revision, international rates were again reduced by 20% while the national service rates were raised by 40%. The international rates which were introduced in January 1996 ranged from US 3.2 to 4.8 per minute for International Subscriber Dialing (ISD) calls. See Figures 3 and 4 below for national and international calls respectively.

FIGURE 3.
Rates of Charges for National Subscriber Trunk Dialing (STD) Calls:
Effective 1 January 1995.

Radial Distance	**Period in Seconds per Unit**	
(In Km.)	Full Rate or Hour Rate	Cheap Rate or Peak Off-Peak Hour Rate
0 - 30	30	70
30 - 150	9	20
150 - 510	4	10
OVER - 510	2	5

Explanatory Note: 1: One Unit Fee is Tshs 6.00
Explanatory Note: 2: Exchange Rate: 1 US$: Tshs 599.008 (Bank of Tanzania mean rate on 10/08/1995)
Source: Telecommunications Tariff, Tanzania Telecommunication Company Limited, Dar Es salaam, January, 1995.

[8] "Telecommunications Tariff", Tanzania Telecommunications Company Limited, Dar es Salaam, 01 January 1995

FIGURE 4.
International Telephone/Telefax Rates for International Subscribe Dialing (ISD) Calls effective 01 January 1995

Zone	Rate per minute in US$
1. Eastern and Southern African Countries excluding Kenya and Uganda.	3.2
2. Other African Countries	4.0
3. Rest of the World	4.8

Source: Telecommunications Tariff, Tanzania Telecommunication Company Limited, Dar Es Salaam, January, 1995.

4.2.2 During the field study, users of private leased circuits said the rates for such services both national and international were too high. They argued that they pay a full rate for 24 hours use when, if used for ordinary service, the usage period would be relatively lower. This is an area which the Tanzania Telecommunication Company Limited (TTCL) might wish to examine. After the expansion under the Tanzania Restructuring Project (TRP), TTCL may have idle capacity in some areas which could earn revenue if appropriate rebates are allowed.

4.2.3 The Tanzania Communications Commission included guideline's in the license issued to TTCL concerning the fixing of tariffs. Tariffs for basic telecommunications services provided by TTCL will be fixed in accordance with a price-cap to be set by the Commission periodically in consultation with TTCL. The price cap will take into account a number of factors. They include increase in the Consumer Price Index for Tanzania, devaluation, operational costs and efficiency. Rates fixed according to the price-cap may be reviewed by the Commission on its own initiative or on complaints by members of the public.

4.3 From the rate fixing guideline contained in TTCL's license it can be deduced that the Commission will regulate only basic services rates. This would be a proper approach since the rates for non-basic services, which have been or are being fully or substantially opened to competition, would be regulated by market forces.

5. REGIONAL COOPERATION

5.1 General

Geography and history give Tanzania a strong potential as a business hub, and a nucleus of economic co-operation among Eastern, Central and Southern African Countries. Tanzania is a member of most groupings of those sub-regions. Tanzania is also a transit centre for trade for the three sub-regions. Although her tourist industry is not sufficiently developed, Tanzania's potential is well recognized internationally. A visiting group of international tourist promoters recently pointed to the possibility of Tanzania becoming a tourist hub for the Central, Eastern and Southern African Countries. Well developed telecommunications for regional communications, and intensification of regional co-operation should advisably feature strongly in Tanzania's policy.

5.2 Membership of Regional and Subregional Organizations

Tanzania is a member of the OAU, ECA, PATU, and RASCOM. Also, she is a member of COMESA, SADC, and SATCC. She was a member of the former East African Community, which had its headquarters in Arusha, Tanzania. That Community is in the process of being revived. Telecommunication-wise, the three countries which formed the East African Community, (Kenya, Tanzania and Uganda), retain close co-operation on technical and operational levels. They still have a common numbering system and apply "national" tariff rates to each other. Tanzania is also a member of the Kagera Basin Organization (KBO) which is formed by Burundi, Rwanda, Tanzania and Uganda.

5.3 Participation in Regional /Sub-regional Projects

Tanzania is part of the PANAFTEL network. It is linked by terrestrial routes to countries lying to the North, South and West of it through that project. Under the Telecommunication Restructuring Project Tanzania is rehabilitating the microwave backbone to Kenya and Uganda which was constructed in the early 1970's. Owing to congestion and aged facilities, communication on that route is very poor. Under the Kagera Basin Organization (KBO) organization, a telecommunication project funded by the African Development Bank and executed in the late 1980's linked directly, by terrestrial routes, Tanzania with Uganda through Masaka; and also Tanzania with Rwanda and Burundi.

5.4 State of Inter-African Communications

Tanzania is a transit centre for trade traffic by road, railway, and inland waterways to Uganda, Burundi, Rwanda, Zaire, Malawi, Zambia and Zimbabwe. During the field study, business customers voiced dissatisfaction with poor telecommunications, particularly to Uganda and Kenya and, to a large extent, to the other countries. The Tanzania Telecommunication Company Limited expects that the situation will improve when the Telecommunication Restructuring Project is fully implemented. Major transmission routes to the North, South- West and West of the country are being expanded and rehabilitated under the project.

The distribution of direct circuits from Tanzania to other countries in the world is shown in Appendix 2. It is strongly influenced by historical and economic ties as well as geography (in the case of African Countries) Kenya and Uganda with 18 and 16 circuits respectively, were, together with Tanzania, members of the Former East African Community. They were also closely coordinated administratively by the U.K. during the colonial era. The other African countries with which Tanzania has direct telecommunications links are members of subregional economic groups to which Tanzania belongs as shown in section 5.2 above.

The U.K. with 79 direct circuits from Tanzania, out of 191 circuits to non-African countries, was the country's immediate former colonial ruler apart from being also a major trading partner. Furthermore, the U.K. serves as a transit centre for communications between Tanzania and other countries. The allocation of circuits to other non-African countries is also dictated by trade and other economic factors, such as convenient transit centers (for example Singapore).

Efficient communications can be achieved through transit centers. But when transiting is made at more than one level, as for instance through Paris and then London or vice-versa, as is the case for communications between some French-speaking and English-speaking African countries quality suffers or communication fails. The distribution of direct circuits from Tanzania suggests that inter-

African telecommunication services are not likely to improve significantly without the intensification of economic cooperation among African countries.

6. OBLIGATIONS AND MARKET ACCESS REQUESTS/OFFERS UNDER GATS

6.1 Access to and use of Telecommunications

Tanzania made a commitment on tourism under the GATS. Therefore, Tanzania has an obligation, under Annex III of GATS (Telecommunications) to provide to foreign providers of tourist services, in Tanzania, including travel, access to and use of telecommunications, for their operations. Airlines use the SITA network for reservations going through that network. Airlines voiced dissatisfaction with telecommunication services for purposes of networking their local branches, or communication between airlines reservation offices in Tanzania and their local agents. They said breakdowns are common especially during the rainy seasons. Sometimes agents have to drive to airline offices or send messengers to check on the status of reservations, instead of using their personal computers. These problems should be alleviated under the Telecommunication Restructuring Project.

The regulatory framework adopted by Tanzania, including the establishment of a regulatory body and the regulatory policy and guidelines being evolved, enable it to fulfill substantially, the requirements for objectivity and transparency in providing access to and use of telecommunications, to foreign providers of other services.

6.2 Market access requests/offers under GATS

Allowing foreign providers to compete in selected segments of telecommunication services gives a developing country access to capital and skills necessary for developing its telecommunication sector. Committing competition policies by making market access requests/offers under the GATS enhances the stability of such policies in that they cannot be changed easily. Such stability provides added incentives for foreign and even local investment.

6.2.1 Basic Telecommunications

Tanzania has to a significant degree permitted competition in the following services segments:

- mobile telephony
- operation of pay phones
- data transmissions
- paging and two-way radio services

Although these services are considered as value-added in some countries including Tanzania, under the ongoing GATS negotiations on basic telecommunications, they will most likely be regarded as basic services.

6.2.2 Value - added Services

Market access offers for the provision of value - added services, may also be made, as they have been almost fully opened to competition.

7. CONCLUSION AND RECOMMENDATIONS

7.1 Conclusions

7.1.1 Within a short space of time, three years, Tanzania has launched far-reaching reforms in its telecommunication sector. It has embarked on a development programme, the Telecommunication Restructuring Project, of unprecedented magnitude. The project has given hope to the many existing and potential customers, who are very unhappy about the current inadequacy of telecommunication services in terms of quantity and quality.

7.1.2 The Government has reorganized the telecommunication sector framework, the Tanzania Telecommunication Company Limited is commercializing itself and the Tanzania Communication Commission is getting established in its regulatory role.

7.1.3 The recently announced move to license rural network operators and associated incentives, if successful, is likely to alleviate the daunting problem of providing telecommunication services in rural areas.

7.1.4 Problems remain which need to be addressed if the pace of reform in the telecommunication sector is not to be slowed down. They include slowness in making decisions concerning the authorization of new businesses by relevant authorities.

Also, during the study some applicants for private network licenses indicated that the Commission took a long time (three months) to make decisions on their applications. On its part the Commission found it necessary to take time to examine the applications and their implications carefully, especially those relating to closed-user group networks for which licenses had not been issued hitherto.

7.1.5 With waiting applicants almost double connected telephone lines, the demand for services is unlikely to be met without increased participation of the private sector including foreign investors in providing telecommunication services, especially new and enhanced services for business users.

7.2 Recommendations

Tanzania has put in place a sound framework for telecommunication sector development. What remains now is effective implementation if the sector's development objectives as reflected in the mission of the Tanzania Communication Commission outlined in section 2.5 above. The following are some of the actions and strategies that the Consultant considers would contribute to the realization of such objectives:

(a) The ongoing policy-formulation should be speeded up in order to provide the Tanzania Communication Commission, operators and investors with clear policy guidelines on the development of the telecommunication sector.

(b) To secure sufficient and timely financing, as well as more efficient management of the telecommunication sector, greater private-sector participation be encouraged through the following short-term and long-term strategies:

    (i) Carrying through the planned licensing of local/rural networks

(ii) partial privatization of Tanzania Telecommunications Company Limited, through sale of shares to employees as well as the public when a stock exchange is operational. This strategy is enshrined in the legislation that incorporated TTCL.

(c) Licensing and other authorization procedures should be streamlined and simplified as far as practicable. The issuance of general guidelines applicable to operators and service providers instead of negotiating a long string of conditions with individual operators should be explored. Class licenses for value-added services and private networks is another possibility. The adoption of type-approvals and standards of selected countries, is a further option. The objective should be to reduce regulatory overload by regulating in detail only where absolutely necessary.

In some countries legislation has set deadlines for making regulatory decisions for instance, issuing licenses or approving tariffs. Since this is not the case with TCC (except for license to TTCL) it is recommended that TCC include in regulations time-limits for such matters

(d) To exploit its potential as a business hub and transit centre, Tanzania should aim at improving its communications with Central, Eastern and Southern African countries and Africa as a whole.

(e) To encourage foreign investment, by making market access offers/requests under the GATS, consistent with existing policies as indicated in Section 6 above and also with any further liberalization actions that might be adopted under the ongoing telecommunication sector policy formulation. The services in which Tanzania may advantageously liberalize under the GATS include:

a) Cellular mobile telephone services
b) operation of payphones
c) data transmission services
d) paging and two-way radio services
e) value-added services

For suggestions on the limitations that may be attached to such offers/requests and other relevant matters refer to the chapter in the main report regarding "Liberalization under the GATS and Telecommunication Development".

APPENDIX 1

PERSONS MET DURING THE FIELD STUDY IN TANZANIA.

Mr. V. Mrisho	Principal Secretary, Ministry of Trade and Industries.
Mr. W.L. Mwakimi	Principal Foreign Trade Officer, Ministry of Trade and Industries.
Mr. G.P.E. Lauwo	Senior Trade Officer, Ministry of Trade and Industries.
Mr. Sekwao	Ag. Principal Secretary, Ministry of Works Transport and Communications.
Mr. A.Sizya	Principal Economist, Department Public Investment, Ministry of Finance.
Mr. E.N. Ole-Kambaine	Director General, Tanzania Communication Commission, TCC
Mr. Mushesha	Director of Finance and Administration, TCC
Mr. A.S. Ndakidemi	Director of Consumer Services and Industry Affairs, TCC.
Mr. E.N. Madeje	Director of Posts, TCC
Mr. J.S Ngatena	Deputy Managing Director/Customer Service, Tanzania Telecommunication Company Ltd. (TTCL)
Mr. J.S. Murasi	Company Secretary, TTCL.
Dr. J. Kilimbe	Director, International Services, TTCL
Mr. P.S. Malembeka	Acting Director of Business and Strategic Planning, TTCL
Mrs. N. Felician	Director, Commercial Services, TTCL
Mr. D.R.J. Omara	Principal Economist, TTCL.
Mr. R. Rose	General Manager, Millicom Tanzania Ltd (Mobitel)

Mr. S. Mworia	Vice - Chairman Tanzania Chamber of Commerce, Industry and Agriculture (TCCIA)
Mr. M.M. Kalanje	TCCIA.
Mr. R. Mkenda	Director, Board of External Trade.
Mr. L.A. Mmasi	TCCIA.
Mr. J. Seleka	Deputy Director Radio Tanzania
Mr. G.K.O Duma	Chief Manager, Networking and Systems Software, National Bank of Commerce.
Mr. J. Njau	Communications Manager, Air Tanzania
Mr. A. Haji	Resident Manager, Ethiopian Airlines.

APPENDIX 2

TANZANIA INTERNATIONAL TELEPHONE TRAFFIC CIRCUITS

A: AFRICAN COUNTRIES

COUNTRY	TOTAL NUMBER OF CIRCUITS
Burundi	10
Ethiopia	2
Kenya	18
Malawi	10
Mozambique	2
Rwanda	10
South Africa	12
Uganda	16
Zambia	11
Zimbabwe	6
TOTAL	97

B: OTHER COUNTRIES

Belgium	2
Canada	12
France	6
Germany	12
India	6
Italy	10
Japan	6
Netherlands	5
Singapore	7
Sweden	9
Switzerland	5
UAE	14
UK	79
USA	18
TOTAL	**191**

ANNEX D. 5

UGANDA

CONTENTS.

ACRONYMS
PREFACE

1. OVERVIEW OF THE EXISTING SITUATION 169

1.1 KEY FACTS 169
1.2 EFFECTS OF TRAUMATIC EVENTS ON TELECOMMUNICATION SERVICES 169
1.3 EFFORTS AT EXPANSION AND REHABILITATION OF TELECOMMUNICATION SERVICES 169
1.4 TOWARDS REFORM OF THE TELECOMMUNICATIONS SECTOR 170

2. ORGANISATIONAL RESTRUCTURING 171

2.1 SEPARATION OF POSTAL FROM TELECOMMUNICATIONS OPERATIONS 171
2.2 SEPARATION OF POLICY, REGULATION AND OPERATIONS 171
2.3 ESTABLISHMENT OF A REGULATORY BODY 172

3. ECONOMIC RESTRUCTURING OF THE TELECOMMUNICATION SECTOR 173

3.1 PRIVATISATION OF NATIONAL TELECOMMUNICATIONS OPERATOR 173
3.2 OPENING UP OF SERVICES TO COMPETITION 174
3.3 LIMITED COMPETITION IN CORE-NETWORKS 175
3.4 PRIVATE NETWORKS 175

4. TARIFFS 176

4.1 TARIFF POLICY 176
4.2 TARIFF FOR BASIC SERVICES 176

5. REGIONAL COOPERATION 176

5.1 GEOGRAPHICAL ASPECTS 176
5.2 MEMBERSHIP OF REGIONAL AND SUB-REGIONAL ORGANISATIONS 176
5.3 PARTICIPATION IN REGIONAL/SUB-REGIONAL PROJECTS 177
5.4 HARMONISATION OF POLICIES AND REGULATION 177

6. OBLIGATIONS AND MARKET ACCESS REQUESTS/OFFERS UNDER GATS 178

6.1 ACCESS TO AND USE OF TELECOMMUNICATIONS 178
6.2 MARKET ACCESS REQUESTS/OFFERS 178

7. SUMMARY AND RECOMMENDATIONS 179

7.1 SUMMARY OF FINDINGS 179
7.2 RECOMMENDATIONS 180

APPENDIX - PERSONS MET DURING THE FIELD STUDY IN UGANDA

ACRONYMS AND ABBREVIATIONS

AFRALTI	-	African Regional Telecommunication Training Institute
AJAS	-	African Joint Air Services
BOT	-	Build-Operate-Transfer (a scheme for project financing)
BTO	-	Build-Transfer-Operate (a scheme for project financing)
CAPAS	-	Coordinated African Programme of Assistance on Services
CDC	-	Commonwealth Development Corporation
COMESA	-	Common Market for Eastern and Southern African Countries
ECA	-	Economic Commissions for Africa
EAC	-	East African Community
EAPTC	-	East Africa Posts & Telecommunication Corporation
GATS	-	General Agreement on Trade in Services
IBS	-	International Business Services
IFC	-	International Finance Co-operation
JICA	-	Japan International Co-operation Agency
KBO	-	Kagera Basin Organisation
NGBT	-	Negotiating Group on Basic Telecommunications
OAU	-	Organisation of African Unity
PANAFTEL	-	Pan African Telecommunications Network
PATU	-	Pan African Telecommunication Union
PTA	-	Preferential Trade Area
RASCOM	-	Regional African Satellite Communications
UPTC	-	Uganda Posts & Telecommunication Corporation
VSAT	-	Very Small Aperture Terminal

PREFACE

The main report on the study addresses the general telecommunications concerns and constraints of CAPAS countries and to a lesser extent, of African Countries. Also, in the main report, ongoing and planned telecommunication sector reforms in CAPAS countries are outlined and, on the basis of international experience and lessons from the studies in the five CAPAS countries, proposals of general application are made as inputs to ongoing reforms. Furthermore, regional co-operation and multilateral liberalisation are considered and general market access offers/requests under GATS, for CAPAS countries, have been made in that report.

In this Annex (5) the same issues as those in the main report are considered against the background and particular circumstances of Uganda, and where appropriate, observations and recommendations are made as inputs to ongoing reforms. Finally, suggestions on market access requests/offers are made that might be consistent with the present and planned telecommunication sector development policies in Uganda.

1. OVERVIEW OF EXISTING SITUATION

1.1 Key Facts.

Uganda has an area of 241,000 sq.Km and a population of about 17 million inhabitants. GDP per Capita was US$ 167 in 1993.

In May, 1995 there were 38,000 main telephone lines while the number of waiting applicants for telephone lines was 3500 according to Uganda Posts and Telecommunication Corporation (UPTC). Telephone density was 0.22 per 100 inhabitants compared to the Sub-Saharan average of 0.46 per 100 inhabitants. Not all districts centres, let alone counties, are served by telephone.

The quality of existing service is poor. Business customers such as manufacturers, transporters and exporters say that their faulty telephones take from two to 10 days to get repaired. Often it is difficult to make successful long - distance calls and even local calls. But the situation was starting to improve following the implementation of the Marubeni Project.

1.2 Effects of Traumatic events on Telecommunication services.

Up to mid 1977 telecommunication services in Uganda, Kenya and Tanzania were operated by a single organisation, the East African Posts and Telecommunication Corporation (EAPTC), an agency of the former East African Community (EAC). The sudden break-up of the Community caused dislocations and disruptions in the organisation and operation of telecommunications and other services provided under the umbrella of that entity. The situation was worsened by war and civil strife during the period 1978 - 1985.

Some of the telecommunication infrastructure including a standard B Earth Station were destroyed. Some of the facilities that survived included equipment dating as far back as 1940's and 1950's. To these two traumatic events must be added the other constraints that plague telecommunication development in other developing countries: shortage of manpower and finance.

1.3 Efforts at Expansion and Rehabilitation of Telecommunication Services.

Telecommunication services are crucial in the economic and social reconstruction of the country. Considerable efforts have been exerted to restore telecommunications in the course of reconstruction. Rehabilitation and expansion projects undertaken countrywide since 1986 have been financed with funds from multilateral sources mainly the World Bank and the African Development Bank. Bilateral financiers, including French, German, Irish and South Korean Governments have also helped in the rehabilitation. By far the largest project is the replacement of service distribution cable (trunk cable, also known as outside/external plant) with optic fibre in Kampala, Jinja and Entebbe. Financed by the World Bank, the project was executed by the Marubeni Corporation (hence its name "Marubeni Project") and completed in the last quarter of 1993. The project has had a big impact on the expansion of the telephone

customer base. As of June 1993, the number of mainline telephone connections was 21,799 and waiting applicants for telephones were 2,579. At the time of the site-visit in Uganda in May 1995, the number of connections was 38,000 with 3,500 waiters[1].

[1] Uganda Posts and Telecommunication Corporation.

Following the completion of the Marubeni project which made possible the use of excess exchange capacity (approximately 20,000 connections out of 60,000 lines exchange capacity at the end of 1993), UPTC had been connecting new customers at the rate of over 1,000 per month. With regard to the small number of waiters in June 1993 vis-à-vis the large number of customers that were being provided with services, the UPTC source attributed the paradox to suppressed demand. Potential customers had refrained from lodging applications for service because of long waiting time. Once they learnt that service was being provided quickly applications were submitted in large numbers.

As a result of this rehabilitation the Uganda's penetration rate rose from 0.15 per 100 inhabitants at the end of 1993 to 0.22 at the end of April, 1995. This is still very low compared to the Sub-Saharan average of 0.46. The estimated current and projected demand is substantial. According to a recent study financed by Japan International Co-operation Agency (JICA) in 1993, the estimated demand for mainlines is as follows:

Year	1995	2000	2010
Main Line	73,000	126,000	226,000

Not less than US $500 million is required to implement an expansion of this magnitude, most of it in hard currency. Also, external managerial and technical expertise will be required to complement local human resources in carrying out such a programme.

1.4 Towards Reform of the Telecommunication Sector.

1.4.1 After years of political strife and economic instability, the current Uganda Government launched a series of programmes of rehabilitation and development in the mid 1980's. The First Rehabilitation Programme (1985/86 - 1991/92) focused on the stabilisation of the macro economic environment with emphasis on restoring financial order, controlling inflation, exchange rate liberalisation and promotion of savings and investment. These macro-economic objectives having been substantially achieved, the second Rehabilitation and Development Plan (1991/92 - 1994/95) places strong emphasis on sectoral development and policy, including the services sectors. Telecommunications being a medium of transportation of other economic and social activities is among the sectors being strengthened with a view:

(a) to provide basic telecommunication services throughout the country for improving and rationalising government administrative services and upgrading the welfare of the people.

(b) to support national development taking into account the Government Policy of an independent integrated and self-sustaining economy.

The next two chapters address some of the reforms and other actions being initiated by the Government to make telecommunications contribute effectively to the achievement of these macro objectives.

1.4.2 The Uganda Government recognises that private sector participation in the development of the telecommunication sector is essential for enhancing the sector's facilitating role in national development. Detailed policies and other actions for implementing the objectives are to be adopted by the Government on the basis of findings and recommendations of a "Committee on Investment in Telecommunications". The terms of reference of the Committee are:

(a) To isolate the postal from the telecommunication facilities throughout the country;

(b) To carry out the valuation of telecommunication assets throughout the country;

(c) To work out the legal framework to facilitate private investment in the telecommunication subsector;

(d) to study the entire posts and telecommunication sub-sector in order to establish the scope of private operations.

(e) to open telecommunication and any other services within the sub-sector including cellular telephones to private investment and to invite public tenders for those services.

The terms of service indicate the likely direction of telecommunication policy. The Committee submits its reports to Government periodically to enable Government to take decisions and give directions for further action by the Committee.

2. ORGANIZATIONAL RESTRUCTURING

2.1 Separation of Postal from Telecommunication Operations.

Following the break-up of the East African Posts and Telecommunication Corporation in 1977 the Uganda Posts and Telecommunication Corporation (UPTC) was established initially by a Presidential Decree in 1977 and later by the Uganda Posts and Telecommunication Act, 1983. According to a recommendation of the Investment Committee which has been accepted by the Government, upon the separation of the postal and telecommunications operations, the telecommunication department of UPTC will be corporatized (i.e, incorporated under companies legislation).

2.2 Separation of Policy, Regulation and Operations

Under the existing institutional framework for the telecommunication sector for Uganda, the Sector Minister (the Minister of Transport, Works and Communications) is responsible for policy as well as some aspects of regulation. With respect to regulation, the Uganda Posts and Telecommunication Act, while according the UPTC exclusivity for the construction and operation of basic telecommunication services (telephone and telegraph), vests the following discretionary powers in the Minister in modifying UPTC's monopoly by:

(a) exempting from regulation such networks as the Minister may specify;

(b) granting licenses for private networks;

(c) granting licenses for public telecommunications networks "within Uganda and any place outside Uganda (international service) networks[2].

In addition, the sector Minister together with UPTC control the allocation of radio frequencies and licensing of radiocommunications[3].

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[2] Uganda Posts and Telecommunication Act, 1983 Section 33 (1)

[3] Op. Cit. Section 33 (22)

In the course of discussion with members of the Committee on Investments in Telecommunications it was indicated that the organisation of the telecommunication sector would be re-arranged so that:

(a) operators would have no regulatory roles
(b) an independent regulatory body would be established to regulate the sector.

2.3 Establishment of a Regulatory Body.

There are several options for the establishment of a regulatory body[4]. In brief, those likely to suit Uganda's circumstances include:

(a) A fully independent body like the Federal Communications Commission in the U.S. which operators only in accordance with its statutory mandate and the laws of the land and reports directly to the Legislature;

(b) A semi-independent body established at "arms-length" from the sector Ministry but subject to guidance by the sector Minister, through general directives or both general and specific directives.

(c) A Regulatory Unit within the sector Ministry with substantial autonomy to deal with regulatory matters, but subject to general guidance by the Minister.

Uganda, like many other developing countries has little experience of regulation. Regulatory policy in telecommunications is therefore likely to develop over time. It is desirable that the sector Minister be involved in shaping the regulatory policy. The participation of the private sector is essential in rebuilding the telecommunication sector in Uganda and in expanding services. A conducive environment for private investment includes predictable basic rules and transparency in their implementation. It is desirable that any Ministerial role, in regulation, be exercised in a transparent manner and should improve on existing rules and policies.

A clear mission for the regulator and basic procedural rules reflected in the enabling legislation are other desirable factors for encouraging private investment under domestic and multilateral liberalization.

Whatever type of regulatory body is established, there are minimal requirements for its effectiveness. They are:

(a) Independent Financing.
This is best achieved through making the regulator self-financing; that is, getting its finances from licensing operators and its other activities. Once a budget for the Regulator is approved, the Regulator should have sufficient flexibility to disburse funds without undue bureaucratic constraints.

(b) Secure tenure for the regulator. The Regulator or its members should not be terminated arbitrarily. This desirable pre-requisite is created by stipulating in the enabling legislation a certain period of appointment and that removal from office should only be for cause.

(c) Appropriate Staffing: The Staff of the Regulator need to be of a good calibre well motivated and of high integrity. That partly spells reasonable remuneration and other terms of service.

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4 See the Main Report, for a fuller consideration of regulatory options.

Also, the Regulator needs to have a say in the appointment to ensure that those criteria are met.

3. ECONOMIC RESTRUCTURING OF THE TELECOMMUNICATIONS SECTOR

In accordance with its macro policy of liberalising the economy, the Uganda Government has already involved the private sector in developing the telecommunication sector and envisages increased private sector investments. This section outlines private sector involvement actions undertaken or planned.

3.1 Privatisation of the National Telecommunication Operator

The Government has taken a firm decision to privatise the telecommunication wing of the Uganda Posts and Telecommunications Corporation (UPTC). What remains to be done are decisions on the manner and extent of privatisation as well a timetable for implementation. Privatisation in its narrow sense means the transfer, wholly or partially, of the ownership of a state-owned enterprise to the private sector. The decision of the Uganda Government to privatise the telecommunication business of UPTC appears to be of this nature. There are three approaches for achieving this type of divestiture:

(a) The enterprise or part of it may be sold to a strategic investor or consortium of investors. Where the introduction of new managerial experience is an important element of divestiture, the strategic investor or one of the partners, if a consortium, will usually be an experienced telecommunication operator. In order to minimise risk to the investment the strategic investor would either want to acquire a majority interest in the enterprise or a minority interest coupled with managerial control. The relatively underdeveloped state of the telecommunication infrastructure and high debt are likely to depress the value of the telecommunication assets of UPTC, as would be the case in most Sub-Saharan countries.

It might therefore be advisable to start with the sale of a minority shareholding initially, followed by further divestiture after the network and financial position of the national telecommunication operator have improved.

(b) The divestiture may take the form of a public sale of shares, as was the case with British Telecomms where the main purpose of privatisation was to spread the ownership of the enterprise. This is unlikely to be an immediate practical option for Uganda in the absence of a functioning Stock Exchange. Even if a mature Stock Exchange were in existence, experience has shown in Malaysia, for example, that a substantial one-time sale of national telecommunication operator in a developing country, may be too much for the stock exchange . A gradual sale of the shares would be desirable under this scenario.

(c) A third possibility is a combination of a sale to a strategic investor and public sale of some of the shares (including to employees). The two transactions can be simultaneous or sequential. The advantage of this option lies in making privatisation politically acceptable in circumstances where this is a necessary or desirable factor.

There are other ways of privatising the national telecommunication operator using the term in its wider sense. They include:

(d) Joint-ventures between the existing national operator, and investors, foreign or local. Joint-ventures can be used for selected aspects of the telecommunication business. Like the strategic investor, a joint-venture partner may be invited on the basis of experience in telecommunication operations as well as financial contribution.

(e) Build Transfer Schemes have become a common method of involving the private sector in telecommunication development. The main characteristics of Build and Transfer Schemes are:

- An investor provides the funds for implementation of a network development project (build)
- The investor may, for an agreed period, operate the network (operate),
- The investor may transfer the assets to the existing operator at an agreed time (transfer).

The link between these three components will determine the type of the arrangement. If the transfer is effected after operation the scheme would be "Build-Operate-Transfer" (BOT). If the transfer occurs before the operation the scheme would be known as a "Build-Transfer-Operate " (BTO).

In a BOT or BTO scheme, the payment to the investor for the use of his resources is usually in the form of revenue-sharing over a period of his operation. Such schemes have been used successfully in South East Asia - Thailand and Cambodia; and also in Indonesia in the form of revenue-sharing schemes. In Africa, a BOT is being used in Ghana to build a regional network in the South-East of the Country.

3.2 Opening up of Services to competition:

(a) Uganda has abolished the monopoly enjoyed by the Uganda Posts and Telecommunication Corporation (UPTC) for the provision of equipment that is installed in users' premises (terminal equipment also called customer premises equipment), data transmissions, paging, payphones and value added services. That means these services can be provided on competitive basis between UPTC and other providers or among other providers without UPTC participating.

(b) Mobile Services.
Uganda is the first country in the Eastern African sub-region to have a digital public mobile cellular service. Operated by Celtel, the mobile service started in May, 1995. The network uses GSM technology. The Company is 95% foreign owned. The 5% local shareholding is owned by the employees of the Company. The foreign owners include the International Finance Corporation (IFC) (10%) whose policy is to sell its shares to local entrepreneurs at some stage. Others are the Commonwealth Development Corporation (CDC) - (10%); VIDAPHONE (31%); Clovergem AG (20%) and Mobile Systems International (20%).

The service covers initially Kampala, Entebbe and Jinja. Later it will expand to other major urban centres such as Mbale and Mbarara. This ambitious project is estimated to cost US $16 million. The management envisage not only providing roaming services to other countries but even selling excess capacity to neighbouring countries. Initially telephone services are provided; later roaming, data, paging, fax and value-added services will be offered.

The most striking aspect of the service is the management. It is entirely indigenous Ugandan. Expatriate personnel only assisted in installation and kick-starting the service. Some of the managers are returnees from abroad who have experience in working with a telecommunication operator, (British Telecom) while others worked with financial institutions.

The Consultant learnt during the field study that a second cellular mobile service operator would be licensed.

3.3 Limited Competition in Core-Networks.

The Uganda Government will be considering the introduction of a second national telecommunication operator to construct and operate "core-networks" (facilities for the provision of fixed public services telephone telex and leased lines). If adopted this option would be an effective way of accelerating telecommunication development. However, if privatization of the Uganda Posts and Telecommunications Corporation (UPTC) is implemented through sale to a strategic investor, it is likely that a second national operator might not be practicable immediately because of the small customer base (126,000 telephone lines by the year 2000). The strategic investor would probably want some lead time (exclusivity) in the operation of the existing network. In such eventuality, instead of a second national operator, franchises could be issued for the operation of local or regional networks in areas currently unserved or critically underserved by UPTC. Alternatively, the second national operator (and UPPTC) may be given a geographical area of exclusivity as its starting base.

3.4 Private Networks.

Private telecommunications networks are set to play a significant role in developing telecommunications in Uganda, for business users. The liberal investment environment and simple licensing procedures have encouraged vigorous activity in private network development. International Business Services (IBS), a joint-venture between Starlight Communications, a privately owned Ugandan Company and Norwegian Telecomm, has been licensed to provide a wide range of services to business customers (closed-user group) via satellite. IBS will offer voice, data and value-added services (including the latest advanced services such as communication with customers while in-flight). IBS will have excess capacity which it can make available to UPTC, or resell to other operators, if permitted. At the same time Wilken Communications have also been licensed to operate a private network serving financial business customers including banks. Currently, commercial banks which have branches in the country have no data networks between their headquarters and branches or between branches. They are counting on these private network initiatives to network their banking operations.

Uganda's liberal approach to private networks is reflected in the award of two-way radio frequencies to a number of large trucking firms and large manufacturers which they have used to set up radio contacts between offices and trucks.

4. TARIFFS

4.1 Tariff Policy

The Uganda Posts and Telecommunication Corporation Act 1983, enjoins the Uganda Posts and Telecommunications Corporation (UPTC) to operate on commercial lines. This implies that UPTC is permitted to charge rates that enable it to cover all its operating expenses and other outgoings and to make a reasonable profit. In other words, tariffs are to be substantially cost-based at the same time taking into account UPTC's public service obligation of providing service to as many persons as possible at affordable prices.

4.2 Tariff for Basic Services.

Tariffs for basic telecommunication services are proposed by UPTC and approved by the sector Minister. As for other CAPAS countries and developing countries in general, tariffs for national and local services have been kept low in order to make them affordable, particularly to residential and other non-business users. On the other hand, rates for international services have been high so as to heavily subsidise the domestic services. In 1993 the rates for telephone calls to Europe, the Americas, Middle East and Asia Pacific were US$ 7.50 per minute. Calls within the African Preferential Trade Area were US$ 3 per minute while for the "Rest of the World" were US$ 5 per minute. These high rates for the first group of countries encouraged call-back calls, thus reducing UPTC's revenues from international calls. This situation coupled with pressure from users led to UPTC taking steps towards rebalancing of tariffs. In a tariff revision in early 1995 the rates for international calls were reduced by 20%. That translates to US$ 6 per minute for the calls to the Americas and Europe, a rate that is still high enough to continue encouraging call-back calls. The rebalancing needs to continue in order to move towards cost-based tariffs.

5. REGIONAL CO-OPERATION

5.1 Geographical Aspects

The landlocked nature of Uganda makes efficient communications links with its neighbours and other countries within Africa and beyond imperative for her economic and social welfare. Additionally, Uganda's central geographical position gives her considerable potential not only as a business centre but also a communications hub linking Eastern, Central, Western and Northern African countries. Consequently, it is in Uganda's interest to intensify regional and sub-regional co-operation generally and in telecommunications within Africa in particular.

5.2 Membership of Regional and Sub-regional Organisations

Uganda, together with Kenya and Tanzania, formed the East African Community (EAC) which broke up in 1977. The EAC operated key infrastructural services for the three countries, namely posts and telecommunications, railways, air transport and even maritime services which were in embryo at the break-up. To a significant extent telecommunications survived the disintegration. To date the three countries have continued close co-operation in this area. They have a common numbering system and treat telecommunication services among themselves as "national" for the purpose of tariffs. The national telecommunications operators of the three countries hold regular tripartite consultative meetings on telecommunications development matters.

The three countries have decided to revive the Community, mainly the common market aspects. Although it is unlikely that telecommunications and other infrastructural services will again be managed centrally for the three countries, the declared revival of the EAC will reinforce the existing

co-operation in telecommunications. The present informal consultative forum could be formalised with greater benefit accruing to the three countries in the form of harmonisation of policies and pooling of resources. Also, such reinforcement of co-operation could serve as a nucleus for wider co-operation among other countries within the African region or its sub-regions. Examples exist already. The Telecommunications Training Centre in Nairobi which used to serve the three members of the EAC became the foundation stone for the African Regional Telecommunication Training Institute (AFRALTI) for Anglophone countries.

In a more recent development in co-operation centered around Uganda, the African Joint Air Services (AJAS) was formed among Uganda, Tanzania and South Africa. With Headquarters in Uganda, the new air services co-operation takes inspiration from the former East African Airways which was owned by Kenya, Uganda and Tanzania. Given this precedent it is reasonable to expect that Uganda has good prospects of becoming a sub-centre for telecommunications facilities for which South Africa is a hub.

Uganda is a member of the Common Market for Eastern and Southern African Countries (COMESA) (successor to the Preferential Trade Area-PTA) in which telecommunications features significantly because of its role in promoting trade. As will be seen from Chapter 4 above, Uganda has a preferential telecommunication tariff for countries belonging to that organisation. The Kagera Basin Organisation (KBO) is an organisation for the development of the countries straddling River Kagera. Uganda is a member of the organisation. The others are Burundi, Rwanda and Tanzania. At Regional level, Uganda is a member of OAU, ECA, PATU, RASCOM and AFRALTI. All these organisations, even OAU and EAC whose main objective is not telecommunications, deal with aspects of telecommunications in varying degrees because of the role of telecommunications as a medium of transportation for other economic and social activities.

5.3 Participation in Regional/Sub-regional Projects

Uganda is a participant in an Pan-African Telecommunication Network (PANAFTEL), which links some African countries directly through telecommunications. Uganda is linked by microwave routes to Kenya, Tanzania and Zambia; to Ethiopia through Kenya, to north-western Tanzania through south-western Uganda; to Burundi and on to Rwanda. The microwave route to Tanzania via Kenya was constructed in the early 1970's as a single project financed by a World Bank loan negotiated by the former East African Community. The route now needs refurbishing. Business customers both in Uganda and Tanzania said they experienced acute problems in getting calls through the route. This is particularly difficult for importers and truckers in tracing shipments brought into Uganda through Mombassa and Dar es Salaam.

The three countries have plans to rehabilitate these routes, but this time around they are sourcing funds separately. The route from north-western Tanzania to Burundi and Rwanda was installed in the early 1990's under the aegis of the KBO and financed by a loan negotiated jointly by the three countries from the African Development Bank.

5.4 Harmonisation of Policies and Regulation

Uganda is an active participant in the regional and sub-regional organisations cited above. It is on the executive board of the latest African regional telecommunications organisation - RASCOM. For Uganda and the other CAPAS and African countries in general, telecommunication development and regulatory policies are yet to be harmonised to any significant degree. A positive development which came to the Consultants notice during the visit to Uganda is the mutual recognition among

COMESA Member countries of radio communication operation licenses granted to their residents. This refers not to a license to provide services but permission to operate a radio communication apparatus similar to a permit to drive a car. This regulatory harmonisation is essential for trade particularly for communication between truck drivers within COMESA member countries and the drivers' offices back home.

6. OBLIGATIONS AND OFFERS/REQUESTS FOR MARKET ACCESS UNDER GATS

6.1 Access to and use of Telecommunications

Uganda did not make any commitments on telecommunications or communications under the GATS. This was due to the fact that the domestic reforms leading to opening the provision of telecommunication services in the segments indicated in section 3 above are very recent. In any case they have been carried out in an adhoc manner and it is desirable due to their substantially permanent character, that commitment under the GATS be made when policies have been formulated and adopted. However, Uganda made commitments on tourism and related services, i.e. the operations of hotels and restaurants, and travel agencies/ tour operators.

By virtue of the provisions of Annex III to the GATS (Telecommunications), Uganda is obligated to provide to foreign providers of the services committed, access to and use of telecommunication services (including leased circuits) for their operations. Such services are to be made available on reasonable and non-discriminatory terms and in accordance with objective and transparent procedures. The foreign service providers are not entitled to more than services available in the country, although Uganda is already taking the necessary steps towards the provision of adequate services. In this regard, Uganda to a large extent, meets the obligations of access to and use of telecommunication services. Although Uganda does not yet have an elaborate regulatory framework, its simple licensing procedures for services, for example, private leased circuits, substitute very well for the lack of such framework. Additionally, the formulation of a new and adequate regulatory regime was in the process of being completed, at the time of the site visit in June, 1995.

6.2 Market access request/offers

The costs and benefits of making market access commitments under GATS in respect of telecommunications have been discussed in the main report in the chapter on "Liberalization and Telecommunication Development". In brief, permitting foreign investors to participate in selected segments of telecommunications sector gives a developing country like Uganda access to needed finance in hard currency as well as managerial and technical expertise. Furthermore, binding existing market access reforms under the GATS makes them irreversible, thus providing stability. Committing planned market access policies under the GATS provides an incentive for carrying them through. The opening up of non-core telecommunication services to competition applies to both local and foreign service providers. The introduction of limited competition in core networks, via introduction of a second national telecommunication operator, is under consideration by the Uganda Government.

Additionally, Uganda has in place a highly conducive environment for foreign investors, including speedy authorisation procedure, fiscal incentives and a liberal foreign exchange regime. By a 1994 amendment to the Investment Authority Act, 1990, telecommunications has been added to the list of priority investment industries, making investors in telecommunications eligible for exemption from import duties; tax holidays and other incentives reserved for such industries. The planned introduction of a new regulatory framework for the supervision of reforms in the

telecommunication sector particularly private sector participation in various ways is yet another important prerequisite for multilateral liberalisation that will soon be in place. Accordingly, Uganda is well placed to make market access offers and requests in the segments of the telecommunication sector proposed below:

6.2.1 None-Core basic telecommunication services

The following non-core basic telecommunications services are being opened to competition:

- Mobile services including mobile cellular telephone, paging and truncked radio (two-way radio) services.
- data transmissions
- operation of payphones

These services are regarded as value-added services in some countries, but in Uganda they are usually referred to as "non-core services" . As they have been listed in the "questionnaire" circulated to the GATS Members by the secretarial to the Negotiating Group on Basic Telecommunication Services (NGBT), they are likely to be considered as basic services for the purpose of commitments under the GATS. It is recommended that Uganda makes market access offers and requests for these services, with appropriate limitations. For example for mobile telephony a market access offer/request could include a limitation on the number of service providers because of radio frequency constraints and also viability, in the interests of operators.

6.2.2 Core-networks and Core Services.

This category relates mainly to fixed telephony networks and services which usually are associated with the provision of public utility or "universal service" and their provision through land-based facilities. Should Uganda decide to permit a second national operator, an offer/request could be made with a limitation of two service providers, among other limitations. But owing to the possible costs of liberalizing a core network service in a developing African country (see the chapter in the main report on "Liberalization on Telecommunications Development), it would be preferable to delay binding foreign competition of such a service under the GATS.

6.2.3 Value Added Services

These services which include electronic mail, videotex, teleconferencing and any other services to which value is added through retransmissions involving computer applications or in any other way are in the process of being fully opened to competition in most countries including developing ones. Apart from requiring advanced technology, these services are for specialised business use or research. They do not involve public utility or "universal service" aspects. It is recommended that Uganda fully liberalizes them, by making market requests/offers for them under GATS without limitations on the number of service providers, turn-over or number of transactions.

7. SUMMARY AND RECOMMENDATIONS

7.1 Summary of Findings

7.1.1 Following years of war and civil strife in the late 1970's to the mid 1980's telecommunication development in Uganda suffered severe set-backs. Considerable efforts have been made in restoration but the level of telecommunication services is still low and thus constitutes

bottlenecks to development efforts in other sectors of national development such as business operations.

7.1.2 The main concerns of the Government for telecommunication development encompass expanding services to all areas of the country as well as modernising facilities so that services adequate in quantity, quality and diversity are available for economic activities including business operations. The usual constraints that impede telecommunication development in developing countries - shortage of suitable financing, human resources and technology - also exist in Uganda. The Government has embarked on reforms aimed at minimising these impediments, including organisational reform and involvement of private sector investment in developing telecommunications.

7.1.3 Organisational restructuring envisages the separation of postal and telecommunication operations; corporatization of the telecommunication business of the Uganda Posts and Telecommunications Corporation (UPTC) and the establishment of a separate regulatory body.

7.1.4 Privatisation of the national telecommunication operator, UPTC, is a key strategy of private sector participation in telecommunication development. The Uganda Government has taken a definite decision on this strategy. Also, the Government has opened to competition non-core telecommunication services, such as data communications, mobile cellular services, paging and other radio services as well as value-added services. Further domestic reform is likely to include the introduction of limited competition in core-services in the form of a second national operator or independent regional/local services. Private networks are playing a substantial role in developing telecommunications, especially value-added services for business customers.

7.1.5 The national telecommunication operator's domestic services are heavily subsidised by international services whose tariffs have been so high as to encourage call-back services. Gradual tariff rebalancing has started.

7.1.6 By virtue of its geographical position and landlocked nature, Uganda is well placed, and needs, to encourage regional economic co-operation including integration in the field of telecommunications. Uganda is already playing an active role in this regard.

7.1.7 The macro economic reforms undertaken by Uganda, including a conducive private investment climate; existing and envisaged liberalisation of the telecommunication sector, enable Uganda to make substantial market access offers and requests under GATS.

7.2 Recommendations.

The Uganda Government might wish to consider the following recommendations in connection with the ongoing reform of the telecommunication sector:

7.2.1 A separate regulatory body with sufficient financial and administrative autonomy be part of the new regulatory framework. These attributes may be ensured if the Regulator is financed through fees and other charges for its activities and is given a say in appointing its staff and setting their remuneration.

7.2.2 The roles of the sector Minister and the Regulator be clearly spelt out in the new legislative framework. In particular, if the Minister will be involved in shaping regulatory policy, the legislation should provide for transparency in ministerial intervention, such as, publishing policy guidelines.

7.2.3 The existing simplicity in regulation, especially in private networks and value added services should be preserved in principle. This might be achieved in part by issuing class (published standard) licenses coupled with a requirement for operators to register with the Regulator.

7.2.4 Should difficulties be encountered in immediately privatising the existing national operator, (for example, inability to agree on terms) other ways of private sector participation, for instance joint-ventures or build-transfer schemes be explored.

7.2.5 Market access offers and requests be made under GATS in respect of non-core telecommunications services, including cellular mobile services, data transmissions, data and two-way radio communications, operation of payphones and value-added services.

7.2.6 Tariff rebalancing between rates of charges for international and national services should continue. Tariffs for basic services should be "lightly" regulated for example, through price-caps, in order to allow for timely and gradual changes.

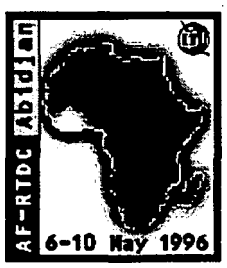
7.2.7 In view of its geographical position it is advisable for Uganda to intensify its regional integration aimed at strengthening and streamlining regional and sub-regional organisations of which it is a Member and participation in regional/sub-regional telecommunications development projects.

APPENDIX

PERSONS MET DURING THE FIELD STUDY IN UGANDA.

Dr. Kagoda	Acting Permanent Secretary, Ministry of Trade.
Mr. T. Sabakaki	Director of Foreign Trade, Ministry of Trade.
Mr. J. G. Itazi	Director of Transport and Communications, Ministry of Works, Transport and Communications.
Mr. W.K. Okecho	Director of Divestiture, Ministry of Finance.
Mr. A.M. Munyarugerero	Acting Managing Director, Uganda Posts and Telecommunication Corporation.
Mr. F.P. Masambu	Deputy Managing Director/Telecoms, Uganda Posts and Telecommunication Corporation.
Ms. E.N. Mwanje	Acting Executive Director, Uganda Manufacturers' Association.
Mr. P. Adengo	Managing Director, Interfreight Forwaders (U) Ltd and Chairman, Uganda Clearing and Forwarders' Association.
Mr. G. Rujojo	Secretary General, Uganda National Chamber of Commerce and Industry (UNCCI).
Mr. P. Mukasa	Managing Director, Starlight Communications Uganda Ltd and Managing Director International Business Services
Mr. W. Birigwa	Managing Director, Celtel Cellular
Mr. F.R. Batamula	Managing Director, Tanzanite Corporation.
Mr. Wanida	Communications Officer, Uganda Commercial Bank.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU



AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 13-E
3 April 1996
Original: English

For Information/Support

Agenda item: 1.1

PLENARY MEETING

SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU

TITLE: TOWARDS AN AFRICAN INFORMATION INFRASTRUCTURE

TOWARDS AN AFRICAN INFORMATION INFRASTRUCTURE

IN COMMUNICATIONS TECHNOLOGIES HANDBOOK 1995

Michael Minges

Telecommunication Development Bureau (BDT), International Telecommunication Union (ITU)

The views expressed are those of the author and do not necessarily reflect the opinions of the ITU or its members.

"The service vision at the Corporation is to ensure that the latest technology is available to our customers at competitive prices. To achieve this we constantly modernize our infrastructure and provide advanced telecommunication services at lowest possible cost."

The text above is not from AT&T or France Telecom but comes from an African public telecommunication operator (PTO). It suggests that in some African countries, there is a desire to participate in the emerging global information infrastructure.[1] But the reality is that Africa is so far behind the rest of the world in conventional telecommunication networks that information superhighways may seem irrelevant. However, advanced communications networks are as important to Africa for the same reasons they are to other regions of the world: to be plugged into the global information society, to attract foreign investment and to provide innovative ways of delivering health, education and government services.[2] Africa has even more of a reason than other regions to be concerned about international connectivity. After Europe, it generates the second highest international traffic per telephone line and its PTOs are far more reliant on international traffic revenues than other regions. The limited availability of communication facilities in Africa

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[1] Information infrastructures constitute the electronic communication and processing facilities for transferring voice, text, data, image and video information. Examples of applications that run over information infrastructures include videoconferencing, on-line database access, electronic mail, electronic data exchange and video-on-demand. The idea of a Global Information Infrastructure (GII) was put forth by the US Vice-President Al Gore: "This GII will circle the globe with information superhighways on which all people can travel". From speech delivered to the World Telecommunication Development Conference, 21 March 1994, Buenos Aires.

[2] "In an increasingly information-driven world, Africa's competitiveness will depend on its ability to access and exchange information globally." World Bank. *Sub-Saharan Africa: From Crisis to Sustainable Growth.* Washington D.C. 1989. The benefits of information infrastructures for developing countries will appear in *World Telecommunication Development Report 1995*. ITU. Forthcoming September 1995. For a detailed review of the application of information technology for Africa see Mike Jensen. *Draft Discussion Paper for UNESCO/ITU/UNECA Africa Regional Symposium on Telematics for Development.* 1994.

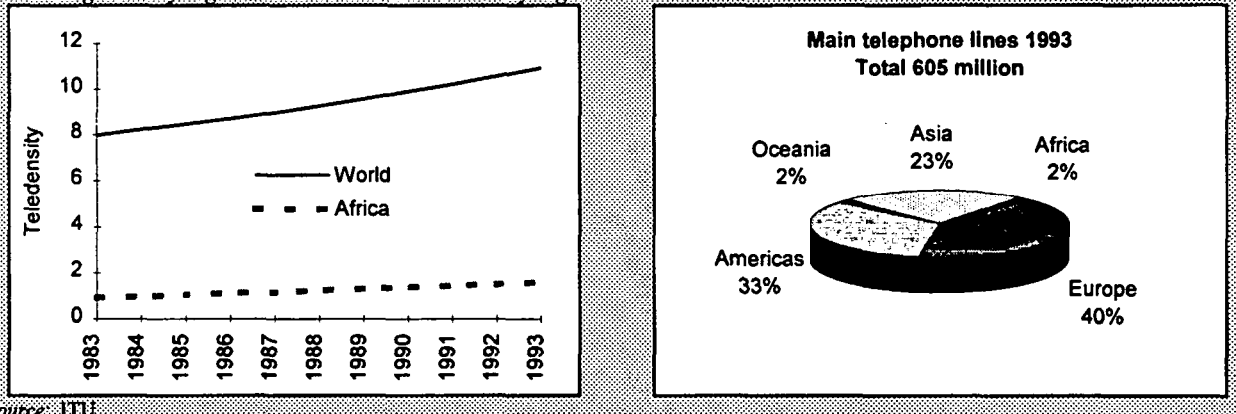
may also be of advantage, since, in the process of catching up with the rest of the world, the continent has an opportunity to install state-of-the-art information infrastructures.[3]

Current network status

Telephone lines are the foundation of a national information infrastructure. Besides their traditional role of supporting voice communications, telephone lines are increasingly used to transmit faxes and to connect computers for sending electronic mail, accessing on-line databases and exchanging data. Developments in compression technology now make it possible to even transfer video images over conventional telephone lines.

The number of main telephone lines per 100 people (teledensity) in Africa stood at 1.6 at the end 1993. This is just 15% of the world average and just 3% of the average for developed economies. Though Africa lags behind other developing regions such as Asia and Latin America in telephone line growth, the African growth rate in main lines is above the world average and about twice that of developed countries. Unfortunately the increase in main lines is offset by high population growth resulting in a smaller change in overall teledensity. There would need to be much higher growth in lines and lower growth in population if Africa is to catch up with the rest of the world (see Figure 1).[4]

Figure 1. Trying to catch up
Main line growth by region, 1983-93 and distribution by region, 1993



Source: ITU

Though many of the world's least developed telecom's networks are African, this is more a reflection of the region's low level of economic development. In fact, if the relation between teledensity and wealth (measured by Gross Domestic Product (GDP) per capita) is examined, many lower income African countries have a higher teledensity than they should compared to the rest of

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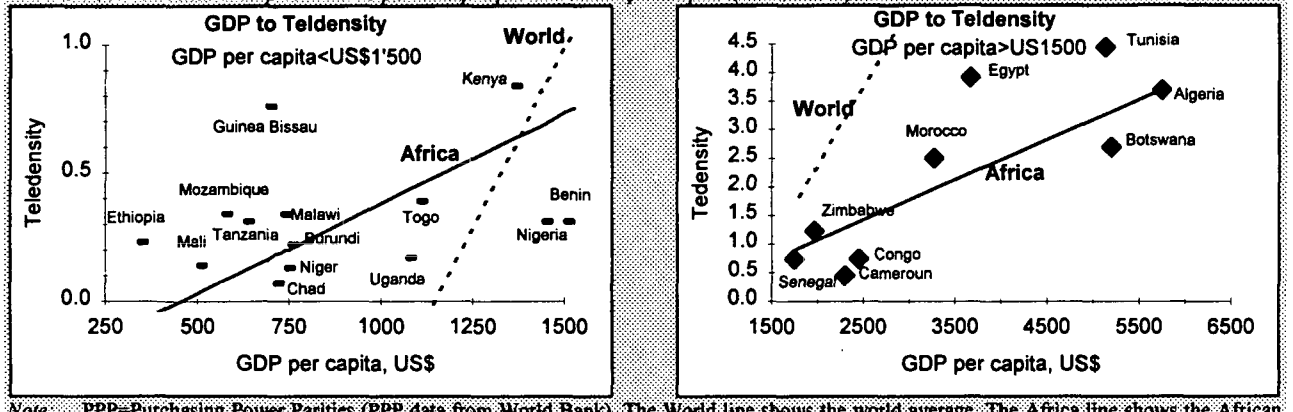
[3] "It is highly possible that investment in the very latest technologies will provide new cost-effective solutions hitherto unheard of in the developing countries - especially countries which have an underdeveloped telecommunications infrastructure." From the opening address delivered by Dr. Pekka Tarjanne, Secretary-General, ITU, at Africa Telecom 94, Cairo, Egypt, 26 April 1994.

[4] For a review of the African telecommunications sector see ITU, *African Telecommunication Indicators*, Geneva 1994.

the world (see Figure 2). On the other hand, most of the African countries that have relatively high income levels are performing worse telecoms-wise than they should compared to the rest of the world. This suggests that added telecoms investment in low income countries may be unproductive unless national policies are conducive to economic growth while higher income African countries can probably benefit from increased investment.[5] It is also significant to note that among the higher income African countries, the ones that are doing better also have more developed information infrastructures (e.g., Internet hosts, packet switch data networks). This reflects the fact that usage of telecommunications services in Africa is probably highly skewed towards serving the foreign-oriented business and diplomatic community. Tourism may also play a role in promoting teledensity in certain countries, such as Egypt, Tunisia and the Gambia.

Figure 2. Telecommunication development and wealth

Relation between main telephone lines per 100 people and GDP per capita (US$, PPPs), 1992



Note: PPP=Purchasing Power Parities (PPP data from World Bank). The World line shows the world average. The Africa line shows the African average. Countries under the average lines have less telephone lines than they should considering their income level. Countries above the average lines have more telephone lines than they should considering their income level.

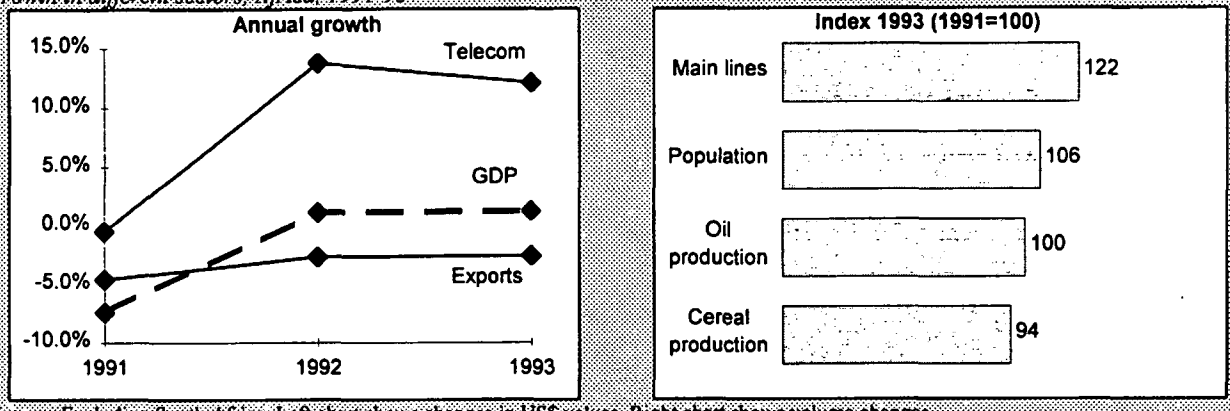
Source: ITU

Turnover in the African telecom service market was $US 7.3 billion in 1993. South Africa and Sub-Saharan Africa contribute around 70% while North Africa provides the remaining 30%. South Africa's Telkom is by far the largest operator. Its 1993 revenues of $US 2.6 billion are four and half times more than the next largest operator, Morocco's Office National des Postes et des Télécommunications (ONPT) (See Table 1). The sector is quite profitable with pre-tax profit around 20% of sales. Growth in telecommunications is outpacing GDP as well as other economic activities (see Figure 3). The growth in African telecoms is such that its share of GDP has risen from 1.2% to 1.7% in just three years.

[5] For example, studies show that telecommunications investments are relatively more effective in upper-middle income countries than in low-middle income countries. See CEC, *Telecommunication and Development*, WTDC, 21-29 March 1994, Buenos Aires.

Figure 3. Telecommunications and other sectors

Growth in different sectors, Africa, 1991-93



Note: Excluding South Africa. Left chart shows changes in US$ values. Right chart shows volume changes.
Source: ITU.

Though the overall size of the African telecom market is relatively small - about equal to the turnover of a smaller US Regional Bell Operating Company - the potential market is enormous. For example, if Sub-Saharan Africa could raise its teledensity to five - less than half the world average and still just a tenth that of a developed country - it would become the fourth largest telecom market in the world.

Most African PTOs derive over 90% of their revenues from the telephone service, a higher percentage than the world average of 75%. Over half the telephone lines in Africa are connected to digital exchanges yet the benefits in providing extra services has rarely been exploited. This suggests that there is considerable potential for developing new services such as data communications, value-added services and entertainment. For example, in The Gambia, the packet switch data service generated more revenues in its first year of operation than the telegraph service.

Table 1. Africa's top public telecommunication operators

African PTOs with 1993 revenue greater than US$ 100 m

		Telecom service revenue			*Profit*		
		Total	*Change*	*%*	*Total*	*% revenue*	
Rank	*Operator (Country)*	*US$ m*	*(92-93)*	*telephone*	*US$ m*	*Pre-tax*	*After tax*
1	Telkom (South Africa) a)	2563.2	*	92%	232.8	14%	9%
2	ONPT (Morocco)	558.7	9.0%	86%	117.6	35%	21%
2	ARENTO (Egypt) b)	440.3	-5.8%	92%	138.8	38%	32%
4	NITEL (Nigeria) c)	390.4	19.3%	91%	39.3	10%	10%
5	MPT (Algeria)	271.6	10.8%	74%	70.6	28%	26%
6	KPTC (Kenya) b)	214.3	17.2%	90%	30.45	14%	14%
7	DGT (Tunisia) c)	198.6	29.2%	95%	...	...	...
8	CI-TELCOM (Côte d'Ivoire)	187.2	*	91%	51.2	27%	27%
9	GPTC (Libya) c)	145.2	2.7%	82%	18.0	...	12%
10	Sonatel (Senegal)	134.5	5.6%	86%	8.8	8%	7%
11	OTP (Gabon) c)	121.0	8.9%	94%	15.8	13%	13%
12	PTC (Zimbabwe) d)	102.6	-7.9%	91%	20.2	20%	20%
	Total	**5327.6**	**7.4%**	**90%**	**743.6**	**19%**	**14%**

Note: Data are affected by different accounting presentations. Operator revenue change based on US$ values. a. Year ending 1/4/94. b. Year ending 30/6/92. c. Year ending 30/12/92. d) Year ending 30/6/93. * Comparison with previous year not relevant due to corporatization.
Source: ITU.

New sources of revenue may not be enough to generate the necessary investment funds for developing information infrastructures. Given the dire financial situation of most African governments and limited official development assistance for telecoms, the only practical source of funds may be private capital.[6] Involving African entrepreneurs would provide an opportunity to build up the private sector in Africa on a significant scale since telecoms is typically one of the biggest national businesses.[7] African ownership would also placate national sensitivities about foreign control. Many African PTOs are saddled by a heavy debt burden, and the introduction of private equity capital, either locally or externally financed, could provide a fresh starting point.

Africa is very dependent on imports for telecoms equipment since there is little indigenous manufacturing (see Table 2). The main way PTOs generate foreign exchange to pay for equipment is through settlement payments made on incoming international calls. Cries for reform of the accounting rate system that presently allocates revenues on the basis of traffic distribution, creeping competition from credit card and call back services and the looming specter of transnational satellite-based telephone systems may affect future foreign cash earnings. For these reasons, African PTOs also may want to consider involvement of foreign partners who can provide capital and expertise, especially in new technologies.

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[6] For example, telecommunication lending by the region's African Development Bank (ADB) amounted to 1.2% of ADB total lending over a ten year period. The ADB lending is uneven with no telecoms loans in some years. Also, the majority of multilateral development funds have gone to just three countries: Algeria, Morocco and Nigeria. See T. Kelly and M. Minges. "The Paradoxes of African Telecommunications." In *Telecommunications and Development in Africa.*

[7] There is scant data on businesses in Africa so it is difficult to know how the telecoms companies rank. However data from other regions suggest that the telecoms company is typically one of the top ten. For example, in South East Asia, the ranking of telecoms operators vis-à-vis other companies is: PT Telkom (Indonesia) (6th), Telekom Malaysia (5th), Philippine Long Distance Telephone Company (9th), Singapore Telecom (6th), Telephone Organization of Thailand (only provides domestic service) (12th). See "The AsiaWeek 1000" *Asiaweek*, 23 November 1994.

Table 2: African telecommunication equipment imports

Average annual telecommunication investment and telecommunication equipment imports (1988-92), Selected countries, US$

	Average 1988-92		
	Telecom investment	Telecommunication equipment imports	
Economy	US$ m	US$ m	As % of investment
Senegal	31.7	14.0	44%
Djibouti	7.7	3.4	44%
Morocco	257.1	126.5	49%
Egypt	198.9	106.5	54%
South Africa	586.5	329.2	56%
Mauritius	30.1	17.5	58%
Libya	133.9	78.7	59%
Burundi	2.5	1.7	66%
Algeria	172.3	115.9	67%
Seychelles	7.2	5.2	72%
Zimbabwe	36.0	28.2	78%
Cameroon	42.6	34.4	81%
Togo	7.1	5.9	84%
Ethiopia	18.4	18.2	99%
Total	**1'532.0**	**885.3**	**58%**

Source: ITU, UN.

New telecommunication services

Africa lags behind other regions in the provision of business communications support such as packet-switched data networks, leased circuits and value-added services. The dearth of facilities is striking. For example, at the end of 1993, ISDN had not been introduced commercially in a single African country, and in the whole of Sub-Saharan Africa, there was just a single computer directly connected to the worldwide *Internet* network. Packet-switched data networks do not exist in two thirds of the African countries and the number of leased lines being used in the continent is less than 1% of the world total. Telex usage, which is declining worldwide, is still popular in Africa where there are roughly as many telex subscribers as fax machines in the Sub-Saharan region.

Table 3. Information poor

Number of subscribers or equipment, 1993 or latest data

	Sub-Saharan Africa	North Africa	South Africa	Total Africa	% of world
X.25 Network subscribers (000s)	1.6	1.5	6.4	9.6	1.0%
ISDN subscribers	0	0	0	0	0%
Leased lines (000s)	9.6	3.9	61.7	75.3	0.4%
Internet hosts	1	4	67	72	0.6%
Telex subscribers (000s)	33.7	32.4	8.7	74.8	7.3%
Fax machines (estimates) (000s)	30	50	60	140	0.5%

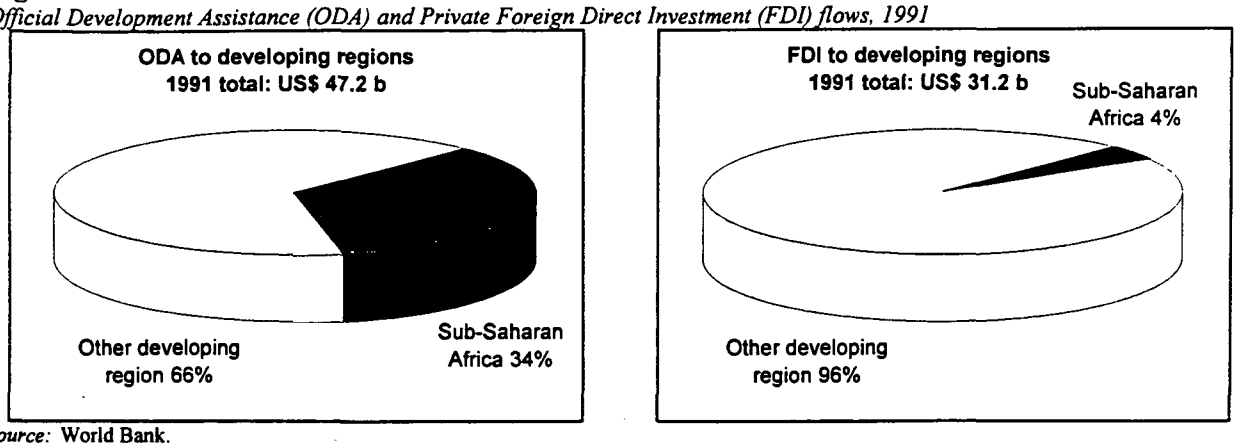
Source: ITU.

The lack of advanced services can be attributed to an undeveloped private business sector. In 1991, private investment in African countries for which data was available accounted for 8.5% of GDP compared with an average of 16% for developing regions as a group. The limited private sector is reflected in foreign direct investment. In 1992, Sub-Saharan Africa attracted only 3.5% of total

private foreign investment to developing countries. Much of Africa's industry is government controlled. State-owned manufacturing and service industries are not as likely to be as motivated as the private sector to use the benefits of advanced communications services.[8]

Figure 4. Hooked on aid

Official Development Assistance (ODA) and Private Foreign Direct Investment (FDI) flows, 1991



Source: World Bank.

The shortage of services can also be attributed to a lack of vision by PTO management. They must understand the application of advanced services and be able to explain them to users. As a manager at GAMTEL, Gambia's national PTO puts it: *"We are at a point where we have to sell our services rather than wait for people to come and buy our services."*[9] Because many African PTOs are not equipped to do this, many large multinational corporations operating on the continent have established their own private communication facilities. Also African PTOs have been slow to cooperate with others to develop new business services.[10]

Many networking developments taking place in Africa are grass root initiatives serving the academic and scientific community. They typically involve providing researchers with electronic mail with the ultimate goal of providing Internet connectivity. The East and Southern African Network (ESANET) is a pilot project linking university researchers in Kenya, Tanzania, Uganda, Zambia and Zimbabwe with each other and researchers around the world via electronic mail. In

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[8] For example, inefficiency in the mining sector is attributed to: "the perverse effects of state management of many of the large mining companies on the continent." See African Development Bank, *1993 Annual Report.*

[9] Gamtel, *Annual Report 1993* (Banjul: 1993).

[10] For example, the development of satellite news gathering in Africa has been impeded by "extortionate licensing fees and local PTT monopolies". See Jeremy Rose. "Satellite News Gathering in Africa." In *Africa Telecom 94 Forum Speakers' Papers.* According to the Society for Worldwide Interbank Financial Telecommunication (SWIFT), the introduction of communication facilities for African banks has been slowed by the fact "that many national telecoms authorities do not fully understand or appreciate the contribution which SWIFT can make to their national banking systems." Kees Hozee. "Africa in a Global Economy-Requirements for Financial Telecommunications." In *Telecommunications and Development in Africa.*

Francophone Africa, access to the Réseau Intertropical d'Ordinateurs (RIOnet) has been provided for almost a dozen countries with the assistance of the French research institute ORSTOM. The Regional Informatics Networks for Africa (RINAF) is a United Nations Educational, Scientific and Cultural Organization (UNESCO) project to establish Internet nodes in Africa. The World Health Organization (WHO) has been supportive of "Health Informatic and Telematics" initiatives for the African medical community and cites a case where a Kenyan doctor was able to save a patient thanks to electronic mail.[11]

Foreign PTOs are involved in several value-added service initiatives. There are around 750 users of the French videotex network in Africa with access arrangements handled by a France Télécom subsidiary. France Télécom is also exploring the establishment of a VSAT network in 15 African countries. Portugal's Marconi owns half of a firm providing public data communication and electronic mail services in Mozambique, and, through its Directel subsidiary, has developed a database of business addresses for Mozambique, São Tome and Principe and Guinea Bissau which is used to generate telephone directories. AfricaNet is a Marconi initiative to develop a data network for the Portuguese-speaking African countries.

Entertainment services

The development of a unified network providing both telephony and pay television service could save money by avoiding duplicate infrastructure, generate higher revenues so that more funds would be available for expanding the network and provide a rationale for building broadband infrastructure that could also be used for text, data and image transmission. For example, one study finds hybrid TV/telephony networks are no more expensive than conventional telephone networks and can generate up to five times more profit than plain telephone networks.[12] Another study estimates that China could save billions of US dollars by building integrated telephone and cable television networks. Despite evidence that high bandwidth fibre/coaxial hybrid cable is no more expensive than copper wire, most African PTOs continue to lay copper for new line installations thus missing an opportunity to build broadband information infrastructures.

The opportunity of using pay television to rationalize building broadband networks is being missed for a number of reasons. In most African countries, PTOs are state-owned monopolies with little incentive to investigate new markets while large waiting lists have made the provision of basic telephone service a priority. Strict government control over broadcasting makes it difficult to provide terrestrial multichannel services.[13] Most importantly, policy makers have underestimated the demand for entertainment by even the poorest segments of the population. This should be self-evident given that there is a larger number of television receivers than telephone lines in Africa. What makes the African television market interesting is that a growing number of viewers have shown a willingness to pay for subscription television even though charges are far higher than basic telephone services. Foreign broadcasting companies and local entrepreneurs are stepping in to exploit this demand.

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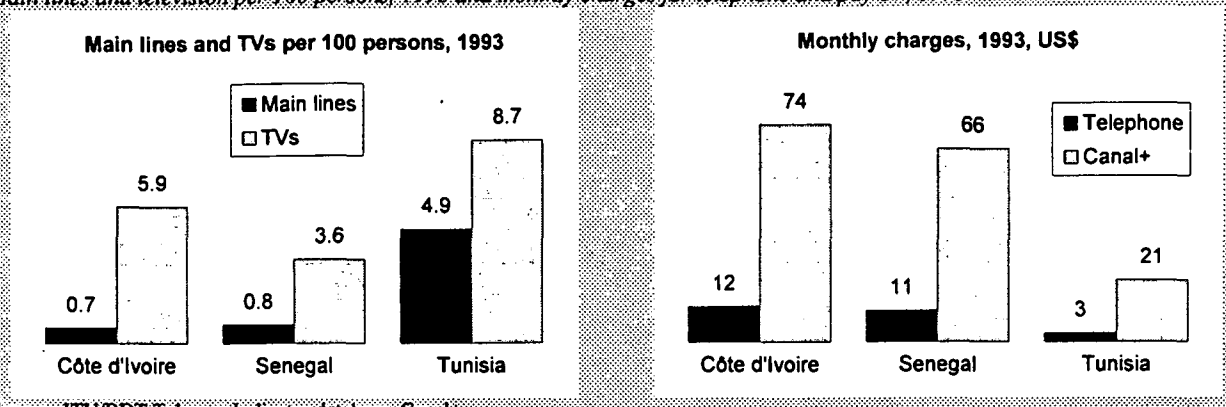
[11] See Salah Mandil. "Telematic Support to Health Care in Africa". In Africa Telecom 94 Forum Speakers' Papers.

[12] Jaluria, R. and Tautges, D. India. *Cable Telephony's Role in Eradicating India's Backlog*. Paper presented at Asia-Pacific Cable & Satellite Television Summit, Hong Kong, 1994.

[13] Ironically while it is difficult for the African private sector to establish terrestrial television broadcasting channels, foreign-produced broadcasting is available via satellite.

Figure 5: We'd rather watch than talk

Main lines and television per 100 persons, 1993 and monthly charges for telephone and pay TV, 1993



Source: ITU/BDT Telecom Indicator database, Canal+.

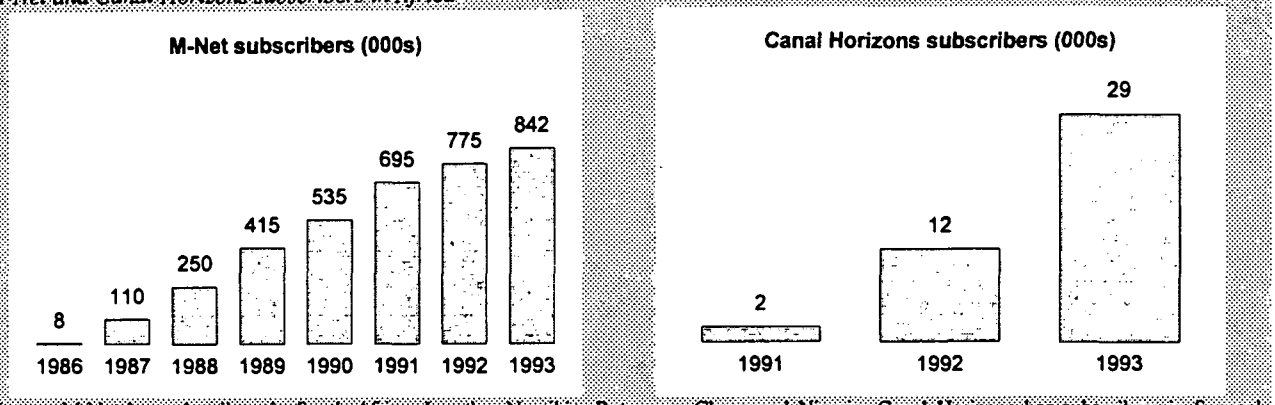
In October 1986, South Africa's M-NET became the first subscription television network launched in the Southern Hemisphere. By March 1994, it had 842 000 subscribers in South Africa, Lesotho, Namibia, Botswana, Ghana and Nigeria, making M-NET the third largest pay-TV service outside North America. It can be reached in 32 African countries with Direct-To-Home (DTH) satellite dishes. M-NET sold its subscriber management services to Multichoice Limited in 1993. According to Multichoice these subscriber services, billing, decoder sales, technical help, are important because "it is foreseen that increasing numbers of subscription channels will enter various markets in Africa, providing an opportunity to expand the existing client base."[14]

France's Canal+, the world's largest pay-TV company (by turnover), is involved in Francophone Africa through its Canal Horizons subsidiary. It has subscribers in Senegal, Tunisia and the Côte d'Ivoire and can be reached by DTH satellite dishes in other countries (though like M-NET, viewers need a decoder). The Francophone TV5 station began broadcasting in 1993 via microwave distribution systems (MDS) partially financed by the Canadian Government and can be seen in Gabon, Senegal, Mali, Burkina Faso, Niger, Benin and Côte d'Ivoire. MDS systems are popular in Africa because DTH antennas are prohibitively expensive and because MDS can be installed relatively quickly. According to a report, one of the most active MDS markets is Nigeria where there are some 15 operators with a potential audience of between 100 000 to 1 million.[15]

[14] MultiChoice Limited, *Annual Report* (South Africa: 1994). Multichoice is also involved in the second mobile cellular network in South Africa with a 25% shareholding.

[15] Wittering, S. "MMDS, I presume." *INTERNATIONAL CABLE*, August 1994, p. 54.

Figure 6: Pay television in Africa
M-Net and Canal Horizons subscribers in Africa



Note: M-Net has subscribers in South Africa, Lesotho, Namibia, Botswana, Ghana and Nigeria. Canal Horizons has subscribers in Senegal, Tunisia and Cote d'Ivoire.
Source: Multichoice Limited, Canal+.

PTOs could capitalize on growing multichannel television demand in Africa. One way would be to provide cable television in conjunction with their telephony services as is being done in the United Kingdom. Another way would be to lease lines as in Denmark where TeleDanmark provides a fibre optic backbone to cable operators.

The involvement of African PTOs in television has benefits beyond extra revenue generation and a rationale for building broadband networks. The combination of voice and television services would be more likely to attract capital than either service on its own. Costs would be lower due to the economies of scale possible with the nationwide PTO network instead of many fragmented pay television operators. Governments may be more supportive since television transmission over wired infrastructure provides content control not available with DTH satellite reception. The additional revenues, coupled with government assistance, could be channelled into African-developed television programmes.[16]

Fibre optics

In addition to greater capacity and better quality for voice telephony, fibre optics provide the high bandwidth necessary for the transmission of multimedia information. Its deployment is spreading throughout the region. There is close to 500 kilometres of fibre optic cable linking major cities in Côte d'Ivoire. Optic fibre systems interlink telephone exchanges in Zimbabwe's capital city Harare. In South Africa, there are some 170 000 fibre kilometres installed in the trunk network. Fibre optic

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[16] There is concern over growing foreign broadcasts to Africa. One critic wonders: "is it to help promote the local culture or to project the culture of the foreigners? Or is it just to sell their products and promote international advertising with all its known effects on local culture?" See Ansah, P. "Foreign Intervention is a Sensitive Issue." *InterMedia*, November/December 1992. Others argue for participation with foreigners to develop a professional African television industry that will change the world's stereotype perception of Africa as "... starving, suffering, and seemingly terminally dependent environment." Eugene Jackson. Chairman's Introduction. *Africa Telecom 94 Speakers' Papers*. ITU, 1994. There are fledging initiatives such as Afrovision to promote African television programme development and exchange. Rex Winsbury. *Afro-Vision Exchanges (some of) the News*. InterMedia. November/December 1992.

cables are being deployed in Lagos, Nigeria to link primary and secondary exchanges. One of the more ambitious fibre programmes is in Botswana where a 1 200 kilometre fibre overlay route is being installed in the more populated eastern part of the country.

There are three private sector initiatives to plug Africa into the global information network through fibre optic undersea cables. This is long overdue since, at present, the only fibre links from Africa to the rest of the world are from South Africa, several from the Maghreb countries and Djibouti. The French telecommunication equipment manufacturer Alcatel is working with a number of nations to develop a West African undersea fibre optic cable that would connect to Europe. AT&T, stating that "African nations need to be connected to the global market place" has proposed a fibre ring around the continent called Africa ONE.[17] The Fiberoptic Link Across the Globe (FLAG) consortium, led by the US Regional Bell Operating Company Nynex and UK-owned Cable & Wireless, has proposed east and west coast fibre cables that would hook up to the 31 000 kilometre FLAG is building from the United Kingdom to Japan. Studies suggest that a 20 000 kilometre cable around Africa with 60 000 circuits would cost around $US 800 million.[18]

Towards an African Information Infrastructure

This survey has shown that there are a number of developments underway to improve Africa's Information Infrastructure. It is significant that many of these initiatives are either grass roots (e.g. efforts to improve connectivity of research institutions), spawned by entrepreneurs (e.g. pay television) or coming from outside Africa (e.g. undersea fibre cable proposals). For the most part, the traditional telecoms operators and their government owners are not leading the drive toward an African Information Infrastructure. It is notable that there are few publicized national information infrastructure plans, policies, strategies or visions emanating from governments. This is unfortunate, for while an African Information Infrastructure is being built, it is proceeding in bits and pieces and far too slowly.

There are a number of steps to accelerate the development of an African Information Infrastructure, most of which could be implemented fairly painlessly and do not depend on development aid. These include:

- **Establish national policies for information infrastructures.** There are regulatory, coordination and social issues that need to be dealt with to accelerate information development. Regulatory issues include policies on who is allowed to build the infrastructure, how services will be priced, how will universal service be provided and how will content be controlled and protected. Coordination issues include bringing together telecoms, broadcasting and development ministries along with researchers and the private sector to devise appropriate national policies. Social issues include how schools and hospitals can be provided with information infrastructures, how the government itself will use information infrastructures to improve the delivery of its services, how national cultures can be strengthened and protected from on onslaught of foreign information and how information disparities between rich and poor and urban and rural can be minimized.

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[17] See *AT&T proposes pan African fiber-optic network at Cario meeting.* AT&T Press Release, 25 April 1994.

[18] Langworth, G. Combining Forces: "The Challenge to Connect Africa." In *Telecommunications and Development in Africa.* (Amsterdam: IOS Press, 1994).

Sub-regional, regional and international inter-governmental agencies should play an active role to assist governments in designing appropriate policies for information infrastructure development.[19]

- **Encourage PTOs to be more involved in information infrastructure development**. One way of stimulating this is to let PTOs operate on a commercial basis. If the PTOs were more entrepreneurial, they would seize the growing opportunities for providing advanced services. They would also be more cost and quality conscious. This should result in better procurement practices so that more equipment can be purchased with the same amount of investment. Quality of service would improve so that value-added services can be provided over the telephone network.
- **Attract private capital for development of the infrastructure**. Pay television developments and undersea fibre optic cable initiatives for Africa show that there is private sector interest in the African market. There are a number of ways of involving the private sector including subcontracting installation, cooperative joint ventures or sale of PTOs. One approach that has a number of benefits is to have a tripartite ownership structure for PTOs. Part would belong to the government to monitor national development strategies, another part would belong to nationals to build up the African private sector and the last part would belong to foreign investors who would provide capital and expertise.

Motivated African PTOs could leverage their existing telecommunication networks and skills to develop national information infrastructures. This would reduce fragmentation and avoid waste of scarce resource on duplicate infrastructure. The resulting economies of scale would make the market more attractive to private capital. Governments in the region need to rapidly familiarize themselves with the issues related to information infrastructures so that they are not only prepared to deal with the social, cultural and economic consequences but are also ready to assume a coordinating and stimulating function. With the appropriate policies, the barriers towards building the African on-ramps to the worldwide information superhighway can be lowered and Africa could begin the 21st century plugged into the global information economy.

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[19] One way intergovernmental organizations are assisting is by organizing forums to promote cooperative action for the development of information infrastructures and services such as the African regional symposium on "Telematics for Development" organized by The United Nations Economic Commission for Africa (UNECA), International Telecommunication Union (ITU) and United Nations Educational, Scientific and Cultural Organization (UNESCO). Telematics refers to the marriage of telecommunications with informatics and audiovisual technologies.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 14-E
3 April 1996
Original: French

For Action

Agenda item: 1.3

PLENARY MEETING

SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU

TITLE: DEVELOPMENT OF TELECOMMUNICATION INDUSTRIES IN AFRICA

Pursuant to various resolutions and recommendations adopted by the African countries at several regional and subregional conferences and meetings, notably those in connection with the Second United Nations Transport and Communications Decade in Africa (1991-2000), on the need to promote telecommunication equipment manufacturing industries, BDT has for several years been taking initiatives in collaboration with UNIDO in an attempt to carry out a feasibility study on the subject.

A project document has been prepared with a view to undertaking an overall feasibility study for the local manufacture of telecommunication equipment in Africa.

The project has three objectives:

1) To conduct a survey of existing industrial units and identify industrial projects in the different African countries, the results of which will be made available to governments and interested public and private operators.

2) To carry out a regional technical and economic feasibility study, based on a detailed study of long-term needs for different types of plant and equipment, with a view to determining the region's local production capacity needs.

3) To prepare a regional programme of action, for the implementation of which interested private operators will be given assistance and advice.

In principle ITU and UNIDO, in close collaboration with all interested regional and subregional intergovernmental organizations, should be responsible for executing the project.

It should however be stressed that, in spite of several attempts and various meetings, ITU and UNIDO have been unable to coordinate their efforts to find the means for carrying out the feasibility study on a global and systematic basis.

The estimated cost of the project is around $US 2 million. It would be desirable for the African financial and economic institutions, together with the private operators which will benefit from the results of the feasibility study, to participate in financing the project. (See project document annexed hereto.)

GOVERNMENTS OF AFRICAN COUNTRIES

PROJECT DOCUMENT

Code number and title: RAF/95/...

Feasibility study

DEVELOPMENT OF TELECOMMUNICATION EQUIPMENT MANUFACTURING IN AFRICA

Duration: 29 months
Sector: Transport and Communications (06)
Subsector: Telecommunications (0660)
Government implementing agency:
Regional communications ministries
Executing agency: ITU
Estimated starting date: June 1996
Site: .....
(with travel in the region)

Contributions and participation in costs ($US)	
UNDP	.....
ITU	.....
UNIDO	.....
ADB	.....
UEMOA	.....
CAEMU	.....
BOAD	.....
BDEAC	.....
PTA-DB	.....
ECOWAS Fund	.....
Other sources:	
Total	**2 071 470**

BRIEF DESCRIPTION: The project is to carry out a global feasibility study for the local manufacture of telecommunication equipment in Africa.

The project has three objectives:

1) To conduct a survey of existing industrial units and identify industrial projects in the different African countries, the results of which will be made available to governments and interested public and private operators.

2) To carry out a regional technical and economic feasibility study, based on a detailed study of long-term needs for different types of plant and equipment, with a view to determining the region's local production capacity needs.

3) To prepare a regional programme of action, for the implementation of which interested private operators will be given assistance and advice.

The project will be executed by ITU and UNIDO, with the latter acting as associate agency. Both agencies will cooperate closely with OAU, ECA, ADB, PATU and the subregional intergovernmental economic cooperation organizations.

APPROVALS AND SIGNATURES

TABLE OF CONTENTS

		Page
ABBREVIATIONS AND ACRONYMS		5
PART A - BACKGROUND		7
A.1	Description of the subsector	7
A.2	Strategy of the countries of the region	12
A.3	Previous or current assistance	15
A.4	Institutional framework	17
PART B - JUSTIFICATION FOR THE PROJECT		
B.1	Problem to be solved by the project: the present situation	18
B.2	Expected situation at end of project	20
B.3	Target beneficiaries	21
	1) Immediate beneficiaries	21
	2) Ultimate beneficiaries	21
B.4	Strategy and implementation procedures	21
	1) Strategy	21
	2) Implementation procedures	23
B.5	Justification for aid by ADFIs and the Executing agency	28
B.6	Special considerations	28
B.7	Cooperation agreements	29
B.8	Support and counterpart capacity	30
PART C - DEVELOPMENT OBJECTIVES		30
PART D - IMMEDIATE OBJECTIVES, OUTPUTS AND ACTIVITIES		30
PART E - INPUTS		
E.1	Host-country government inputs	36
E.2	Participating government inputs	36
E.3	International and regional inputs	36
PART F - RISKS		37
PART G - PRIOR OBLIGATIONS AND PREREQUISITE CONDITIONS		
G.1	Prior obligations	37
G.2	Prerequisite conditions	37
PART H - FOLLOW-UP, REPORTS AND EVALUATION		37
PART I - LEGAL CONTEXT		37
PART J - PROJECT BUDGET		38
ANNEXES		
1	Industrial products in a telephone network	40
2	General project implementation schedule	41

ABBREVIATIONS/ACRONYMS

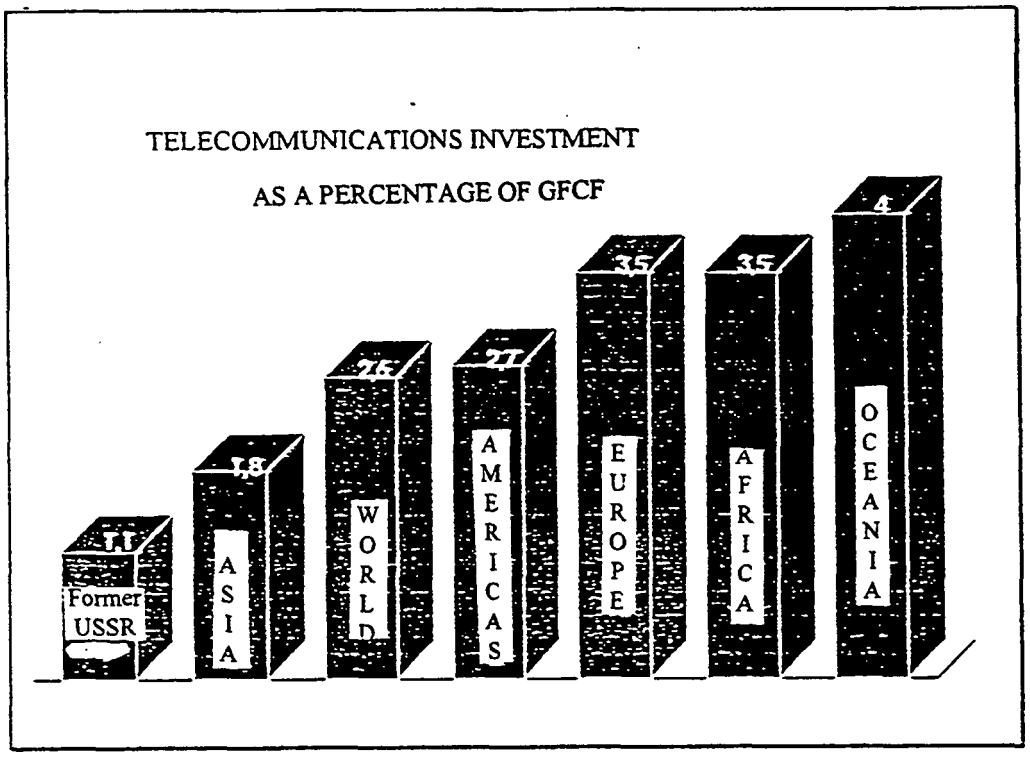
ADB	African Development Bank
ADFI	African Development Financing Institutions
AFRALTI	African Advanced-Level Training Institute
AIPO	African Intellectual Property Organization
ARSO	African Regional Standardization Organization
ARTC	African Regional Technology Centre
BDEAC	Development Bank for Central African States
BDT	Telecommunication Development Bureau (specialized sector of ITU)
BOAD	West African Development Bank
CAEMU	Central African Economic and Monetary Union
ECA	United Nations Economic Commission for Africa
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
ESMT	Higher Multinational School for Telecommunications
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
GII	Global Information Infrastructure
GNP	Gross National Product
IDDA	United Nations Industrial Development Decade in Africa
IGO	Intergovernmental Organization
IOC	Indian Ocean Commission
ITT	International Technical Team
ML	Main line
NSG	National Support Group
OAU	Organization of African Unity
PANAFTEL	Pan-African Telecommunications Network
PATU	Pan-African Telecommunication Union
PTA	Preferential Trade Area
PTA-DB	PTA Development Bank
R&D	Research & Development
RASCOM	Regional African Satellite Communications Organization
SADCC	South African Development Coordination Conference

SATCC	South African Transport and Communication Conference
Tf	Telephony
UAPT	African Postal and Telecommunications Union
UEMOA	West African Economic and Monetary Union
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization
UNTACDA	United Nations Transport and Communications Decade in Africa
UNV	United Nations Volunteer
WTDC	World Telecommunication Development Conference

PART A - BACKGROUND

A.1 Description of the subsector

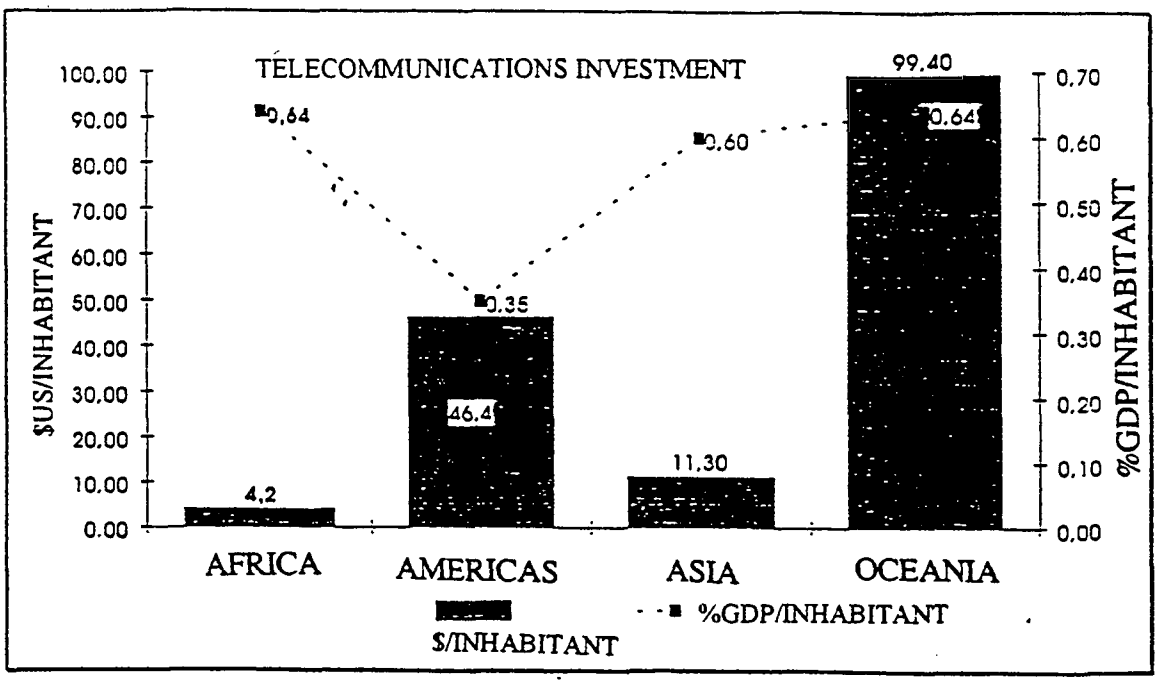
African Governments have over the past three decades devoted a major portion of their investment resources to telecommunications. In 1992 for instance, 4% of the region's gross fixed capital formation (GFCF) went on telecommunications (Figure 1). In that respect, Africa is on a par with Europe and outstrips all other regions of the world with the exception of Oceania; in terms of the percentage of per capita GNP invested in telecommunications (0.64%), Africa has the highest level in the world (Figure 2).



Source: World Telecommunication Indicators (ITU, 1994)

FIGURE 1

Telecommunications investment as a percentage of GFCF

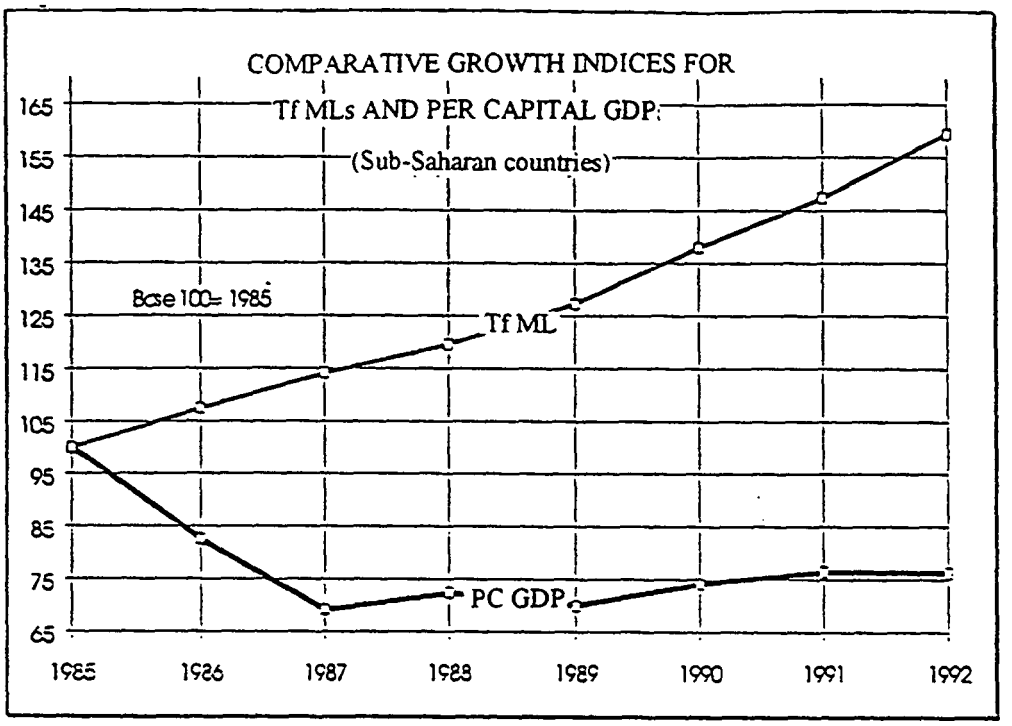


Source: World Telecommunication Indicators (ITU, 1994)

FIGURE 2

Telecommunications investment

It is also found that the growth in the number of subscriber telephones in the region has not for the most part been directly affected by the considerable drop in national earnings over the past several years (Figure 3), a phenomenon which is highly indicative of the strong and rapidly growing need for the basic telephone service.



Source: World Telecommunication Indicators (ITU) and World Development Reports (WB)

FIGURE 3

Comparative growth indices for Tf MLs and per capita GDP (Sub-Saharan countries)

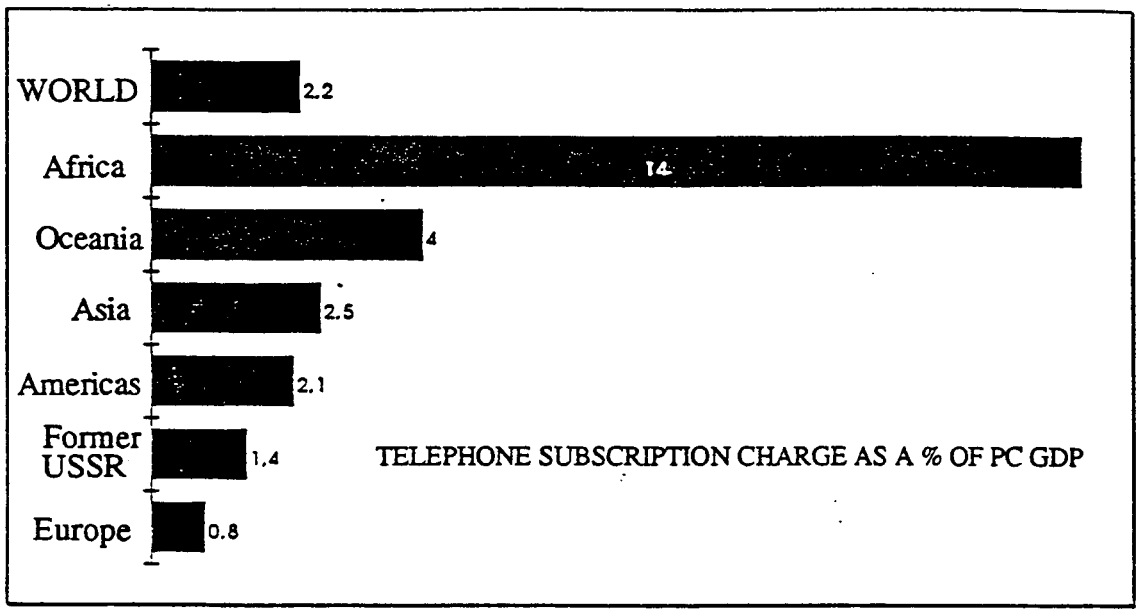
Africa's high level of telecommunication needs is also reflected in the region's long waiting list which in 1992 stood at 3.73 million outstanding applications; that is equivalent to 37% of the total lines in service and represents an annual increase of 7.65% since 1983. At that rate, it will amount to 7 million by the year 2000.

Yet even this very long waiting list is not exactly representative of the region's real needs, because the semi-permanent saturation of local networks so familiar to the population means that many potential applicants for connection do not bother applying to their country's operator.

Thus, in spite of a relatively very high regional investment effort, the statistics suggest that Africa's progress in this subsector remains very modest when compared to economic and household needs: the rate of growth of lines in operation enables only 73% of the total demand for main lines + applications (ML+A) to be met, as against a world average of 93%. The annual mean growth rate stands at 8.7% for the continent as a whole and only 6.8% for the sub-Saharan countries (1983-1992).

Other chief characteristics of Africa's telecommunication network include the following:

- it represents barely 1% of the telephone lines in service throughout the world;
- its telephone density, expressed in main lines per 100 inhabitants, is the lowest in the world: 0.4% in sub-Saharan Africa and 1.47% for the entire continent, as against a world average of 10.49%;
- 35 of the 49 countries having the least developed telecommunication networks, i.e. with a telephone density of less than 1%, are in Africa;
- the average waiting time for connection of a telephone is 8 years in sub-Saharan Africa and 5.5 years in the region as a whole, as against a world average of 1 year and 8 months;
- the telephone subscription cost is the highest in the world: 14% of per capita GDP, as against a world average of 2.2% (Figure 4).



Source: World Telecommunication Indicators (ITU, 1994)

FIGURE 4

Furthermore, the African telecommunication network is reputed to offer one of the lowest qualities of service in the world.

In proportion to income, Africa is the region which devotes most resources to telecommunications but derives least benefit from the subsector; this means that the considerable leverage effects noted in other regions of the world are sharply reduced if not wiped out by the combination of the negative effects of all-too-frequent foreign loans and systematic import of equipment and even expertise. Thus, as things stand at present, Africa's telecommunication subsector is increasing the foreign debt of the countries of the region without enabling public network operators to derive from telecommunication service operations sufficient resources to meet infrastructural growth needs: as a percentage of regional GDP, investments amount to 0.9% while revenue goes no higher than 0.8%, a gap equivalent to $US 320 million (1992).

The **resulting** effect of the factors described above explains the major structural weakness of Africa's telecommunication subsector, which is thus the "missing link" in the context of the rapid economic globalization being brought about by simultaneous advances in and convergence of telecommunication and information technologies. This singular situation of the African network could even compromise the efforts being deployed in other regions of the world to achieve targets of widespread availability of telecommunication media such as those aspired to under the Global Information Infrastructure (GII) concept.

Since everywhere else the rapid development of telecommunication networks has proved to be a precondition for economic development and social change, the under-equipment of the African network is seen as a major obstacle to any positive development of the region's ability to increase the volume of its international trade, and is liable to jeopardize the achievement on schedule of such regional economic integration objectives as those defined in the treaty setting up the African Economic Community, unless lasting solutions are quickly found to help the region reverse the trend, particularly since most of the countries of the region are classed as LDCs by the international community.

Following implementation of the PANAFTEL project to provide a framework for coordinated infrastructural development and human resources development actions, attempts to accelerate the pace of growth with a view to achieving a regional density of one telephone line per 100 inhabitants were made as part of the UNTACDA-I strategy; however, the target had to be postponed until the end of the century, under UNTACDA-II, within which the project described in this document falls.

The impact of too many external factors has undermined the efficacy of most of the solutions hitherto adopted for improving the state of the African networks because, unlike other regions, Africa has no autonomy with regard to telecommunication equipment supplies.

The "African Green Paper", which provides the framework for defining the region's telecommunication policy, acknowledges that "*it would be unrealistic to imagine an integrated, balanced African telecommunication network without the necessary tools to go with it, i.e. manufacturing for equipment suited to the region's environment and development rhythm*". Earlier, the African Telecommunication Development Conference held at Harare, Zimbabwe in December 1990, had adopted Recommendation ATDC-90/REC1 calling upon ITU and UNIDO, with UNDP funding, to help the African countries promote the manufacture of telecommunications equipment in Africa.

Ever since 1982, industrialization has - at the request of their Member States - been the subject of many ITU, UNIDO, PATU and UAPT meetings and seminars; these have produced several recommendations and resolutions urging UNDP, ITU and UNIDO to provide Africa with the necessary assistance and support for creating a regional telecommunication equipment manufacturing capacity in the region. Complementarity of action between the two United Nations specialized agencies is deemed essential in the specific field of infrastructural development.

The development of a telecommunication industry in the African countries is thus seen as a priority field of action for telecommunication development in Africa over the coming years, according to both the regional authorities and ITU which, in this way, seek to encourage the quest for technical solutions suited to Africa with support and assistance from the more advanced countries of both North and South alike.

That aspect of international cooperation in the technological and industrial fields for the benefit of developing countries was considered by the World Telecommunication Development Conference (WTDC) held at Buenos Aires, Argentina in March 1994, which included it among the subjects assigned to ITU for the 1994-1996 study period (Question 5/1).

A.2 Strategy of the countries of the region

As part of the ITU's overall work, this project for a feasibility study for the development of telecommunication equipment manufacturing industries in Africa is just one component in a set of actions which, in synergy, should enable ITU to ensure sustainable telecommunication development in Africa, the other components being projects and regular activities relating to human resources development, terrestrial and satellite infrastructures and improvement of management and maintenance (Figure 5). As such, the present project will help to consolidate and prolong the results obtained from the combined efforts of ITU, UNDP and all the regional and other institutions that have been playing a part in the region's telecommunication development for the past three decades.

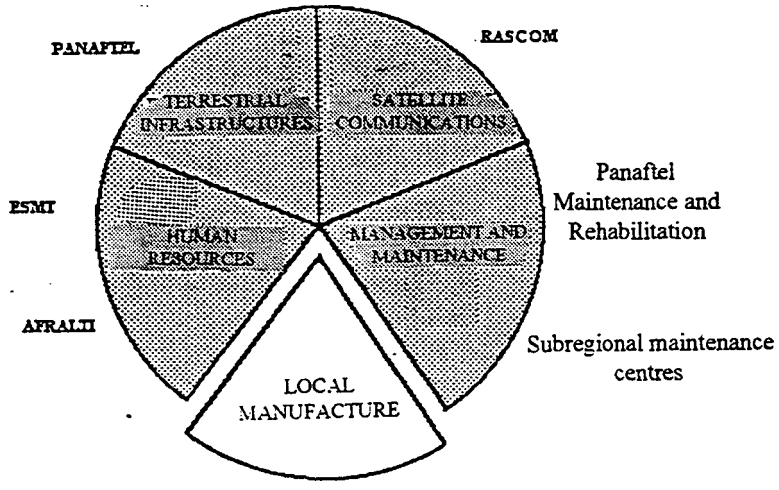


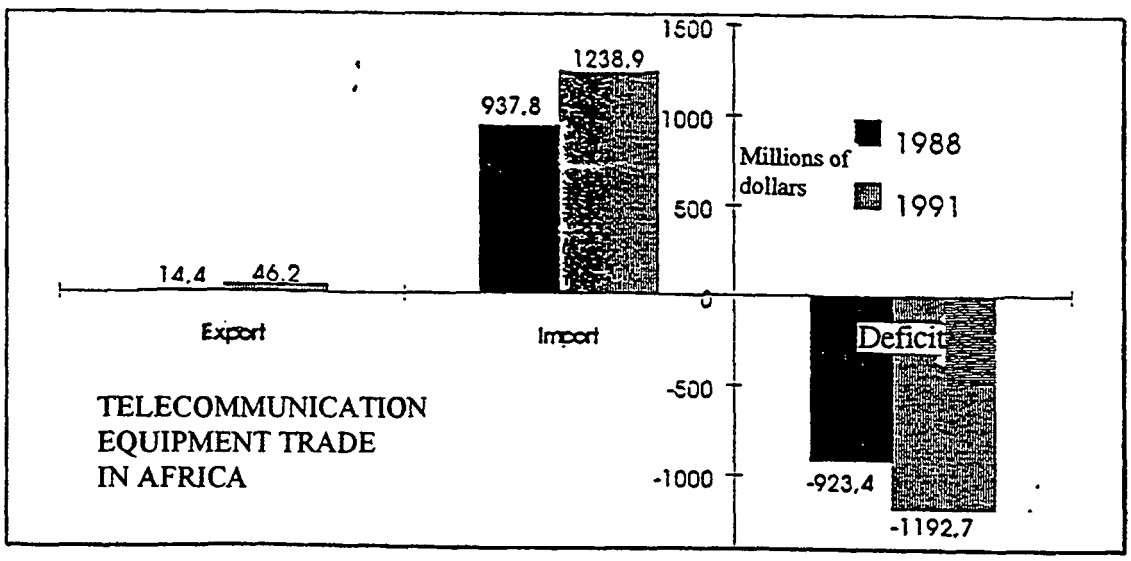
FIGURE 5

Complementarity of BDT action for the Africa region

The project also forms part of the regional strategy for the economic development and technological advancement of the African countries, which seeks to create conditions whereby the latter can take advantage of current advances for gradually developing the local manufacturing industry essential to a faster and more profitable expansion of the region's telecommunication networks.

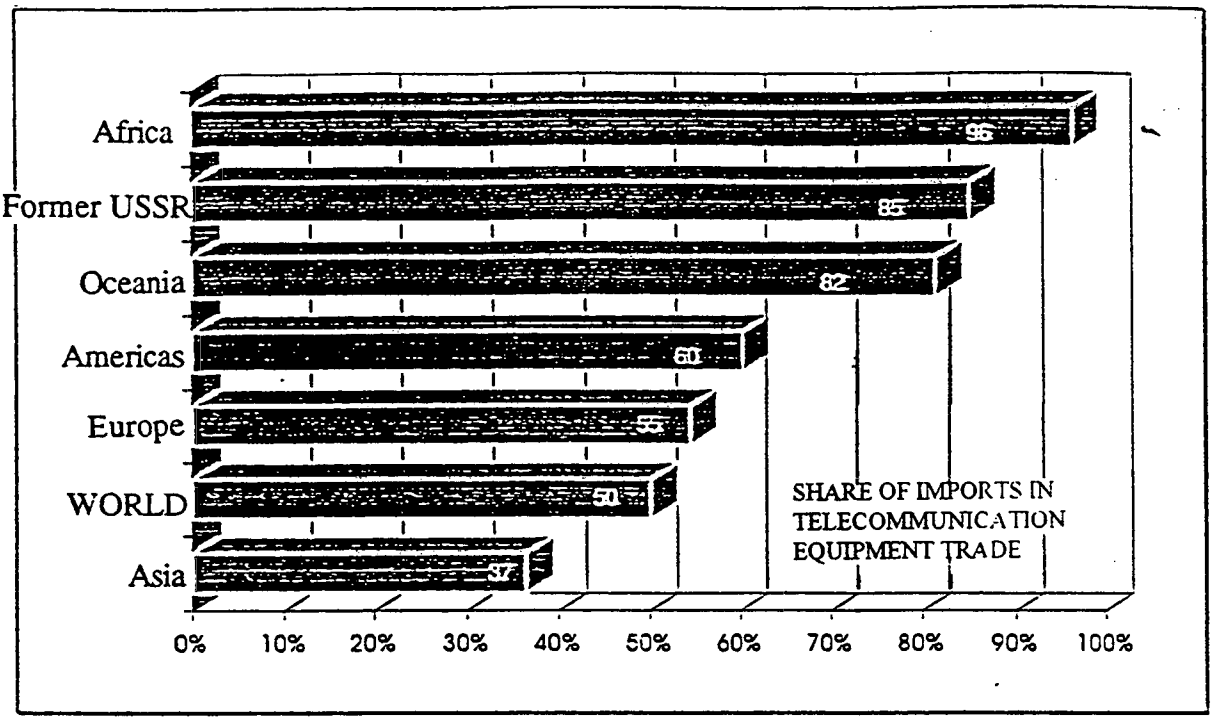
The project is a component of the United Nations' two main regional programmes for infrastructural development in Africa, namely the United Nations Industrial Development Decade in Africa (IDDA) and UNTACDA, the objectives of which are helping to bring about the regional integration targeted in the treaty setting up the African Economic Community, and for which precise sectoral efforts had earlier been defined in the Lagos Plan of Action.

The project is based on the foundations laid in the national development plans to which governments attach such high importance. As a framework for technical, industrial and technological cooperation both among African countries and between them and other countries, the project should also help, through its direct effects on industrial production and its boost to rapid network expansion, to enhance Africa's share in international trade and reduce the imbalance which affects the continent in both the general economic field and the world equipment market (Figures 6 and 7).



Source: World Telecommunication Indicators (ITU, 1994)

FIGURE 6



Source: World Telecommunication Indicators (ITU, 1994)

FIGURE 7

As part of the strategic framework for regional development aimed at integrating the African economies, the project seeks:

a) *to help exploit local raw materials*, through systematic research into their areas of use for the direct benefit of telecommunication networks and industry;

b) *to seek and use the production and sub-contracting potential* of existing local industrial capacities with a view to producing goods that can be used in telecommunication networks;

c) *to foster and support the transfer of technologies* likely to facilitate the development of telecommunication networks and ensure their efficient and permanent operation;

d) *to progressively reduce equipment imports* in favour of greater development autonomy and a reduction in unit and service costs as well as in the foreign debt of African States;

e) *to promote, support and encourage technical research* for adapting imported industrial goods and developing new products or procedures suited to local conditions of use;

f) *to foster and enhance compatibility between systems*, while reducing the range of similar products within networks, enabling the region to develop standards for plant, equipment and procedures in fields and within limits compatible with the principles laid down by the specialized organs of ITU;

g) *to foster the creation of effects of scale for facilitating industrial development*, by encouraging at the subregional level the consolidation of needs for similar products and the intervention of regional and subregional sources in financing such supplies;

h) *to contribute to the development and use of regional engineering expertise* on projects relating to the development of networks and of the telecommunication and electronics industries in general.

On the strength of past experience, financial assistance for implementing the project will be sought, first and foremost, from the African development financing institutions (ADFIs) and, to complement this, from UNDP and other multilateral and bilateral sources whose participation will not be tied in any way to the national industrial or commercial interests of the donor country. The regional industrial operators directly benefiting from the project will also be asked to contribute.

This approach to development financing reflects, on the one hand, the increasingly asserted will of the African States and their regional institutions to play a more active part in developing the continent and, on the other, the new pattern of international assistance being developed and implemented by UNDP; the cutback in UNDP's regional programme should help to create the right conditions for increasing the share of regional institutions and resources in the financing and execution of development projects. In this way, the direct influence of the African parties will be enhanced, particularly with regard to policy and the control of activities, in keeping with the region's own objectives.

A.3 Previous and current assistance

1 From UNDP

1.1 In the telecommunication field

Under its regional programme, UNDP has provided considerable ongoing assistance to the African countries' telecommunication subsector, particularly through financing for the following regional projects:

- RAF/87/011: PANAFTEL - Operation and Extension
- RAF/87/085: PANAFTEL - Maintenance and Rehabilitation
- RAF/87/013 (ESMT) and RAF/85/028 (AFRALTI): Training.

That UNDP assistance, for which ITU is executing agency, is largely responsible for the coordinated and harmonious development of telecommunication infrastructures and human resources in Africa, aided by support from the countries of the region in drawing up master telecommunication plans (MTPs) and national plans for the improvement of maintenance (NPIMs) and carrying out various technical studies, including the drafting of equipment specifications and the establishment of subregional training institutions.

UNDP provided ITU with the funds needed to execute preparatory regional assistance project RAF/87/170 for telecommunication equipment manufacturing in 1988, of which the formulation of the present project is the outcome.

UNDP also contributed to the implementation of the RASCOM feasibility study.

1.2 In the industrial field

[to be inserted here: information from UNIDO on assistance received from UNDP in the industrial field for the region.]

2 From ITU

As mentioned earlier, the ITU executed the preparatory assistance project financed by UNDP in collaboration with UNIDO and in consultation with OAU, ADB, ECA, PATU, ECOWAS, PTA, SATCC, WADB, DBCAS, ARSO, AIPO and ARTC. That study enabled opinions to be gathered from the governments of all five OAU subregions and allowed relevant aspects of national industrial and telecommunication development policies to be taken into account in formulating the strategy for this project.

ITU also provided the necessary resources for drafting this project document.

3 From UNIDO

Several seminars provided the framework for discussing and defining elements of the region's local manufacturing strategy, which was validated and formally ratified by the African countries during the preparatory assistance study executed by ITU in close collaboration with UNIDO.

4 From the ADFIs

The ADFIs have regularly supported telecommunication and industrial development whenever their Member States have requested assistance from them. They have constantly displayed great interest in telecommunications and have broadly supported action by the countries of the region to further their economic development.

ADB, WADB and the ECOWAS Fund may be cited as examples.

- ADB has financed maintenance extension and improvement projects in several African countries in all the subregions. It also played a significant part in organizing the regional RASCOM project and carrying out its feasibility studies. Its assistance to sectoral development is continuing within the framework of UNTACDA-II, whose Resource Mobilization Committee it chairs.
- The ECOWAS Fund, which has set up its own Special Fund for Telecommunications, helped greatly in bringing about the PANAFTEL interconnection network in West Africa, as well as certain maintenance and training activities.

– WADB has already helped to finance national network extension projects. Some 10 years ago it financed, at the request of UAPT on behalf of the States Members of both organizations, the pre-feasibility study for a telecommunication cable manufacturing unit coupled with the production of electrical cables in West Africa. That study did not lead to the achievement of the objective sought, largely for reasons relating to the organization of the project in question, the resumption of which is envisaged as part of the present regional feasibility study project.

BDEAC and the PTA-DB have also given considerable support to telecommunication and industrial development, each in its own area of interest.

All the ADFIs have signified their interest in promoting a regional industry and have declared themselves ready, when the time comes, to examine any requests submitted to them in that connection. The views they expressed have been duly taken into account in the present regional project.

A.4 Institutional framework

Execution of the project will be organized on a subregional basis within the framework of the geographical jurisdiction of the following intergovernmental cooperation organizations (ICOs):

– West Africa: ECCAS
– East Africa: PTA
– Southern Africa: SADCC

With a view to enhancing its operational efficiency, however, the project will also take account of the specific needs of other intergovernmental cooperation and economic integration institutions within the subregional groupings mentioned in the preceding paragraph. These include the following:

– UEMOA in West Africa
– CAEMU in Central Africa
– IOC in East Africa

In each country, the governmental cooperation body will be the public telecommunication operator, under the authority of the Minister responsible for telecommunications and with close collaboration from the Ministry responsible for industrial development and from the national federation of chambers of commerce and industry.

PART B - JUSTIFICATION FOR THE PROJECT

B.1 Problem to be solved by the project: the present situation

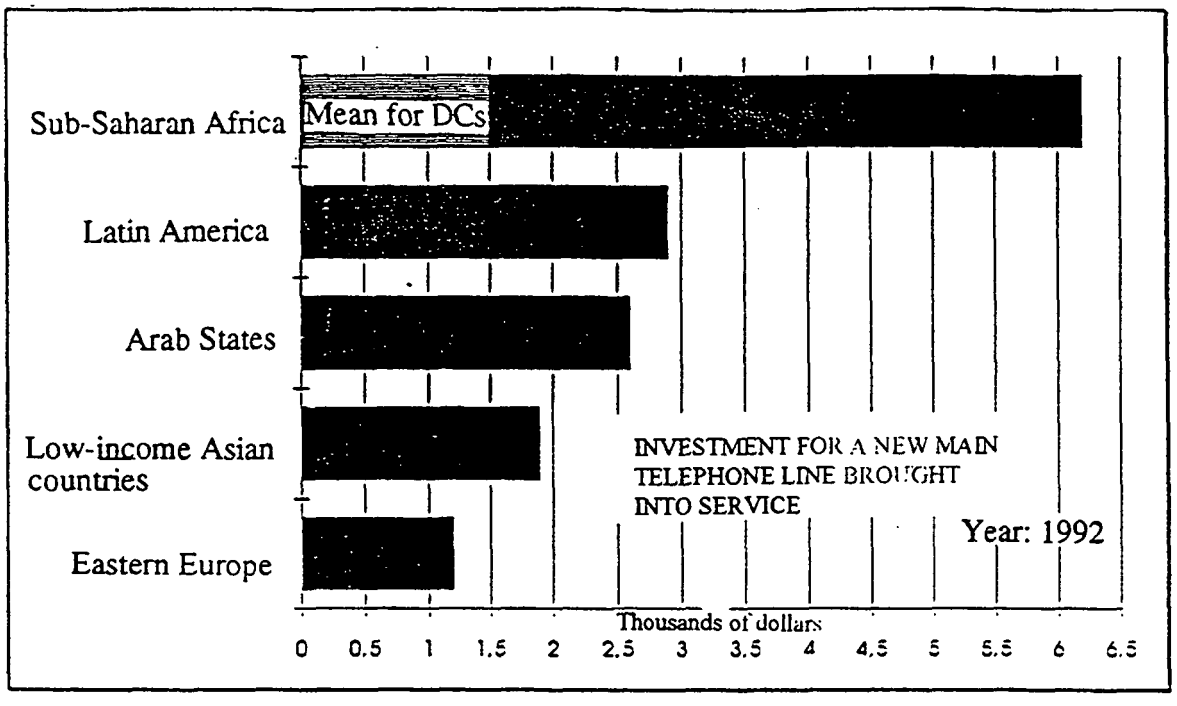
Telecommunication networks comprise a very wide variety of industrial products of greater or lesser technological complexity, depending on their function, a fact which also determines the nature and costs of the technical and human resources needed for manufacturing them. The products range from simple components produced by a primary processing of metals or plastics, to equipment having logical analysis and operational decision-making capabilities based on the intensive use of micro-electronics, relying on highly complex design and manufacturing procedures and techniques. Such industrial products, which form the backbone of modern telecommunication networks (prime examples are given in Annex 1), all reflect fields of manufacturing and/or subcontracting industries which the regional project seeks to promote in Africa.

It is through their assembly in an appropriate architecture that such products of highly diverse origins constitute telecommunication networks that have to meet permanent service and operational efficiency criteria in the environment for which they are designed. Making allowance for the characteristics of that environment at the design and manufacturing stages is thus essential: it determines the economic and financial costs of operating a telecommunication system, and therefore the level of its contribution to economic and social progress. Keeping those costs to a minimum through appropriate equipment design is therefore one of the main functions of national or regional industry.

In the present situation, virtually all the plant and equipment which make up the telecommunication networks of African countries are imported from countries outside the region, without any involvement of the countries of the region in their design or manufacture. Such imports range from simple wooden telephone poles to terminal equipments, public and private telephone exchanges, transmission systems of all capacities, cables and wires of all sorts, and all accessories and spare parts. The case is unique in the world.

The reality described results in several financial, economic and technical problems which together seriously constrain the ability of African governments and their public telecommunication operators to exercise any real influence over the development and operation of their telecommunication networks in keeping with their development objectives and schedules. For the following reasons, that aspect of infrastructural development has a negative impact on every national economic development strategy:

a) high unit costs, ascribable to supply conditions that are hardly if at all competitive and stem from the often restrictive conditions as to choice of supplier stipulated in most bilateral loans. As Figure 8 shows, the average cost of adding a telephone line in a sub-Saharan African country is 313% higher than the mean unit cost observed in the group of developing countries. That commercial factor is a direct consequence of the weak negotiating power of African network operators, which is itself a reflection of their modest national needs. High unit and service costs have a considerable damping effect on the "purchasing power" of national investment budgets with, as a direct result, a growth level which is not in keeping with the volume of expenditure;



Source: World Telecommunication Indicators (ITU, 1994)

FIGURE 8

b) low economic return on investments, attributable to the "turnkey" supply method practised in the sub-Saharan countries. Experience of that practice over three decades warrants the assertion that it sharply reduces the leverage effect of telecommunication investment on the national economy because, contrary to what occurs in the other regions, such investment has no direct impact on the other segments of economic activity, such as sub-contracting and the transfer of technology and expertise;

c) the low degree of reliability of network development plans, due to the low self-investment capacity of telecommunication operators in the African countries, particularly south of the Sahara, who usually resort to outside sources of financing, preferably ADFIs. Investment costs, of which the foreign currency component amounts to 90% of the total on average, thus absorb much of the counties' export earnings and in so doing increase the region's foreign debt. Telecommunications, which as mentioned earlier is a support sector which does not generate any added value within economies, is in direct competition with such high-priority sectors as health and education for the use of hard-currency reserves;

d) too frequent malfunctioning ascribable to the unsuitability of equipment to the African environment (permanent high humidity in some countries, high temperatures and drought in others, dust, high energy costs, the high cost of training and delays in delivery, etc.); the unsuitability of plant and equipments also affects the needs to be met, in both nature and capacity. This results in very high additional operating costs, all of which reduce operating revenue and therefore self-investment capacity. In this respect the African example is unique in the world;

e) reduced equipment life, attributable to replacements that are unwarranted from the standpoint of network needs but are imposed by suppliers even if the public telecommunication operators in Africa are not prepared for such changes; this relates above all to telephone exchanges and, to a lesser extent, transmission equipment. Generally speaking, the reasons for such replacements as "suggested" by suppliers, who in so doing resort to the effective method of refusing to supply spare parts, lie in the effects of the fierce industrial competition imposed in the markets of the major industrialized countries, as reflected most visibly in the accelerated pace of innovation. Such changes entail repetitive investments without creating any additional connection capacity;

f) serious shortcomings with regard to maintenance and repairs, ascribable to spare-parts problems and to excessive equipment diversity and differences in characteristics which, as is known, depend on the country of origin and especially on the maintainability objectives set by its telecommunication operator(s);

g) under-use of the industrial capacities installed in the few countries that have embarked on equipment manufacturing, due to a lack of information on such local production, sometimes even within the countries concerned and/or their immediate neighbours.

B.2 Expected situation at end of project

By the end of the project it is anticipated that the African Governments and subregional economic cooperation organizations will have a precise and exhaustive knowledge of the following seven aspects:

1) *sources of supply* of telecommunication equipment manufactured in the African countries;

2) *the products manufactured,* their nominal technical characteristics and their mean unit prices;

3) *opportunities for creating units for manufacturing* telecommunication equipment and the technical, financial and other conditions required for implementing industrial investment projects;

4) *general opportunities for cooperation* in the telecommunication industry, both between operators in African countries and between them and operators in countries outside the region for concluding joint ventures; and in such fields as the transfer of technology and know-how, expertise, human resources, research and development and raw materials;

5) *financing opportunities* available within the region for investment projects relating to telecommunication networks and industries, and the general terms of intervention of ADFIs to promote telecommunications and industry;

6) *the status of technical research* in telecommunications and electronics within the region, and the possibilities and conditions for developing it;

7) *the region's needs with regard to the standardization* of plant and equipment, and research activities to be undertaken in connection with local manufacture.

An exhaustive knowledge of the status of manufacturing in the African countries and of the region's financing possibilities should have an immediate impact on the supply policies of telecommunication operators, with supplier diversification leaning towards African industry, particularly if in this aspect of regional economic promotion the project enjoys support and assistance from the ADFIs.

All manner of information concerning the region's telecommunication subsector industry will be made available by the project through the African Telecommunication Industry Database (INDUSTEL), which is to be set up within UNIDO and interconnected with the BDT Information Service.

B.3 Target beneficiaries

1) Immediate beneficiaries

a) *the African Governments*, who will have full information on the status of local manufacture, as well as the relevant facts needed for taking decisions concerning the technical, financial and economic conditions for setting up and/or expanding industrial units for the local manufacture of telecommunication equipment;

b) *African and other industrial promoters* interested in industrialization in Africa, who will be informed of existing investment opportunities for creating new industrial activities to promote telecommunications;

c) *Africa's public telecommunication operators*, who will be able to readjust their development strategies in keeping with local supply possibilities and the economies of scale they can derive from the consolidation of needs with other operators in their subregion.

2) Ultimate beneficiaries

In the long term, local supply will indirectly benefit telecommunication service users through such anticipated side-effects as the following:

a) *enhanced quality of service* as the result of improvements in the intrinsic reliability of equipment adapted to local conditions;

b) *a reduction in the cost of supplies, charges and rentals* as a result of economies of scale and the homogenization of the equipment market through regional standardization.

B.4 Strategy and implementation procedures

1 Strategy

a) *Constitution of a homogeneous regional telecommunication market*

The fragmentation of the telecommunication market into low-demand national segments does not favour viable national industrial production in the case of most products or countries. The constitution of a critical demand mass based on a supply strategy coordinated between the countries, as mentioned earlier, is therefore essential if industrial investment projects are to be justified without economic risk to countries and promoters.

To that end, the project will carry out a study of long-term regional demand for the different types of plant and equipment. The study will be as detailed as the available information permits; it will constitute the central activity of the project, since its outcome will determine the volume and nature of all other activities, particularly investment projects.

The study of needs will rely heavily on ITU skills and on information available within the agency.

b) *Mobilization of regional financing*

Experience has taught that as a rule the choice of supplier(s) is tied to the source of funds for financing investment projects; with the consequences developed at length above and to the detriment of existing industries in some countries of the region. Studies under the preparatory assistance project (ITU/RAF/87/170) and project UNIDO/US/RAF/90/279 revealed that such local manufacturing industries experience major difficulties in selling their products in their own domestic markets, for reasons that are related to neither unit prices nor quality. In many cases this has resulted in the closure of lines manufacturing industrial products for telecommunications or in promoters switching to other fields of activity.

ADFI help will be needed for making public telecommunication operators - the main users of the subsector's industrial production - more independent vis-à-vis the external influences responsible for the situation, and for providing a lasting solution to a problem which is having a negative economic impact on all the countries of the region.

c) *Acquisition of technologies and know-how*

Generally speaking, the level of technological development and research within the region is insignificant. Much therefore needs to be done in that respect. Moreover, the preparatory studies have shown that the means of production of most of the units operating in the region are either very old or obsolete. The transfer of technologies and the implementation of appropriate technical solutions are therefore a prime necessity in the case both of those units in operation and of those to be created following the feasibility study.

The project will identify useful technology sources and the most appropriate technical industrial solutions to the problems to be solved in Africa. It will also seek technical partners from outside the region interested in joint ventures with African industrial operators, based on mutual advantage and industrial promotion in Africa.

On such matters the project will have recourse to the expertise of UNIDO, which has structures specializing in the transfer of technology and industrial project promotion.

d) *Promotion of local sub-contracting*

In the African countries, "turnkey" supply arrangements mean that all system components are imported. As mentioned earlier, even in their present state African industry and local craftsmanship would be able to supply some of those components, particularly non-complex ones in the initial phase. That would help to reduce investment costs and to increase their leverage effect within national economies.

Accordingly, the project will on the basis of UNIDO expertise strive to identify, as exhaustively as possible, local capacities in the sub-contracting area and to establish the assistance requirements of identified units, particularly with regard to the transfer of technology and know-how, training and equipment.

e) *Exploiting the region's natural resources*

Preliminary enquiries have shown that most of the raw materials used by the production units operating in the African countries are imported from countries outside the region, yet come originally from African countries, sometimes even the one in which the user unit is established. The impact of such triangular supply circuits on production costs - and therefore on unit prices - is considerable.

With a view to improving the supply conditions of regional telecommunication and electronics manufacturing units, the project will make as exhaustive an inventory as possible of the raw materials and various industrial inputs required and available in African countries. The inventory will be widely circulated among operators and industrial promoters.

f) *Creation of technical structures to support industry*

Consolidation of Africa's regional telecommunication market must be based on common standards of quality and capacity, which should be imposed on both local manufacture and suppliers from outside the region. This will require appropriate test, control and approval facilities.

To that end the project will foster the creation within each subregion of a test and control centre to support industry and sustain maintenance activities as a subregional management and quality reference centre. The arrangements for and sites of the centres will be determined in collaboration with ECOWAS, ECCAS, PTA and SADCC. Close coordination, particularly in that respect, will be established and maintained with the subregional maintenance centre projects developed by ITU, which should be able to carry out that function - so useful to coordinated industrial development - with assistance from UNIDO, particularly with regard to equipment and expertise. Major site savings could therefore be made.

2) Implementation procedures

The project will be executed by ITU as lead agency and UNIDO as associate agency. The terms of cooperation between them will be laid down in an inter-agency agreement.

The two agencies will collaborate closely with OAU, ADB, ECA and PATU, as well as with all other regional and subregional organizations concerned by the project.

They have agreed to the following arrangements:

a) The study will be executed by an international team of experts made up as follows:

Function/speciality	Staff	Source agency
Coordinator	1	ITU
Telecommunication experts	4	ITU
Industrial experts	3	UNIDO
Standardization expert	1	ITU
Research & Development Expert	1	UNIDO
Industrial finance analyst	1	UNIDO

Additional consultant services will be provided for very brief missions concerning highly specialized fields. The consultants will be appointed by ITU or UNIDO, depending on the field concerned.

ITU will be responsible for coordinating the project and for all activities relating to the detailed forecasting of long-term demand for plant and equipment, as well as for standardization,

UNIDO will be responsible for all industrial technical studies relating to existing and new units: definition and location of production facilities, organization of production, industrial training and transfer of technology and know-how.

b) Execution of the project will be organized in three successive phases as indicated in the table below and set out in Figure 9.

PHASE I:	– Survey of existing units and identification of existing industrial projects in the African countries – Creation of the INDUSTEL database
PHASE II:	– Regional feasibility study based on a detailed study of long-term needs for different types of plant and equipment – Study of support activities (standardization and research & development)
PHASE III:	– Execution of investment and assistance projects

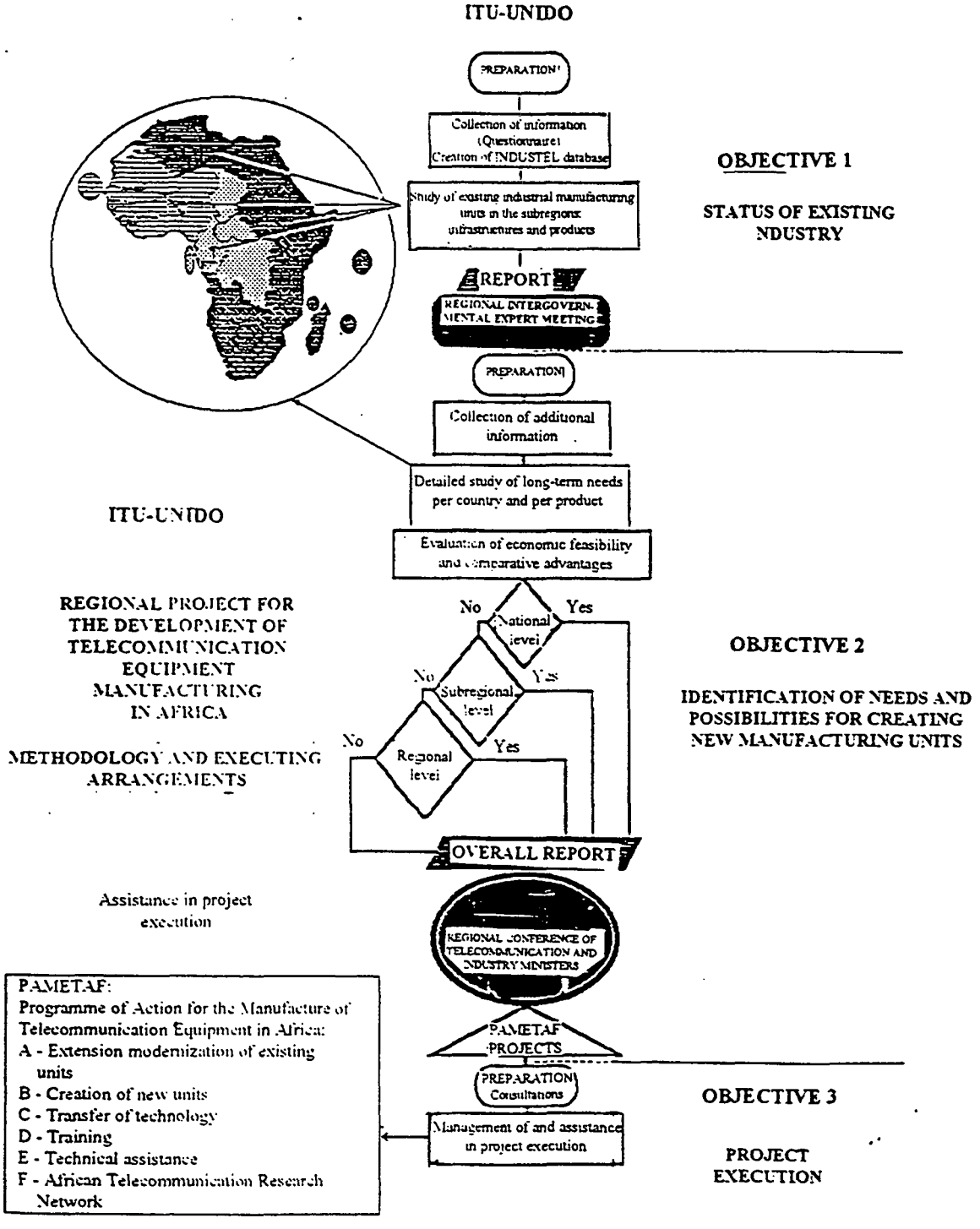

ITU-UNIDO
PREPARATION
Collection of information (Questionnaire)
Creation of INDUSTEL database
Study of existing industrial manufacturing units in the subregions: infrastructures and products
REPORT
REGIONAL INTERGOVERNMENTAL EXPERT MEETING
OBJECTIVE 1
STATUS OF EXISTING INDUSTRY
PREPARATION
Collection of additional information
Detailed study of long-term needs per country and per product
Evaluation of economic feasibility and comparative advantages
ITU-UNIDO
REGIONAL PROJECT FOR THE DEVELOPMENT OF TELECOMMUNICATION EQUIPMENT MANUFACTURING IN AFRICA
METHODOLOGY AND EXECUTING ARRANGEMENTS
No
National level
Yes
No
Subregional level
Yes
No
Regional level
Yes
OBJECTIVE 2
IDENTIFICATION OF NEEDS AND POSSIBILITIES FOR CREATING NEW MANUFACTURING UNITS
OVERALL REPORT
Assistance in project execution
REGIONAL CONFERENCE OF TELECOMMUNICATION AND INDUSTRY MINISTERS
PAMETAF PROJECTS
PAMETAF:
Programme of Action for the Manufacture of Telecommunication Equipment in Africa:
A - Extension modernization of existing units
B - Creation of new units
C - Transfer of technology
D - Training
E - Technical assistance
F - African Telecommunication Research Network
PREPARATION Consultations
Management of and assistance in project execution
OBJECTIVE 3
PROJECT EXECUTION

FIGURE 9

The objective in Phase I is to assemble all relevant information concerning the existing production units in the region and their products, and to identify the assistance requirements of those units with a view to improving their production capacity and/or product quality, business organization and training.

Phase I will comprise the following four main sequences:

1) Preparation of the survey.

2) Survey missions to the countries.

3) Preparation and dissemination of the report.

4) Intergovernmental meetings of experts and industrial promoters.

The intergovernmental experts involved in the meeting are:

– Directors-General of Telecommunications.

– Directors-General of Industrial Development.

The purpose of the meeting will be to examine the reports on the present status of telecommunication plant and equipment manufacturing in Africa, together with all relevant information including outlines of the main problems affecting the operation of industrial units and proposals for solving them.

The objective in Phase II is to make a study of all the African countries' telecommunication plant and equipment needs, to decide precisely and justifiably which products might be considered for manufacture on a sound economic and financial basis, and to pinpoint the criteria and terms of such feasibility at the national, subregional or regional levels as the case may be. Special emphasis will be placed on factors likely to help in developing and strengthening cooperation between the countries of the region.

Phase II will include:

i) an in-depth study of long-term demand (15 years) for different types of plant and equipment;

ii) technical, financial and economic feasibility evaluations accompanied by Recommendations on the arrangements and procedures to be followed for setting up production units, where necessary. The evaluations will clearly indicate comparative advantages and make an inventory of raw material availabilities in the different countries and national potentials with regard to human resources in the specialized fields required;

iii) an inventory of available technologies appropriate for solving specific problems of the region based on a cost-benefit trade-off. The respective recurrent charges will also be indicated;

iv) a detailed study of industrial partnership both between operators in African countries and between them and those of countries in other regions. The study will define the conditions and obligations likely to favour the establishment of joint ventures geared to transfers of technology for the benefit of African countries, among other advantages;

v) a study of needs in the field of product standardization, based on relevant experience acquired in the other ITU regions; regional standardization will seek to overcome obstacles to interworking, facilitate the constitution of joint spare-part stocks and help reduce supply,

operating and maintenance/repair costs. The study will be based on a thorough knowledge of network operating conditions and service objectives; in particular, it will take account of regional objectives for setting up an economic community;

vi) a study of the organization of telecommunication research. This will seek to determine the conditions and criteria for creating a regional network of telecommunication research centres, based on existing or planned national institutions in the sector and on the principle of specialization to avoid any redundancy in the programmes of activities of the countries of the region;

vii) a meeting of telecommunication and industry experts in each of the subregions to examine the reports mentioned and prepare a draft programme of action which takes account of the specific context of the subregion and the level of development reached in implementing its economic integration strategy;

viii) conference of telecommunication and industrial development ministers, to be preceded by a preparatory meeting of experts.

The intergovernmental experts involved in the above meetings are:

- Directors-General of Telecommunications.
- Directors-General of Industrial Development.

The regional preparatory meeting of experts referred to in viii) above will have to examine the report on all the Phase II studies and prepare, for the conference of ministers, recommendations on the investment projects to be promoted, the cooperation agreements to be conducted and the joint venture arrangements to be established.

The conference referred to in viii) will bring together the ministers responsible for telecommunications and industry in all the States of the region.

The purpose of this conference will be to take appropriate decisions, binding upon the governments participating in the project, on the different aspects dealt with in the report of the meeting of intergovernmental experts, including the number and nature of the projects to be executed in Phase III, which are classed in six types:

A projects to extend and/or modernize existing units;

B investment projects for creating new production units;

C transfer-of-technology projects;

D training projects;

E technical assistance projects;

F projects relating to the African Telecommunication Research Network.

The conference will agree on the steps to be taken by States to facilitate industrial cooperation and on those likely to foster the consumption of products by the countries of the region, according to criteria to be agreed.

ADB, UNDP, the ADFIs, the African organizations and economic and industrial operators concerned will be invited to attend the meeting of experts and the conference of ministers.

The objective in Phase III is to offer the necessary management and assistance for executing the Programme of Action for Telecommunication Equipment Manufacture in Africa (PAMETAF), which will consist of all the investment, assistance and study projects identified by the end of the Phase II study and classified as indicated above.

The main players in this phase will be the public and private promoters concerned and interested, both African and from outside the region: industrial operators, sources of funding and public telecommunication operators.

Phase III will comprise three groups of activity:

1) preliminary consultations with partners (public and private operators, both African and from outside the region);

2) assistance in the execution of the industrial promotion programme;

3) close-of-project conference.

Details of activities in each of the three phases are given in Part D of this document.

B.5 Justification for priority to aid from ADFIs

Financial assistance from within the region would be seen by the international community as a firm reflection of Africa's will, through its specialized intergovernmental institutions, to increase its direct participation in solving its development problems, particularly in such decisive areas of the modern economy as telecommunications and industrialization. Such intervention will also reduce any undesirable influences which might result from too marked a predominance of financing from outside the region other than that received from UNDP and specialized agencies of the United Nations system.

Financial intervention by the ADFIs would also be bound to have a locomotive effect on initiatives to assist the project on the part of a number of multilateral institutions.

B.6 Special considerations

The project will help to promote and strengthen technical cooperation between developing countries (TCDC) in such fields as the creation of common industrial units, exchanges of experience and products, the transfer of technologies and know-how, expertise and training.

It is designed to support the African governments' economic strategies for encouraging the use of technology in the service of development, reducing the foreign debt and promoting national private-sector intervention in industrial development.

The project will also ultimately help to reduce the foreign debt of African States and improve their foreign trade balances.

The electronics and electromechanical industries planned for creation under the project generate a wide variety of jobs, particularly for women and young university and professional graduates. The project will therefore make a major contribution to the policies of African governments for reducing unemployment.

Lastly, since production is aimed on a priority basis at meeting the domestic needs for basic telecommunication facilities, the project will significantly foster an improvement in telephone penetration rates, particularly in the poorest regions of the African countries which, in the context of regional under-equipment, are still the least endowed with modern communication facilities.

B.7 Cooperation agreements

The two United Nations specialized agencies will agree on a schedule of meetings and on ongoing procedures for monitoring and evaluating the performance of all the activities assigned to the project's International Technical Team (ITT).

At the subregional level, each cooperation organization will appoint one of its own officials as project correspondent for the entire execution period.

The project will endeavour in particular to secure the collaboration and assistance of each of the different subregional organizations for coordination purposes.

At the national level, given the multidisciplinary nature of the project, a National Support Group (NSG) will be set up in each country. This will comprise two national experts appointed by the government, one in telecommunications to serve as national coordinator, the other in industrial development.

The NSG will be responsible for collecting all data and information required by the international team. It will serve as a liaison body between the project office and the national institutions.

At the subregional level, each cooperation organization will appoint one of its own officials to serve as project correspondent for the entire execution phase.

The cooperation arrangements are summarized schematically in the chart in Figure 10.

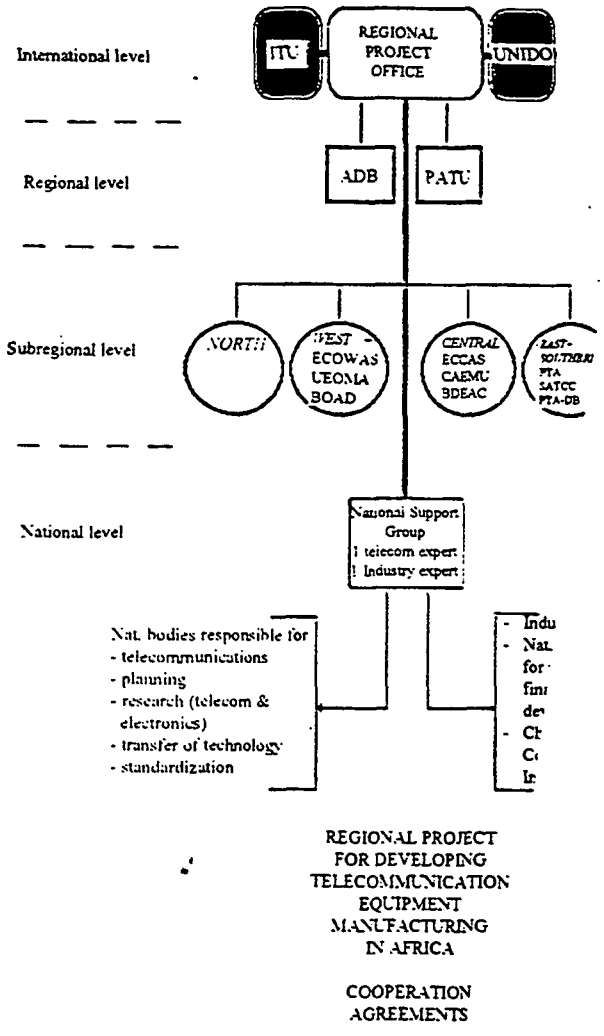


FIGURE 10

B.8 Support and counterpart capacity

The governments of the participating countries and their subregional cooperation organizations have the necessary support capacity and have indicated that they will provide the project's ITT with the assistance required for the proper performance of the activities envisaged.

The government of each country will provide the project with the following services:

a) appointment of the NSG members;

b) provision free of charge to the ITT during its mission to the country of the logistic facilities needed for the performance of its activities: an office, secretarial assistance, local transport facilities and telecommunication facilities.

The associate subregional organization will do all in its power to provide effective support for the project activities. It will provide the following services:

a) facilitation of contacts with governments and other organizations if necessary;

b) appointment of an official responsible for relations with the project and for subregional supervision and coordination of the project activities.

ITU and UNIDO will collaborate with the ADFIs and the regional and subregional organizations concerned in the material organization of the meetings of experts and conference of ministers, the contribution and responsibility of each partner being defined by common agreement.

PART C - DEVELOPMENT OBJECTIVES

The medium - and long-term objective is to enable the African countries to master the creation and operation of national, subregional and regional industries in the telecommunication sector so that they can develop in an organized and progressive manner towards relative self-sufficiency in that area.

PART D - IMMEDIATE OBJECTIVES, OUTPUTS AND ACTIVITIES

1 First objective - Phase I

To determine as exhaustively as possible the status of telecommunication plant and equipment manufacturing in Africa.

Output 1.1: Report on the status of production, by country and by product.

Activities	Tasks	Responsibility
1.1.1	Preparation of a questionnaire covering all the fields related to execution of the project, and circulation to countries and subregional IGOs	UNIDO
1.1.2	Visits to countries and IGOs for collecting unreturned questionnaires and/or further information	UNIDO
1.1.3	Collection of information relevant to the project from international and regional organizations (ITU, UNIDO, UNESCO, ADB and ECA)	ITU
1.1.4	Detailed analysis of replies to the questionnaire	ITU UNIDO
1.1.5	Preparation of the report on the status of the telecommunication industry in Africa. The report will contain, *inter alia*, detailed information on enterprises and the organization of their production, products and unit prices. Its content should give telecommunication operators clear information on the region's supply potential	UNIDO

Output 1.2: Creation of the INDUSTEL database.

Activities	Tasks	Responsibility
1.2.1	Elaboration of screens	UNIDO
1.2.2	Capture of data from the regional questionnaire, analysis and formatting	UNIDO
1.2.3	Initial data input	UNIDO

Updating the INDUSTEL database is a permanent activity which will be performed by UNIDO in cooperation with the ITU/BDT Information Service.

Output 1.3: Intergovernmental meeting of experts on industrialization in the telecommunication field.

Activities	Tasks	Responsibility
1.3.1	Dissemination of the report (task 1.1.5) to all African Governments, the ADFIs, the regional and subregional IGOs and operators/industrial promoters concerned	UNIDO
1.3.2	Meeting of intergovernmental experts (DGs of telecommunications and industrial development) with participation by organizations concerned and both public and private sector industrialists/economic promoters	UNIDO ITU

Means of verifying attainment of the objective: availability of the report, operation of the database and the final report of the meeting of intergovernmental experts.

The activities for this objective are currently under way.

2 Second objective - Phase II

Feasibility study for the production of telecommunication plant and equipment in Africa, based on an in-depth study of needs for the different types of plant and equipment.

Output 2.1: Identification of types of investment projects to be promoted.

Activities	Tasks	Responsibility
2.1.1	Detailed study of the status of telecommunications in the countries of the region: development, installed capacities, operational assessment of the different types of plant, useful information on manufacturers, unit costs, mean recurrent expenses, etc.	ITU
2.1.2	Exhaustive inventory of the national telecommunication network development hypotheses of all countries, based on master plans, RASCOM forecasts, UNTACDA objectives and other hypotheses envisaged in the countries	ITU
2.1.3	Determination of the volume of demand for the main types of equipment by country and subregion	ITU
2.1.4	Inventory of technologies available for manufacturing the different types of plant and equipment identified in 2.1.3, together with an indication of the respective costs of those technologies, including recurrent expenses, and all relevant information on procurement conditions and aspects relating to training	UNIDO
2.1.5	Technical, economic and financial evaluations of the feasibility of investment projects at the national, subregional or regional levels	ITU UNIDO ADB
2.1.6	Identification of possible sources of financing	ADB UNIDO ITU
2.1.7	Preparation of the feasibility report, together with recommendations on the inter-State arrangements to be agreed, regional partnerships and partnerships with countries outside the region to be established, technologies to be acquired and all other measures likely to foster the promotion of local telecommunication manufacturing	ITU UNIDO ADB

Output 2.2: Study of manufacturing support activities: Research & Development.

Activities	Tasks	Responsibility
2.2.1	Analysis of replies to the part of the regional questionnaire relating to research & development	UNIDO
2.2.2	Collection of any further information needed from countries and the international and regional organizations concerned (ITU, UNIDO, UNESCO, PATU, etc.) and from non-African national/regional institutions	UNIDO
2.2.3	Identification of cooperation opportunities in R&D between African countries and between them and countries outside the region	UNIDO
2.2.4	Preparation of a detailed report on R&D for the telecommunication and general electronics industries in the African countries. This will indicate needs in the R&D area and include recommendations on the institutions to be created, research projects to be undertaken and the establishment of a regional African research network focusing on telecommunications and electronics	UNIDO

Output 2.3: Study on manufacturing support activities: Standardization.

Activities	Tasks	Responsibility
2.3.1	Analysis of replies to the part of the regional questionnaire concerning standardization	ITU
2.3.2	Collection of any further information needed from countries and from specialized and/or concerned international and regional organizations, as well as from non-African national/regional institutions	ITU
2.3.3	Identification of plant, equipment or procedure areas in which it would be useful to undertake standardization activities in Africa	ITU
2.3.4	Preparation of a detailed report on standardization in the telecommunication field in Africa. This will indicate relevant needs and include recommendations on the institutions to be created and facilities to be implemented in the field	ITU

Output 2.4: Regional conference on industrialization in the telecommunication area.

Activities	Tasks	Responsibility
2.4.1	Preparation of the general report on the execution of Phases I and II and of the action taken by the executing agencies pursuant to the decisions of the intergovernmental meeting of experts under Phase I	ITU UNIDO ADB
2.4.2	Dissemination of the general report to all African governments, the ADFIs, regional and subregional IGOs and operators/industrial promoters concerned, and invitation of the above to the ministerial conference	ITU UNIDO ADB
2.4.3	Ministerial conference: – Ministers responsible for telecommunications – Ministers responsible for industrial development – International, regional and subregional organizations – ADFIs – industrial operators and economic promoters The conference will have to adopt the programme of the Plan of Action for Telecommunication Equipment Manufacturing in Africa (PAMETAF), which constitutes Phase III of the regional project. It will determine the priority products to be promoted for local manufacture and partnership arrangements to be established and will agree on the most appropriate sites for setting up production units, based on criteria proposed by the study. The conference will establish a precise mandate for executing Phase III.	ITU UNIDO ADB

Means of verifying attainment of the objective: availability of the general report on Phases I and II and of the final report of the ministerial conference.

3 Third objective - Phase III

Execution of the Plan of Action for Telecommunication Equipment Manufacturing in Africa (PAMETAF).

Output 3.1: Preliminary consultations with partners.

Activities	Tasks	Responsibility
3.1.1	Consultations with the public telecommunication operators of African States on their participation in the setting up of industrial enterprises in association with regional and non-regional private partners	ITU UNIDO ADB
3.1.2	Consultation with subregional and regional federations of chambers of commerce and industry on procedures for implementing the decisions of the conference, and concerted determination of the nature and scope of those institutions' contribution to the regional programme of action	ITU UNIDO ADB
3.1.3	Consultations with ADFIs and other potential sources of financing with a view to their participation in implementing investment projects	ITU UNIDO ADB
3.1.4	Consultations with the leading manufacturers of equipment in service in the African countries, and with industries of various countries, particularly in developing regions, with a view to involving them in the promotion of local manufacture	ITU UNIDO ADB

Output 3.2: Assistance in executing the industrial promotion programme.

Activities	Tasks	Responsibility
3.2.1	Assistance to promoters for carrying out feasibility and implementation studies relating to investment projects, and for mobilizing finance	ITU UNIDO ADB
3.2.2	Assistance to existing industrial units: – organization and management – modernization – extension	ITU UNIDO ADB
3.2.3	Assistance for implementing the regional telecommunication research network	ITU UNIDO
3.2.4	Implementation of standardization options	ITU UNIDO
3.2.5	Assistance in the fields of training and transfer of technology	UNIDO ITU

Output 3.3: Close-of-project conference.

Activities	Tasks	Responsibility
3.2.1	Preparation and dissemination of a final regional project evaluation report	ITU UNIDO ADB
3.2.2	Conference of ministers responsible for telecommunications and industrial development. This will have to examine the final PAMETAF* implementation evaluation report and if necessary decide on the nature of any follow-up action needed.	UNIDO ITU ADB

Means of verifying attainment of the objective: availability of the final evaluation report and the report of the ministerial conference.

PART E - INPUTS

E.1 Host-country government inputs

1.1 Furnished and equipped offices for the ITT experts.

1.2 Telecommunication installations offering free service communications.

1.3 Exemption from all customs duties and fiscal dues on equipment intended for the project, including those of the ITT experts, on entering and leaving the host country.

1.4 The services of a secretary if possible.

E.2 Participating government inputs

2.1 Appointment of the national counterpart personnel indicated in B.7.

2.2 Free service communication facilities.

2.3 Local transport for the project experts during their study visit, including outside the capital.

2.4 Support staff for the project experts during their stay in the country.

2.5 Exemption from all customs duties and fiscal dues on equipment intended for the project, including those of the ITT experts, on entering and leaving the participating country.

E.3 International and regional inputs

PHASE I = Implemented from Italian financing to UNIDO:
- 1 team of consultants - Italy
- 1 internationally recruited telecommunication expert
- 1 internationally recruited analyst-programmer

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* Programme of Action for Telecommunication Equipment Manufacturing in Africa.

PHASES I & II	=	1 coordinator	=	29 m/m
		1 computer specialist	=	27 m/m
		various consultants	=	8 m/m
PHASE II	=	3 telecom experts	=	27 m/m
		2 industry experts	=	16 m/m
		1 standardization expert	=	2 m/m
		1 research expert	=	3 m/m
		1 financial analyst	=	4 m/m
PHASE III	=	1 telecom expert	=	16 m/m
		1 industry expert	=	16 m/m

The overall schedule for implementing the activities is annexed hereto.

PART F - RISKS

1) Delays in securing the funds needed for starting the regional project.

2) Difficulties in securing the information required from governments, telecommunication operators and other parties to the project, IGOs, industrial operators, etc.

PART G - PRIOR OBLIGATIONS AND PREREQUISITE CONDITIONS

G.1 Prior obligations: none.

G.2 Prerequisite conditions: none.

PART H - FOLLOW-UP, REPORTS AND EVALUATION

At least once every twelve (12) months, the project will be subject to a tripartite review (representatives of governments, the executing agencies - executing and associate agencies - and ADFIs). The first such meeting will take place within the twelve (12) months following the start of the regional project.

The executing agency's chief project manager (coordinator) will prepare an evaluation report on the results of the project for submission to the tripartite review. Other reports may be required if necessary within the duration of the project.

A final draft report will be drafted for the final tripartite review. A preliminary draft version will be prepared in advance to enable the executing agency to examine and approve it at least four months before the final tripartite review.

PART I - LEGAL CONTEXT

This project document constitutes the instrument of execution of the Resolutions and Recommendations adopted by the African governments and addressed to ITU, UNIDO and other development financing and aid institutions, aimed at securing assistance for the creation of a regional telecommunication equipment manufacturing capacity in Africa.

The executing agent in each country will be the governmental cooperation organ mentioned in the final paragraph of Section A.4.

The following changes may be made to the project document only if signed by the ADFI representative, provided he has the assurance that the other signatories to the project document have no objection to the changes proposed:

a) amendments or additions to the annexes to the project specifications;

b) amendments which have no appreciable impact on the immediate project objectives, results or activities but relate to the evolution of the combinations of inputs already agreed or to cost increases due to inflation;

c) compulsory annual reviews for rescheduling anticipated project inputs, inflation-related increases in expert expenditures or other costs, in keeping with the financial flexibility of the body in question.

PART J - BUDGET

The project budget is indicated overleaf.

BUDGET FOR PROJECT RAF/95/

Project components		Total		1996		1997		1998	
		m/m	$	m/m	$	m/m	$	m/m	$
15	INTERNATIONAL EXPERTS								
11.01	Coordinator	29	331 200	7	78 400	12	136 800	10	116 000
.02	Telecom expert.(ECOWAS)	18	212 800	6	68 400	5	63 200	7	81 200
.03	Telecom expert (ECCAS and NORTH)	11	131 600	6	68 400	5	63 200		0
.04	Telecom expert (PTA)	11	131 600	6	68 400	5	63 200		0
.10	Industry expert (ECOWAS & NORTH)	18	212 800	6	68 400	5	63 200	7	81 200
.11	Industry expert (ECCAS & PTA)	11	131 600	6	68 400	5	63 200		0
.20	Financial analyst	4	53 240	1	15 310	3	37 930		0
.40	Research expert	3	37 930		0	3	37 930		0
.41	Standardization expert	2	26 620		0	2	26 620		0
.50	Consultants	8	103 080	2	26 620	3	37 930	3	38 530
11.99	Sub-total	115	1 372 470	40	462 330	48	593 210	27	316 930
12	ADMINISTRATIVE SUPPORT STAFF		58 000		14 000		24 000		20 000
14	UNV (Computer expert)	27	81 000	5	15 000	12	36 000	10	30 000
15	Travel		240 000		80 000		100 000		60 000
16	Mission costs		48 000		16 000		18 000		14 000
19	COMPONENT TOTAL		1 799 470		587 330		771 210		440 930
30	TRAINING								
32	Group training		135 000		15 000		60 000		60 000
39	COMPONENT TOTAL		135 000		15 000		60 000		60 000
40	EQUIPEMENT								
41	Recoverable equipment (office material)				10 000		5 000		3 000
	Non-recoverable equipment		65 000		40 000		20 000		5 000
39	COMPONENT TOTAL		65 000		50 000		25 000		8 000
50	MISCELLANEOUS								
52	Report costs		51 000		1 000		25 000		25 000
53	Miscellaneous		21 000		6 000		10 000		5 000
59	COMPONENT TOTAL		72 000		7 000		35 000		30 000
99	**PROJECT TOTAL**		**2 071 470**		**659 330**		**891 210**		**538 930**

ANNEX 1

(Project document)

Development of telecommunication equipment manufacturing in africa
Telephone network plant and equipment according to industrial origin

	SUBSCRIBER TERMINAL SYSTEM	CONNECTION SYSTEM	SWITCHING SYSTEM	TRANSMISSION SYSTEM
	* inside ** specific user needs	* inside ** local environmental characteristics	* inside ** number of subscribers, traffic/subscriber, traffic structure	* outside/inside ** local environmental characteristics, total traffic of network served, characteristics of corresponding networks (compatibility)
Industries of origin ELECTRONICS/ ELECTROMECHANICAL	telephone sets and facsimile machines, PABXs, computers, modems, shared line equipments, operator consoles	concentrators	public automatic switching exchanges, manual exchanges, computers, printers	antennas (circuits) and accessories (terrestrial/satellite), current carrier equipment/overhead lines, multichannel/single-channel radio systems, mobile radio systems, computers, printers
			POWER SUPPLY AND SUNDRY MAINTENANCE laboratory supply - generating set - wind-power generators - solar generators - rectifier-chargers - inverters test and measuring equipment electronic components printed circuit boards (PCBs) electromechanical relays and components	
CABLE	installation cables, leads	single-pair overhead cables, multi-pair overhead cables, multi-pair underground cables, wire	installation cables, cabling wire, leads, cable terminations, electric cables	installation cables, cabling wire, leads, electric cables
ELECTRO-CHEM.			starting accumulators, static accumulators, batteries	starting accumulators, batteries
METALLURGICALS		distribution cabinets, junction boxes, heavy-duty covers, metal posts, stays, ties, lead sleeves, bolts, sundry accessories	prefabricated shelters, cable ducts, distributor bars, fuses and supports, connections	antennas (structural), racks, prefabricated shelters, cable ducts, distributor bars, fuses and supports, connections
PLASTICS	terminal equipment boxes, cable connectors, telephone sockets	distribution cabinets, junction boxes, PVC ducts, insulators, sleeves, marker strips	prefabricated shelters, sundry accessories	prefabricated shelters, sundry accessories
Buildings, Public Works and Miscellaneous		shelters, concrete/fibro-cement ducting, heavy-duty covers, concrete posts, porcelain insulators	shelters	shelters

KEY: * installation site ** main factors affecting design

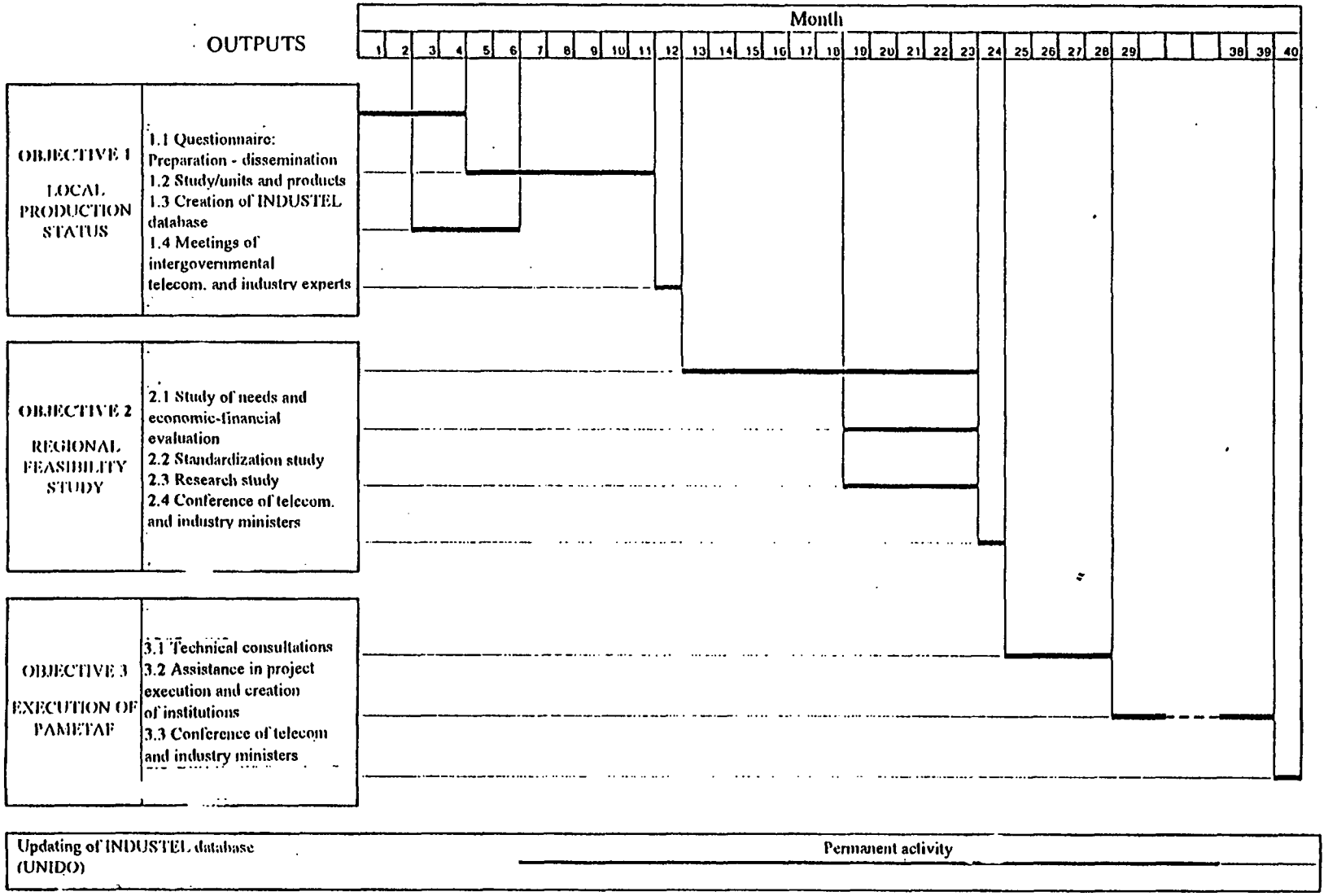
ANNEX 2

Project document

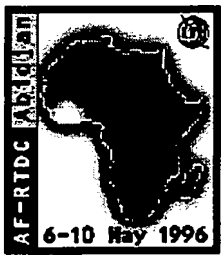
ITU

Project for the development of telecommunication equipment manufacturing in africa

GENERAL IMPLEMENTATION SCHEDULE



INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU



AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 15-E
3 April 1996
Original: English

For Information/Support

Agenda item: 2.4

PLENARY MEETING

SOURCE: SECRETARY-GENERAL, ITU

TITLE: DISASTER COMMUNICATIONS: DRAFT CONVENTION ON THE PROVISION OF TELECOMMUNICATION RESOURCES FOR DISASTER MITIGATION AND DISASTER RELIEF OPERATIONS

Report on follow-up and Implementation of Resolution 7 of WTDC-94 on Disaster Communications and Resolution 36 of PP-94 on Telecommunications for Disaster Mitigation and Disaster Relief Operations

Pursuant to Resolution 36 of PP-94, which endorsed Resolution 7 of WTDC-94, the three ITU Sectors have taken measures towards the implementation of these Resolutions under the overall coordination of the Secretary-General. Within the framework of Resolution 7 of WTDC-94, the sectors concerned have been working with the United Nations Department of Humanitarian Affairs **(DHA)** and the ad hoc Working Group on Emergency Telecommunications **(WGET),** which includes, *inter alia*, the Secretariat of the International Decade for Natural Disaster Reduction (IDNDR), major partners in humanitarian assistance such as United Nations agencies and offices, aid organizations, experts and advisors.

The work has concentrated on the main issues addressed in the Tampere Declaration on Disaster Communications, which is annexed to Resolution 7 of the ITU/WTDC-94, and in particular includes:

a) preparations for the adoption of an International Convention on the Facilitation of Telecommunications for Disaster Mitigation and Disaster Relief Operations by an Intergovernmental Conference in late 1996 or 1997;

b) encouraging measures to apply the ITU Resolutions relevant to disaster telecommunications;

c) exchanging and disseminating information concerning emergency telecommunications and promoting cooperation in the use of field telecommunications.

Charging and accounting in domestic and international disaster telecommunications, are also being studied within the **WGET**. A waiver of charges for emergency telecommunications during the acute phase of a disaster already has been obtained from one Communications Satellite Operator.

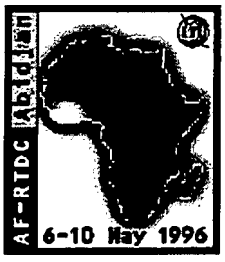
Thanks to the ITU initiatives, the subject of Emergency Telecommunications attracted wide attention during the Strategies Summit at the TELECOM 95 Forum (Geneva, October 1995). In 1996, a special session of the Strategies Summit of the America's TELECOM Forum (Rio, 10-15 June 1996) will be devoted to this subject.

The **WGET** has prepared a draft text for the **"International Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Disaster Relief Operations"**. This draft Convention is composed of 21 Articles. It is foreseen that the ITU may have a specific role as technical coordinator with responsibility for information exchange in the following Articles of the Convention:

- Article 7: Telecommunication Resource Inventories
- Article 8: Telecommunication Assistance Plans
- Article 9: Regulatory Barriers
- Article 12: Competent Authorities and Points of Contact.

Resource implications for the Union's involvement in eventual implementation of the Convention are currently being assessed. The 1996 Session of the ITU Council will be informed of developments and further guidance is expected to be received from it as to the role of ITU under the Convention.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU



AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 16-E
3 April 1996
Original: English

For Information/Support

Agenda item: 2.4 **PLENARY MEETING**

SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU

TITLE: NEW INITIATIVES: THE UNITED NATIONS SYSTEM-WIDE SPECIAL INITIATIVE FOR AFRICA

The UN System-wide Special Initiative on Africa (UNSSIA) was officially launched on 15 March 1996 in New York by the UN Secretary-General Mr. Boutros Boutros-Ghali with a live satellite link-up to Addis Ababa where the Ethiopian Prime Minister and current OAU Chairman Mr. Meles Zenawi and the OAU Secretary-General Dr. Salim Ahmed Salim provided official response on behalf of Africa.

The objectives of the UNSSIA are, to add momentum to Africa's development, strengthen the capacity of African men and women to take charge of the development process and to promote the minimum conditions for civil tranquillity, good governance and socio-economic progress in order to give development a chance. It also seeks to give more hope to upcoming generations through better education, health care and employment opportunities.

The total financing for the Initiative is estimated at $25 billion over 10 years and four major actions and themes will be covered:

1 **Give development a chance**

- Peace-building, Conflict Resolution and National Reconciliation
- External Support for Africa's Economic Transition
- Domestic Savings and Investment
- Information Technology (IT).

2 New hope for the upcoming generation

- Basic Education for All African Children
- Health Sector Reform
- Employment and Sustainable Livelihoods.

3 Strengthening the capacity for governance

- Building capacities for good and accountable governance
- Strengthening the capacities of civil society.

4 Urgency on survival issues

- Food Security and Drought Management
- Water Security.

The ITU will be involved, together with several other actors within the UN system as well as outside it in the fourth item of the first theme i.e. Information Technology and systems which will be fostered to improve intra-African links as well as those with the rest of the world.

Details of actions on IT have been reproduced in Annex 1 to this document, entitled, Harnessing information technology for development.

Annex 2, Questions and answers will serve to answer relevant questions that may be generated by the Special Initiative.

ANNEX 1

4 Harnessing information technology for development

89. A number of African states, centres of commerce and learning in Africa, as well as public and private donors (including UNESCO, World Bank, ECA, UNDP, IDRC, ITU, UNCTAD, Carnegie Corporation of New York and USAID), have been actively working to expand information networking and telecommunications systems in Africa. In the course of this exercise, proposals have been submitted by the working group chaired by UNESCO and by ECA-World Bank. In some countries it is clear that the private sector will take the lead in developing information networking systems, but in others it may well take a combination of new policies and direct support by regional and international institutions to make networking a reality.

90. The rationale for such support is strong. Unless African countries become full actors in the global information revolution, the gap between the haves and have-nots will widen, opening the possibility of increased marginalization of the continent. On the other hand, participating in the information society offers tremendous opportunities for Africa to leapfrog over past development deficiencies into the future. African scientists and researchers can participate fully in the global scientific community through direct access to the Internet, the global network of networks. Throughout the region, particularly in rural areas, people will have dramatically increased access to communications and information, accelerating and bolstering sustainable development.

91. Education, health and trade as well as regional and international cooperation will be vastly strengthened by enhanced telematics infrastructure in the region - at modest investment costs compared to those of any other sector. An increased flow of information also will increase Africa's participation in the global dialogue on issues such as the environment, human rights and democratization.

92. Most of the current constraints to African entry into the global information society lie in the area of policy, human infrastructure and culture. African leadership must seize available opportunities and avoid increasing marginalization. It requires trained personnel to operate and utilize the new systems that will be introduced. Changes are also necessary in attitudes about information and its use - creating cultures that are information-hungry and information-sharing.

93. The ECA and the World Bank are both undergoing internal re-examination of their approaches to key strategic issues for the African continent, placing information technology high on their priority lists. Other donors (including USAID, IDRC and UNDP) are also interested in this field and will be involved. The World Bank has launched InfoDev as a global initiative to facilitate the access of developing countries to the information revolution. This activity is an African initiative that links up with InfoDev, the global initiative, and accelerates Africa's chances to take advantage of opportunities and to prepare to face the challenges of the information revolution. In joining ECA in an effort to harness information technology for development under this activity, InfoDev and the World Bank see an opportunity for great synergy, UNESCO, building on the Regional Informatics Network for Africa project of its Intergovernmental Informatics Programme, has been working closely with both the ITU and ECA to establish appropriate conditions to improve access to telematic facilities for development in Africa. The activity will address the following areas:

- Awareness-raising: Securing the necessary policy reform for African participation in the Information Age through a series of national and regional efforts. Policy issues to be addressed include permitting information access and permitting private initiatives, where likely to flourish. Deregulation and privatization issues may be involved. Private sector interest should be assessed, and, as appropriate, involved in national consultations.
- Strategic analysis of opportunities and dangers: Providing forums for African leaders to promote dynamic change in this area; involvement of African stakeholders in the information revolution. Undertaking essential studies to reposition policies to facilitate African countries' participation in the information society.
- Increase connectivity: Setting up infrastructure for full Internet connectivity in pilot countries.
- Applications: Promoting the development and dissemination of user applications in key sectors to strengthen Africa's competitive position in the rapidly changing global economy. Special attention will be given to weaving in women's organizations and gender information.
- Training: Building capacities in Africa for computer networking and for using informatics in development decision-making and sectoral programmes.

94. An estimated cost of $11.5 million would be involved. This programme would cover 20 countries in Africa. It is expected that an additional 20 countries will be covered under a project expected to shortly be approved by USAID.

95. The ECA, World Bank, UNESCO, ITU and UNCTAD, will work together as the lead agencies. Their first tasks will be to (i) establish their division of responsibilities, (ii) to involve other interested donors, and (iii) to establish a fully collaborative process with African governments. The International Development Research Centre (Canada), UNIDO, the Carnegie Corporation of New York, the Global Information Infrastructure Commission and the Internet Society (USA) have indicated their willingness to participate in all aspects of this endeavour. Other interested donors to be approached include UNDP, USAID, and development assistance agencies in countries such as France, Germany, Italy and Japan. The World Bank Economic Development Institute, working with the Institute of Development and Economic Planning (IDEP), sponsored by ECA, would be the major facilitators for awareness raising and training. The initiative would work in close cooperation with the Africa Internet Forum. African countries which have taken a catalytic role in this area would join a Steering Committee for the project: these include Egypt, Senegal and South Africa. In the field of telecommunications, efforts will concentrate on strengthening what has so far been achieved by African countries.

96. Implementation of this priority will entail the following:

- national policy and sectoral workshops to intensify policy dialogue on regulatory frameworks;
- regional commission on information technology and communications;
- installation of Internet nodes with local servers, to provide Internet services through very small aperture terminals (VSATs, or small satellite earth stations) in eight countries;
- training systems engineers and operators and information users throughout Africa in computer networking;

- applications development and dissemination, drawing upon UNIDO's experience especially in applying informatics to industry; and
- establishment and operation of an electronic clearinghouse on African development information.

97. Operating principles will include: encouragement of competitiveness and African private sector development in information service provision; necessity of policy reform in telecommunications deregulation to permit competitiveness and private sector participation in the provision of value added services and the licensing of VSATs; utilization of local resources and established information bases; encouragement of South-South cooperation through repatriation of skills of Africans trained abroad; and technical assistance from other developing countries with experience in this area.

ANNEX 2

System-wide
Special Initiative
on AFRICA

Questions and Answers

1 What is the UN System-wide Special Initiative on Africa?

Led by the entire UN system, the Special Initiative is an unprecedented set of concrete and coordinated actions designed to maximize support for African development efforts. It begins with a year-long political mobilization campaign to raise Africa's priority status on the international agenda and to provide a new stimulus to African development. This Initiative is historic because, for the first time, the UN system has committed itself to working in a synergistic manner to support the development of a continent's people.

2 What are the objectives of the Special Initiative?

The Special Initiative's objectives are to add momentum to Africa's development at a time when prospects for economic recovery are greater than they have been in recent years. Many African countries are creating an enabling environment of accountability and better governance. Growth rates are picking up and conditions for investment and production are improving rapidly for local and foreign entrepreneurs. These are all positive indicators for accelerating development efforts.

The Initiative will strengthen the capacity of African men and women to take charge of the development process and promote the minimum conditions for civil tranquillity, good governance and socio-economic progress in order to give development a chance. It will also seek to give more hope to upcoming generations through the provision of better education, health care and employment opportunities.

3 What are the main components of the Special Initiative?

The Special Initiative has 14 components concentrated in the following sectors: basic education, basic health, governance, food security, water and sanitation, peace-building and informatics. To facilitate implementation of these components, innovative ways to improve development cooperation and increase aid effectiveness have been devised.

UN System-wide
Special Initiative
on AFRICA

4 How much will the Special Initiative cost and where will the money come from?

Up to $25 billion will be required to finance the Special Initiative over a 10-year period. Financing will come mainly from a redirection of existing resources at national and international levels, as well as from new resources. The exact mix will be determined through a series of consultations at the regional and national levels.

The Initiative proposes three mechanisms for resource mobilization. First, multilateral and bilateral donors are to create goal-oriented regional forums to raise resources for key sectors. Second, African governments are to prepare goal-oriented country investment programmes to maximize the impact of

internal and external resource mobilization. Third, participation in Consultative Group and Roundtable meetings is to be broadened to encourage involvement and participation of non-traditional partners, such as leaders of business and civil society. The Initiative recommends other ways of releasing funds for development, including deeper debt relief, an expansion of Africa's trade opportunities and enhanced South-South cooperation.

5 Can the UN deliver its part of the Initiative during its budgetary crisis?

The current financial difficulties of the UN do not justify any reduction in its activities in Africa, a continent it has identified as the world's foremost development challenge. The financial implications for the Secretariat, the most hard-pressed part of the system, are quite small. Operating agencies, including the World Bank and other multilateral and bilateral donors, are expected to meet the external financial resource requirements for the various components of the Initiative. With the UN playing a catalytic role, the commitment of the heads of all UN agencies ensures an unprecedented level of concerted action.

6 Will Member States support the Special Initiative?

Since 1986, Member States have directed the UN to give special attention to Africa. In various UN programmes unanimously adopted by Member States, they have jointly identified the most significant challenges facing the continent and the most appropriate ways of addressing them. The Special Initiative begins with a one-year campaign to mobilize the political and financial support required for successful implementation. Early consultations with a number of countries indicate that this Initiative is welcomed, and further intensive consultations are planned at the national, sub-regional and regional levels. The participation of the chairman of the Organization of African Unity in the launching of the Special Initiative demonstrates the offi-

cial recognition and support given to it by the leadership of Africa. A major meeting of Africa's ministers of finance and planning reviewed the Initiative in depth, and other ministerial meetings on the continent have also endorsed it.

7 How does this Initiative differ from past UN programmes for Africa?

The Initiative is innovative because it aims to give practical expression to the policy commitments made in the past, such as the UN New Agenda for the Development of Africa in the 1990s (UN-NADAF) and the UN System-wide Plan of Action for African Recovery and Development. Second, financial mobilization will take place with the full cooperation of the World Bank. Third, specific leadership roles are taken by agencies across the UN system for each of the 14 major components of the Initiative. Fourth, the heads of UN agencies will hold themselves mutually accountable for achieving results.

8 Who will be in charge of the Special Initiative and how will it be managed?

For each of the major components of the Initiative, a lead UN agency or agencies will be responsible for resource mobilization and for coordinating implementation. All 14 major components of the Initiative respond to priorities established by African leaders, and almost all the programme implementation will be based on requests from African governments. The UN Administrative Committee on Coordination, composed of the heads of all UN agencies, will monitor implementation of the Special Initiative through a Steering Committee

co-chaired by the Administrator of the UN Development Programme and the Executive Secretary of the UN Economic Commission for Africa.

9 What is the World Bank's role in the Special Initiative?

The Bank has agreed to lead in the resource mobilization for the two largest components of the Special Initiative: basic education and health reform. It is also expected to play an active role in all other components of the Special Initiative.

10 Why is so much emphasis being given to basic education?

In recent years consistent evidence has shown that basic education, particularly for girls and women, is the best possible development investment. Basic education is strongly correlated with a number

of desirable outcomes: greater participation in democracy, more productive farmers, better family planning and higher incomes. The Special Initiative intends to help Africa meet the goal of universal basic education adopted at the UN's Education for All Conference in 1990. Strengthening and expanding access to basic education may also give some impetus to expanding opportunities in higher and tertiary education.

11 Why is there so much emphasis on social development?

The international community has agreed, most recently at the 1995 World Summit for Social Development in Copenhagen, that improved social conditions are of critical importance for balanced development. It is also recognized that Africa's economic crisis has led to cutbacks in social spending in recent years and a reversal in some countries of the gains made in social development since political independence. The Special Initiative, therefore, addresses the backlog of unfulfilled needs through social investment programmes which will be prepared by African governments with the assistance of the international community.

12 How will the Initiative help Africa surmount its development crisis?

With its differentiated and flexible approach, the Initiative aims to help African countries that are affected by conflict as well as boost development efforts in the majority of African countries. The Initiative will help Africa strengthen its capacity to build peace and resolve conflicts through the Organization of African Unity and also through a stronger civil society. With its emphasis on basic education and health, the Initiative will support African efforts to accelerate the creation of the basic conditions for more rapid development. With its activities in such areas as food and water security, resource mobilization and governance, the Initiative will also help African countries improve the livelihoods of their people, increase their productivity, enhance the climate for investment and establish the necessary conditions for sustainable economic and social development.

DPI1799A — February 1996 — 10M
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AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 17-E
3 April 1996
Original: French

For Action

Agenda item: 3.1 **PLENARY MEETING**

SOURCE: SENEGAL

TITLE: MECHANISMS FOR FUNDING TELECOMMUNICATIONS: USE OF NATIONAL AND INTERNATIONAL RESOURCES

Over the last decade the volume of international telephone traffic has increased by nearly 16% per year, i.e. four times more than the growth rate of the world economy, due to a sustained investment effort necessitated by:

- the increase in professional and domestic communication requirements;
- technological progress.

However, the level of telecommunication development differs from one country to another. While the OECD countries have now achieved around 50 or more telephone lines per 100 population, the vast majority of African countries do not even have one telephone line per 100 population.

This is a clear reflection of how far the African countries are lagging behind. The main reasons for these differences are:

- difficulties in the financing of investments;
- the chronic economic recession;
- the weakness in consumer purchasing power.

I National resources

A Government budgetary resources

Most telecommunication networks started out as the exclusive property of the State which directly operated them.

Operating revenue went almost directly into the State coffers.

At the same time, the State was responsible for mobilizing funds needed for investment.

Since some of these funds originated from (preferential) loans to the State, the rest therefore had to come from the State budget (counterpart funding).

The financial imbalances which have affected many countries have made budgetary resources precarious and given rise to delays in investment.

B Companys' own resources

Since gaining financial autonomy vis-à-vis the State, telecommunication companies have devoted some of their assets to financing investment.

Due to a lack of early investment, telecommunication companies (in Africa in particular) had few subscribers able to free the resources needed for a rapid increase in supply.

The need to make up the existing deficit as quickly as possible means that resource requirements go way beyond companys' means, not to mention the fact that in some countries the absence of hard currency is a major constraint.

C Local financing banks

The weak position of national savings and the virtual non-existence of long-term resources have excluded local banks from the telecommunication company financing circuit.

D National private sector

The regulatory framework governing telecommunications provided only partial authorization for the activities of private operators in the telecommunication sector, besides which national private operators' relative lack of influence vis-à-vis telecommunication investment requirements would probably have prevented them from making a significant contribution.

II International resources

A Multilateral financing institutions

The World Bank, the European Investment Bank, the African Development Bank, the West African Development Bank, the Islamic Investment Bank and the ECOWAS fund, among others, have long been the leading multilateral financial players in African telecommunications.

These institutions generally lend directly to the operating State. They also accept that loans granted to the State be onlent to public or quasi-public enterprises.

These institutions, whose primary objective is to finance development, generally apply low interest rates and grant long repayment periods. The conditions of origin which they apply are generally unrestrictive.

B Bilateral financing institutions

Bilateral financing institutions have also made a large contribution to telecommunication investment. Their activities, however, are more liable to be affected by cultural, political, geographical and other affinities.

Conditions of origin are often restrictive (the product supplied must come wholly or partly from the country of origin of the funds).

In view of the very attractive conditions on offer, bilateral financing has usually been the first choice of many developing countries.

C International private sector

The international private sector has participated very little in telecommunication investment in Africa.

The regulatory framework governing the functioning of State monopolies regarded as strategic left little scope for private initiatives.

III Priorities

It should be noted, however, that in spite of assistance received from development partners, Africa lacks sufficient resources which can be rapidly mobilized to cope with its immense growth requirements.

Priorities within priorities therefore have to be drawn up and choices made. This process, naturally geared towards restoring large-scale macro-economic balances and towards meeting States' obligations, has not helped to facilitate the financing of telecommunications.

The international community, via the ITU, has however drawn the attention of countries and financial players to the close link between telecommunication development and economic development.

IV The case of Senegal

A Financing difficulties pre-1985

Telecommunications in Senegal were run by two companies, each with a different status: the one responsible for international telecommunications was a private company whose capital was completely underwritten by the State; the other, which was responsible for national telecommunications, was a public administration operated under the direct responsibility of the State.

The situations of these two companies were different in every respect.

International telecommunications

Management ratios are good and management is autonomous and flexible. The company tends to be over-liquid at times and lacks large-scale projects in which to invest. Its dominant features are:

- high profitability;

- large capacity for self-financing;
- a good reputation with financial backers;
- the execution of major projects (submarine cables, earth station, transit exchanges, etc.).

National telecommunications

The company is handicapped by its status and its resulting cumbersome nature. Its investment programme is postponed from budget to budget and from plan to plan. Its dominant features include:

- an incapacity to self-finance significant investments;
- revenue put back into public funds enabling the State to meet its obligations in the fields of health, security, education, etc.;
- some loans onlent by the State at quasi-commercial conditions;
- some supplier credits;
- exemption from customs duties.

B Disengagement of the State

From 1983 onwards, the political authorities began to clarify their perceptions of the role of telecommunications. A series of discussions focusing on the principle of flexibility and financial autonomy resulted, in 1985, in the establishment of a private management company (SONATEL[1]), with the State the sole capital holder. Thus the State disengaged itself from the day-to-day management of telecommunications.

It should be noted that in order to demonstrate the priority which it now attached to telecommunications, the State of Senegal decided at the same time to:

- waive collection of its dividends;
- stagger the payment of customs duties over five years.

This reform, which the financial sponsors have backed by granting substantial credit, has produced sharp growth in the telecommunication sector, the salient features of which were previously chronic under-equipment, virtual stagnation of the existing equipment and poor quality of service.

Thus it has been possible to realize major projects.

C Financing of telecommunications (1986-1994)

Financing of public telecommunications in Senegal has evolved as follows:

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[1] **SONATEL** (Société Nationale des TELécommunications du Sénégal) was the result of a merger between Télésénégal and the Telecommunications Directorate of OPT; it took over the status previously held by Télésénégal.

TABLE

Evolution of SONATEL investments
(millions of CFA francs)

Item	1987	1988	1989	1990	1991	1992	1993	1994	Total
Investments including tax	11 366	11 704	15 543	4 333	11 395	16 411	6 861	17 946	95 559
Loans	4 861	7 873	7 926	4 333	7 692	7 100	4 028	1 227	45 040
Actual self-financing	6 505	3 838	7 617	0	3 703	9 311	2 833	16 719	50 526
Rate of self-financing	57%	33%	49%	0%	32%	57%	41%	93%	53%
Cash flow	8 035	6 990	8 556	14 986	19 258	15 625	25 050	30 185	128 685

Average annual investment between 1987 and 1994 was 12 billion CFA francs. During the same period, the annual mean cash flow was 16 billion CFA francs.

The size of the cash flow mainly derives from four factors:

- a regular increase in turnover resulting from the rapid growth in subscriber numbers;
- a systematic decrease in operating expenses (drop in intermediate consumption and rationalization of staff costs) in spite of network expansion;
- the establishment of a *Provision* for the renewal of plant and equipment (PROM) in accordance with tax law, and;
- a growing credit balance on international traffic accounts.

The 1991-1994 period saw a rapid improvement of the balance sheets in favour of SONATEL. This enabled the debt ratio to be reduced substantially while taking investment to record levels.

The average self-financing rate of 53% disguises the fact that in 1994 SONATEL self-financed practically all its projects (93%) in spite of a big increase in the volume of investment compared to previous years.

SONATEL also benefited from other tax facilities intended to encourage investment, particularly by tax relief on taxable profit[2].

Between 1986 and 1994, SONATEL carried out the following operations:

TABLE

Accumulated typical values

Investments (including tax)	102 billion CFA francs
Main lines installed	82 050
Increase in stocks	14% per annum on average

[2] **Tax relief on taxable profit:** If (BF) is the taxable profit and (INV) the investment, the law authorizes tax relief amounting to (MON), where *(MON) = minimum (INV, BF/2)*.

Cash flow	133 billion CFA francs
Total medium- and long-term loans	54 billion CFA francs

However, 80% of borrowed funds have already been repaid (most by advance payment).

These operations have enabled SONATEL to increase the telephone density in Senegal from 0.34 to 1.00 main lines per 100 inhabitants, i.e. a three-fold increase in nine years.

D Future requirements (up to 2005)

Despite the psychological importance of "one main line per 100 inhabitants", this is still a low figure in terms of Senegal's network development objectives.

A 2.5% telephone penetration rate by 2005 would amount to a total of 287 500 main lines - i.e. 200 000 more than at present (1995).

That would necessitate an average investment equivalent to 50% of SONATEL's turnover for the period. In the best-case scenario, only half could be self-financed.

This being the case, external funding is envisaged.

V Trends in telecommunication financing

A Multilateral financing institutions

The primary role of these institutions is to assist governments in coping with the heavy investments they have to make.

The conditions pertaining to these loans, thus far generally preferential, are now tending to resemble market conditions more closely.

Private telecommunication operators are now ready to take on the role previously occupied by States, accepting the risks inherent in such investment.

A number of multilateral financial players also envisage handing over funding of this sector to the private sector.

This trend may be consolidated in the years to come with gradual changes to the regulatory framework governing telecommunications.

B Bilateral financing institutions

These generally operate on the same basis as multilateral institutions except that the funds they provide must also serve to promote their own national industry.

It should be noted, however, that the rules of the World Trade Organization (WTO) concerning, in particular, access to the market and the most favoured nation clause limit the scope of bilateral interventions to segments open to competition.

C The private sector

As the telecommunication market opens up more and more, the private sector occupies an increasingly important role.

1) Private financing

Private funds will be used more and more to finance telecommunications.

Participation in the capital of telecommunication firms is one means (increase of capital made available wholly or partly by the private sector).

By using certain of the financing instruments described, the private sector is also contributing to the emergence of new-style telecommunication companies, born from the convergence of the telecommunication and computing sectors.

The resulting value-added services stimulate substantial demand, which may be satisfied by SMEs[3].

The popularity of the "information highways" has also given a new dimension to "teleservices"[4], which represent a growing share in the telecommunication market.

2) Private operation

It may be necessary to arbitrate between the strategic role of telecommunications and the urgency of developing the supply in this field.

Various formulae linking the private sector to a greater or lesser degree with operation of the network have been implemented in various countries. The best-known of these are as follows:

- "Build-and-transfer (BT)": the promoter finances and constructs an infrastructure and hands it over to the government subject to agreement on a schedule for repayment of the investment, taking account of a reasonable internal rate of return.
- "Build-lease-transfer (BLT)": the promoter finances and constructs an infrastructure and leases it to the government. Transfer of the property to the government is automatic on expiry of the contractual period.
- "Build-operate-transfer (BOT)": the promoter is responsible for financing, construction, operation and maintenance of an infrastructure. He operates it for an agreed period during which he is authorized to set tariffs for and invoice charges and fees within agreed limits. The infrastructure is then transferred to the government on expiry of a specific period. The BOT scheme may be directly or indirectly open to suppliers, who must therefore provide technology transfer and in-depth training .
- "Build-own-operate (BOO)": the promoter is solely responsible for his activities and has no obligations to the government other than those to which all companies are subject.
- "Build-transfer-operate (BTO)": The government orders a turn-key infrastructure from a private entity. The property is transferred to the government on provisional acceptance. The private entity exploits the infrastructure for the government's on a contractual basis.

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[3] **SMEs:** Small and medium-sized enterprises.

[4] **Teleservices:** "Any value-added service between separate legal entities, using telecommunication tools" Thierry Breton.

These techniques have proven themselves to be effective for substantial investments which go beyond the intrinsic capacities of public operators.

VI Main financing instruments

A Commercial banks

Although the traditional banking sector is highly conservative, it is the largest lender in many sectors. However, its involvement in the financing of telecommunications in Africa is limited.

B Risk capital companies

These function like mutual credit companies run by financial experts with detailed knowledge of given industrial sectors.

Unlike the commercial banks, they have a very keen eye for promising deals and are prepared to take greater risks than those generally acceptable to a bank.

They already play an important role in the fields of communication and computer hardware and software.

Their contribution to the development of teleservices may well be decisive.

C Business angels

These private investors seek out companies whose profitability is proven and greater than that of other forms of investment, even if there is a long wait for the company to grow.

This profile matches the reality of the telecommunication sector.

Experts put annual investment by risk capital companies at 5 billion dollars and by business angels at 50 billion dollars.

D Commercial financing companies

These operate like commercial banks except that:

- they take greater risks in lending;
- they have higher fees and rates of interest;
- they have a greater interest in the activities of the borrower.

E State-guaranteed lenders

A mechanism such as the Small Business Administration (SBA) run by the United States Government enables loans granted by private companies to small and medium-sized enterprises/industries to be guaranteed.

The lender is thus able to be more tolerant with regard to collateral.

F Commercial factors

We refer here to debt redemption entities.

G Donations

These are becoming more and more rare.

VII Conclusion

The regulatory environment of telecommunications is changing almost everywhere. A marked liberalization in access to the market in this sector has been under way for a number of years. The recent establishment of the WTO after the conclusion of the Uruguay Round negotiations, which, for the first time, included services among the subjects for negotiation, is a crucial step.

It is highly likely that value-added services will find many different sources of financing. On the other hand, investment needed in the countries to cover all requirements remains a subject of concern. Each country could certainly meet its requirements, but in order to do so it would need a deadline which was incompatible with its development objectives.

Private funds are needed for the harmonious development of telecommunications in Africa, if only because bilateral and multilateral State sources are becoming more and more rare. However, it will be necessary to use every formula which offers an acceptable compromise between the strategic concerns of States and the private sector's requirement of profitability.

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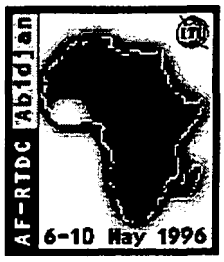

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 18-E
3 April 1996
Original: English

For Information/Support

Agenda item: 2.3

SOURCE: UGANDA

TITLE: THE REGIONAL SATELLITE COMMUNICATIONS (SATCOM) TRAINING CENTRE PROJECT (KAMPALA)

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1 Introduction

1.1 In 1980, the Uganda Government contracted the Pan African Telecommunication Union (PATU), on a proposal to establish a Regional Satellite Communications (SATCOM) Training Centre, utilizing one of the disused domestic satellite (DOMSAT) earth stations in Uganda. A joint (PATU, ITU, UNDP, INTELSAT and Uganda) mission was therefore undertaken in June 1981, to survey the available facilities and determine the approach to be adopted in the establishment of the SATCOM training centre in Uganda. Among the conclusions of the joint survey mission, were that the disused DOMSAT earth station at Kololo Hill in Kampala could be used for the project, residential accommodation could be provided at the Uganda Posts and Telecommunications Corporation (UPTC) training school which was then being constructed at Nakawa, about 4 km from Kololo Hill and that the Kololo Hill DOMSAT station should be rehabilitated and upgraded to ensure continued operation from training purposes.

1.2 As a result of a report made to the 2nd Ordinary Session of the PATU Conference of Plenipotentiaries which was held in Kinshasa in 1982, the Conference adopted Resolution 2S/CPL/82/RES.07 requesting the PATU Secretary-General to cooperate with ITU, INTELSAT and other agencies to assist the Uganda Government to carry out a comprehensive study on the establishment of the SATCOM training centre for the benefit of African countries.

1.3 In January 1985, another joint (PATU, ITU, Uganda, France and India) mission was undertaken to Kampala. The report of the mission indicated that if UNDP-funding was provided, the SATCOM project would be technically feasible and viable at an estimated total cost of $ US 3 019 500 and that technical and financial assistance should be sought for its implementation.

1.4 After considering the first draft project document on the SATCOM project, the 3rd Ordinary Session of the PATU Conference of Plenipotentiaries which was held in Arusha 1986 noted that the implementation of the SATCOM project had far-reaching financial and legal implication on the PATU Member States. The Conference therefore adopted Recommendation 4/3S-CPL/86 requesting the PATU Administrative Council to re-examine the relevant documents and submit comments on the modalities of the implementation of the SATCOM project.

1.5 The status report on the SATCOM project, was considered by the 4th Ordinary Session of the PATU Conference of Plenipotentiaries which was held in Monrovia in 1990 and Resolution 7/4S-CPL/90 was adopted, mandating the PATU Secretary-General to solicit all possible assistance towards the realization of the SATCOM project as soon as possible.

1.6 The SATCOM project document was finalized in February 1992, after taking into consideration the comments and observations submitted by UPTC, ITU, INTELSAT, Inmarsat, ESA and EUTELSAT on the draft SATCOM project document.

1.7 At the 5th Ordinary Session of the PATU Conference of Plenipotentiaries which was held in Kampala in August 1994, the agreement of PATU Member States on the regional satellite communications training centre was approved and sixteen (16) Member States signed the agreement.

2 The objectives of the SATCOM project

2.1 The long-term objectives of the project are that Africa will:

a) be self-sufficient in the training and supply of the manpower required for its national and regional satellite communications operations and development;

b) have bilingual (English and French) regional centres of excellence for training, research and development in satellite communications;

c) have the personnel to undertake technical cooperation among African countries (TCAC) in the field of satellite communications.

2.2 The short-term objectives of the project are that Africa will have:

a) a well-established satellite communications training centre;

b) an infrastructure for the transfer of satellite communications technology within the framework of international cooperation and technical assistance;

c) three African permanent staff and a number of international visiting lecturers in satellite communications to undertake the training of Africans in satellite communications;

d) about fifty African personnel trained/oriented annually in various aspects of satellite communications.

3 Inputs required for the establishment of the SATCOM training centre

3.1 Uganda Government considerations:

a) the granting of diplomatic immunities and privileges to the SATCOM training centre;

b) exempting the SATCOM training centre from all taxes as well as customs and import duties on all equipment and items required for the operation of the SATCOM centre;

c) granting of diplomatic immunities and privileges to the African permanent staff and the international visiting lecturers;

d) facilitating the granting of entry visas to the staff and trainees of the SATCOM training centre.

3.2 Uganda Posts and Telecommunications Corporation (UPTC) provisions:

a) appropriate sites and suitable office/equipment/laboratories and lecture rooms;

b) postal, telecommunications, electricity and water services for the SATCOM training centre, free of charge;

c) administrative and logistic services during the initial stages of the SATCOM training centre;

d) suitable hostel accommodation and social/recreational facilities for the trainees; and assist the staff of the SATCOM training centre in securing suitable housing accommodation.

3.3 Telecommunications Administrations of PATU Member States support:

a) releasing qualified and experienced staff for the management and operation of the SATCOM training centre as and when required;

b) sponsoring the activities of SATCOM training centres and providing facilities for the hosting of seminars by the SATCOM centre, in their respective countries.

3.4 Pan African Telecommunication Union (PATU) commitments:

a) solicit for technical and financial assistance for the realization of the SATCOM training centre project;

b) recruit the three African permanent staff (i.e. Director and two engineers) of the SATCOM training centre.

3.5 International/regional organizations offers:

a) technical assistance in the form of equipment, visiting lecturers and teaching/course materials;

b) financial assistance in the form of fellowships, sponsorships, grants and contributions.

4 Budget and implementation plan

The estimated cost of the SATCOM training centre project up to the steady-state operation stage (i.e. the first four years) is about $ US 1 589 000. An amount of about $ US 690 000 will be required in the first year for the establishment of the SATCOM centre and thereafter the annual operational recurrent cost is estimated to be about $ US 400 000.

It is estimated that the training activities of the SATCOM training centre will generate an annual income of about $ US 300 000 after the third year of its establishment.

5 The status of the SATCOM training centre project

As of March 1996, it is confirmed that the following facilities are available for the use of the SATCOM training centre, at the UPTC training school at Nakawa:

a) one complete section of the top-floor of a classroom block to provide offices, classrooms, laboratories and store;

b) a prefabricated block for the training equipment;

c) fifteen single rooms at the students hostel;

d) dining hall space reservation for SATCOM staff and students.

It was however agreed that the three blocks near the administrative block of the UPTC training school at Nakawa be used as the SATCOM training centre.

6 Technical and financial assistance mobilization

6.1 Offers:

In response to the PATU Secretary-General's efforts to solicit assistance for the realization of the SATCOM training centre project, the following offers have been made:

a) The International Telecommunications Satellite Organization (INTELSAT) is to provide some second-hand items of earth station equipment for teaching purposes free of charge (c.i.f. Entebbe, Uganda), training course materials and specialists to deliver some course topics. (NOTE - The items of equipment and some course materials have already been received by UPTC).

b) The International Maritime Satellite Organization (Inmarsat) is to provide active support and cooperation which will be specified later.

c) The European Telecommunications Satellite Organization (EUTELSAT) is prepared to assist in furthering the establishment of the SATCOM training centre.

d) The European Space Agency (ESA) foresees some joint SATCOM/ESA training activities and the possibility of training one SATCOM tutor in the Netherlands.

e) The International Telecommunication Union (ITU) is to use its Resource Mobilization Unit in seeking voluntary contributions for the SATCOM training centre project.

f) The Indian Space Research Organization (ISRO) is prepared to send experts to provide training if transport and local hospitality will be provided by the SATCOM training centre. Requests for other possible contributions are to be examined at government level and indicated later.

6.2 In the pipeline:

a) The SATCOM training centre project document has been sent to the Economic Commission for Africa, the Executing Agency for the United Nations Transport Communications Decade for Africa Programme (UNTACDA II) for the SATCOM project to be considered for funding under the UNTACDA II.

b) The representatives of the World Bank, MCI and AT&T, who attended the AFCOM '92 Conference which was held in Washington D.C. in March 1992 indicated that their organization may be interested in being associated with the SATCOM training centre project. These are being followed up.

7 Conclusion

7.1 With the creation of the Regional African Satellite Communications (RASCOM) Organization in May 1992, to provide the space segment requirements for the African REGIONAL and DOMSTAT satellite communications, there is an urgent need to establish a regional satellite communications training centre as early as possible, in order to satisfy the training needs of African Telecommunications Administrations in the operation and maintenance of the numerous earth stations to be installed to provide these services. It is of interest to note that about $ US 800 million is estimated to be spent by African Telecommunications Administrations as a whole, in the establishment of the earth segment facilities for the provision of these services. When the earth segment facilities are fully provided, the African Telecommunications Administrations will require a staff of about 2 205 of which about 1 075 will require training in satellite communications services management and equipment operation/maintenance.

AGREEMENT OF PATU MEMBER STATES ON THE REGIONAL SATELLITE COMMUNICATIONS TRAINING CENTRE (KAMPALA, UGANDA)

(Approved by the 5th Ordinary Session of the
Conference of Plenipotentiaries, Kampala, August 1994)

Secrétariat Général, B.P. 8634 Kin I. Tél 22175-26164 - Fax 25302 - Tlx 21049, République du Zaire
General Secretariat, P.O. Box. 8634 Kin I. Tel 22175-26164 - Fax 25302 - Tlx 21049, Republic of Zaire

AGREEMENT OF PATU MEMBER STATES ON THE REGIONAL SATELLITE COMMUNICATIONS TRAINING CENTRE (KAMPALA, UGANDA)

The Member States of the Pan African Telecommunications Union (PATU)

noting

that the establishment of national and multinational training institutions in some African countries has made it possible to train certain categories of the senior staff whereas the training of staff of a higher level in satellite communications presents a problem to many countries due to the lack of the means to implement such training programmes locally,

further noting

that African countries have at many fora, expressed the desire to have the training of the personnel of their telecommunications sector enhanced as far as possible at:

- national training centres for the semi-skilled and skilled staff;
- regional training centres for staff of high level and specialized skills,

considering

Resolution CM/RES/754 (XXXIII) (Rev.1) relating to the Feasibility Studies on the Regional African Satellite Communications (RASCOM) System for the Development of Africa, which was adopted at the CAU Council of Ministers 33rd Ordinary Session (Monrovia, 1979),

aware

of the need to provide African personnel who are adequately trained in the field of satellite communications technology, which prompted the PATU Conference of Plenipotentiaries to adopt Resolution 2S/CPL/82/RES.07 at its 2nd Ordinary Session which was held in Kinshasa in January 1982 and Resolution 7/4S-CPL/90 at its 4th Ordinary Session which was held in Monrovia in March 1990 relating to the establishment of the regional satellite communications training centre in Kampala, Uganda,

in cognizance

of the creation of the RASCOM Organization in May 1992, as a commercial entity as well as the trend in the development of satellite communication technology for the provision of telecommunication services in the rural and remote areas and personal communications services (PCS),

appreciative

of the fact that the Government of Uganda has provided the infrastructure and facilities for the regional satellite communications (SATCOM) training centre, at the Uganda Posts and Telecommunications Corporation Regional Training School at Nakawa, Kampala (Uganda).

HAVE AGREED AS FOLLOWS:

ARTICLE 1

Definitions

For the purpose of this Agreement:

a) "OAU" shall stand for the Organization of African Unity.

b) "Host Government" shall refer to the Government of the country where the SATCOM training centre is located.

c) "PATU" shall stand for the Pan African Telecommunications Union.

d) "UPTC" shall stand for the Uganda Posts and Telecommunications Corporation.

e) "SATCOM training centre" shall refer to the Regional Satellite Communications Training Centre.

f) "Board" shall refer to the Advisory Board of the SATCOM training centre.

g) "Staff" shall refer to any person engaged by the SATCOM training centre, full-time or part-time, to carry out an assignment on its behalf.

h) "Statutory Staff" shall refer to the internationally recruited staff of the SATCOM training centre.

i) "Property" shall mean anything that can be a subject of ownership, including contractual rights.

j) "Archives" shall refer to registers, correspondence, documents, manuscripts, photographs, photocopies, diskettes, acoustic or video recordings and equipment.

k) "AFRALTI" shall refer to the African Regional Advanced Level Telecommunications Training Institute.

l) "ESMT" shall refer to the Multinational Telecommunications High School.

m) "MCPTTC" shall refer to the Multi-Country Posts and Telecommunications Training Centres.

n) "USTTI" shall refer to the United States Telecommunications Training Institute.

ARTICLE 2

Purpose of the SATCOM training centre

1 The objective is to provide PATU Member States with a facility for the local training of their telecommunications personnel in satellite communications technology.

The SATCOM training centre shall therefore:

a) provide facilities for the training of African cadres in the field of satellite communications;

b) provide facilities for the training of satellite communications instructors responsible for the basic training of technicians in the national training centres;

c) organize seminars on satellite communications for the Member States;

d) examine all issues related to training in satellite communications submitted by Member State administrations;

e) advise on the harmonization and updating of teaching materials in satellite communications used in the African multinational and national training centres;

f) undertake studies and research related to satellite communications;

g) prepare policy guidelines for the development of satellite communications in Africa.

ARTICLE 3

The organs of the centre

1 The organs of the SATCOM training centre shall be:

– the Advisory Board;

– the Management Committee.

ARTICLE 4

The Advisory Board

1 Composition

The Advisory Board of the SATCOM training centre shall be composed as follows:

–	The Representative of the Host Government (Uganda)	–	Chairman
–	The Secretary-General of PATU or his representative	–	Vice-Chairman
–	Six representatives of PATU Member States Administrations (two from West Africa and subregion and one each from the other four subregions)	–	Members
–	The Director-General of the RASCOM Organization or his representative	–	Member
–	The Managing Director of UPTC or his representative	–	Member
–	The Coordinator of the SATCOM training centre	–	Member/Secretary

Upon a request submitted to the Chairman of the Advisory Board, PATU Member State Administrations who are not members of the Advisory Board may be represented at a meeting of the Advisory Board as observers.

The Advisory Board may invite to its meetings, any person or organization of its choice, as an adviser/consultant.

2 Mandate

Under the guidance of the PATU Administrative Council, the Advisory Board shall ensure the proper management of the SATCOM training centre, set the course outline of its programme, draw up the budget, establish and maintain relations with AFRALTI, ESMT, MCPTTC, USTTI and other international training centres.

It shall submit the draft annual programme budget of the centre to the PATU Administrative Council for approval.

It shall also submit the administrative, financial and staff rules and regulations for the provisional approval of the PATU Administrative Council.

The PATU Administrative Council shall appoint the coordinator of the centre upon the advice of the Advisory Board while the Advisory Board shall appoint the other statutory staff upon the recommendation of the PATU Secretary-General.

3 Meetings

The Board shall meet at least once a year in Ordinary Session at the SATCOM training centre.

The Board shall meet in an Extraordinary Session at the request of the Chairman or at the request of a Member subject to the agreement of 2/3 of its Members.

All meetings of the Board shall be convened by the Member/Secretary, on the advice of the Chairman of the Board.

4 Rules of procedure of the Board

The Advisory Board shall adopt its rules of procedure which will be submitted to the PATU Administrative Council for provisional approval.

ARTICLE 5

The management committee

1 Composition

The management committee shall be composed of the following:

–	The coordinator of the SATCOM training centre	–	Chairman
–	The statutory staff	–	Members
–	The Head of Administration and Finance	–	Member/Secretary

2 Mandate

a) The management committee shall consider management, admission of trainees, discipline, procedural and organizational matters.

b) The coordinator shall be responsible for:

- implementing the decisions and directives of the Board;
- the running and management of the SATCOM training centre;
- appointing the non-statutory staff whose posts are provided for in the centre's staff establishment and budget;
- preparing the draft administrative and financial regulations and the staff rules and regulations of the SATCOM training centre, for the consideration of the Board;
- preparing the annual reports and the draft annual programme budget to be submitted to the Board;
- examining all matters to be submitted to the Board for approval or decision;
- presenting for the approval of the Board, proposals for the purchase of important equipment for the extension and modernization of the various laboratories of the centre;
- representing the centre in legal matters and in all acts pertaining to the social life of the centre.

c) The statutory staff shall examine all matters concerning teaching, training documents, materials and programmes.

d) The Head of Administration and Finance shall, under the direction of the coordinator, execute administrative and financial actions needed for the implementation of the centre's programme of activities.

ARTICLE 6

Legal status and immunities

The centre shall:

- enjoy full international legal status and capacities as well as privileges and immunities, on the territory of each of the PATU Member States, to enable it to execute its functions and attain its objectives;
- have free franking privileges for national and international telecommunications facilities to and from PATU Member States, on reciprocal operational agreements;
- be exempt from all customs rights on imported items provided that such items are required for the functioning of the centre;
- negotiate separately with the host government, an agreement guaranteeing immunities and privileges granted to international organizations of intergovernmental character.

  The Secretary-General of PATU shall sign the concluded agreement between the host government and the SATCOM training centre, with the approval of the PATU Administrative Council.

2 The statutory staff

The statutory staff of the centre shall enjoy the facilities, privileges and immunities in conformity with the agreement signed between the host government and the SATCOM training centre.

3 The trainees

The trainees of the centre shall not be subjected to immigration restrictions.

4 Renunciation of privileges

The PATU Secretary-General may renounce privileges and immunities to which the centre and the staff may be entitled, if such immunity could, in his view, jeopardize the course of justice and if it can be renounced without causing prejudice to the interests of the centre.

ARTICLE 7

Application of the agreement

1 This agreement shall apply to all PATU Member States as a privileged instrument for training their staff in the field of satellite communication at the SATCOM training centre.

2 Any other interested African country desirous of using the centre shall send a written request to the coordinator of the centre, who shall forward it, with his recommendations, to the Advisory Board for consideration.

ARTICLE 8

Obligations of the PATU Member States

1 The PATU Member States shall undertake to:

- participate in the financing of the running (operational) costs of the centre and contribute to any other expenses in accordance with provisions set forth by the PATU Conference of Plenipotentiaries;
- release their nationals to serve as staff of the SATCOM training centre, in accordance with the needs of the centre, as approved by the PATU Administrative Council;
- host seminars organized by the SATCOM training centre in their respective countries.

ARTICLE 9

Conditions for the admission of trainees to the centre

1 The centre shall be open to nationals of PATU Member States, in good financial standing, in the first instance.

2 Within the limit of places available, nationals of other African countries may be admitted in compliance with stipulated admission conditions of the centre.

3 All trainees shall satisfy the pre-requisite entry qualifications set by the centre.

4 Applications for training places shall be submitted by African Telecommunications Administrations, to the coordinator of the SATCOM training centre.

ARTICLE 10

Selection of candidates and awarding of diplomas

1 The centre shall select candidates in accordance with the provisions defined in Article 9 of this Agreement.

2 The coordinator of the centre shall cross-check all applications and transmit the short-listed applications to the Advisory Board with recommendations.

3 The Management Committee shall then select successful applicants for a course, taking into account the comments of the Advisory Board.

4 The centre shall, through the Chairman of the Board and upon the recommendation of the coordinator of the centre, award diplomas certifying the successful completion of a course by a trainee, in compliance with the general standards set by the Board.

5 The centre's diploma shall be recognized by the PATU Member States and accorded equivalent grading in the public services of PATU Member States.

ARTICLE 11

Staff rules and regulations

1 Under the directives of the Board, the coordinator of the SATCOM training centre shall, under the supervision of the PATU Secretary-General, prepare the drafts of the administrative, finance and staff rules and regulations for the centre.

2 The PATU Administrative Council shall determine the conditions of recruitment, employment, remuneration and other material and social advantages for the staff of the centre.

ARTICLE 12

Budget of the centre

1 The Advisory Board shall submit in advance, the draft quadrennial budget of the centre to the PATU Conference of Plenipotentiaries, through the PATU Administrative Council for a ceiling approval.

2 Every year, the coordinator shall, in compliance with the financial rules and regulations in force, prepare the financial report and draft programme budget of the centre for the consideration of the Advisory Board and submission to the PATU Administrative Council for approval.

ARTICLE 13

Contribution to the SATCOM training centre

1 The annual budget of the centre shall be met by contributions from PATU Member States in accordance to a scale of assessment approved by the PATU Conference of Plenipotentiaries.

2 At the beginning of every financial year of the centre, the coordinator shall inform Member States, the amount of their contributions to the centre's budget and the procedure for affecting the transfer of the amount into the bank account of the centre.

3 The fee, to be paid in advance, for trainees admitted to the centre shall be determined by the Advisory Board subject to approval by the PATU Administrative Council.

4 The PATU Secretary-General or the coordinator of the centre may, with the consent of the Advisory Board, accept any other contributions, donations, grants or subventions on behalf of the SATCOM training centre.

ARTICLE 14

Working capital

1 To ensure the regular functioning of the SATCOM training centre, a working capital whose nature and operation shall be determined by the PATU Conference of Plenipotentiaries shall be set up.

ARTICLE 15

Moveable and immovable assets of the centre

1 The host government shall put at the disposal of the Pan African Telecommunications Union, premises and other infrastructural facilities required for the proper functioning of the centre, as prescribed in the SATCOM project document and the agreement signed between the host government and the SATCOM training centre.

2 All moveable and immovable assets as well as other properties intended for the use of the centre shall be placed under the responsibility of the Advisory Board, in trust for the Pan African Telecommunications Union (PATU).

ARTICLE 16

Amendment and revision

1 This agreement may be amended or revised at the request of the PATU Member State, in writing to the Chairman of the SATCOM Advisory Board, who shall transmit it to all PATU Member States for their comments and due consideration by the PATU Administrative Council.

ARTICLE 17

Dissolution of the SATCOM training centre

1 In the event of the dissolution of the SATCOM training centre, the PATU Administrative Council shall determine the modalities for the liquidation of the assets and liabilities of the centre, and submit the same for the consideration of the PATU Conference of Plenipotentiaries.

ARTICLE 18

Entry into force

1 This agreement shall enter into force upon its adoption by the PATU Conference of Plenipotentiaries and signature by at least ten (10) PATU Member States.

ARTICLE 19

Authentic texts

1 This agreement is made in English and French texts, both texts being equally authentic.

Done at KAMPALA, Uganda On the 26th day of August 1994

THE 16 MEMBER STATES WHICH SIGNED THE AGREEMENT ON THE SATCOM TRAINING CENTRE

1. BENIN
2. BURKINA FASO
3. CAMEROON
4. CENTRAL AFRICAN REPUBLIC
5. CONGO
6. GHANA
7. KENYA
8. LIBERIA
9. NIGER
10. NIGERIA
11. UGANDA
12. SWAZILAND
13. TANZANIA
14. TUNISIA
15. ZAIRE
16. ZIMBABWE

RESOLUTION 10/5S-CPL/94

RESOLUTION ON THE REGIONAL SATELLITE COMMUNICATIONS (SATCOM) TRAINING CENTRE

The PATU Conference of Plenipotentiaries, meeting at its fifth Ordinary Session in Kampala (Uganda) from 22 to 26 August 1994,

having considered

the Report of the Committee of Experts, meeting in Kampala from 8 to 19 August 1994,

recalling

Resolution 7/4S-CPL/90 which it adopted at its fourth Ordinary Session (Monrovia, March 1990), on the implementation of the SATCOM project,

noting

that the RASCOM project is now at its operational stage, and that there is the need to train indigenous African personnel to manage, operate and maintain the numerous earth stations that will be constructed to use the RASCOM space segment facilities for national and regional communication services,

further noting

that an initial 3-year operation programme budget estimate of $ US 1 589 500 (one million five hundred and eighty-nine thousand five hundred US dollars) during the period 1994-1998 is required,

recording

with appreciation the technical assistance and support provided by international organizations for the realization of the SATCOM training centre,

expresses

1 its gratitude to the Government of Uganda for providing the infrastructure of the SATCOM training centre, for the benefit of the Union;

2 its appreciation for the technical assistance provided by the international organizations towards the realization of the SATCOM project,

recommends

the "Agreement of PATU Member States on the regional satellite communications training centre" and *commends it* for signature by the Member States of the Union,

requests

the Secretary-General to continue his efforts to solicit funds and financial assistance for the operation of the SATCOM training centre,

appeals

to PATU Member States of RASCOM to request the RASCOM Organization and its Members to sponsor and use the SATCOM training centre for the training of their personnel,

further appeals

to international organizations and multinationals to continue to assist and support the SATCOM training centre during its operational stage,

requests

the Administrative Council to report on the development and the activities of the centre to the next PATU Conference of Plenipotentiaries.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 19-E
3 April 1996
Original: English

For Information/Support

Agenda item: 2.1

SOURCE: RAPPORTEUR FOR Q.4/2 - COMMUNICATIONS FOR RURAL AND REMOTE AREAS

TITLE: UNDERSTANDING RURAL TELECOMMUNICATION INFRASTRUCTURE

Executive summary

The widespread understanding and acceptance that access to telecommunication services is a basic human need, and a critically important "change agent" in spurring economic development, has increased the need to bring telecommunications to the rural and remote areas of developing countries. The ITU Development Sector (ITU-D), and its public and private sector M/members, are pursuing ways and means to do this. It is now recognized that successful and sustainable telecommunication services in rural areas must be based on commercial business principles.

A carefully planned and orderly Rural Telecommunication Programme brings major cost savings and develops expertise in the Service Provider and the equipment vendors. Telecommunications will promote economic, social and cultural development for rural residents. New opportunities include telemedicine, distance education, electronic transactions and database access. For commercial reasons, it is important to always provide enough capacity to meet all service needs.

If a Positive Business Case can be achieved for the Rural Service, this will ensure its ongoing viability and sustainability, with minimal regulatory overview, and the continuity of the Rural Telecommunication Service will be assured.

1 Introduction

Much attention has been focused on the need to bring telecommunication services to the unserved rural and remote areas of developing countries. Now, through the Study Groups of the ITU-D, increased attention is being paid to methods of accomplishing this.

Question 4/2 of Study Group 2 of the ITU-D specifically addresses "Communications for rural and remote areas". This paper is based on the contributions and the work that has been put forward on this Question. In this paper, the Coordinator and Rapporteurs who have the specific responsibility for furthering the work on Question 4/2 put forward an overview of the current situation facing telecommunication services in the rural and remote areas of developing countries, and proposes for discussion preliminary conclusions and recommendations.

2 Background

The ITU in 1984, in the Report of the Maitland Commission, "The Missing Link" (Ref. 1), "... recognized the fundamental importance of telecommunication infrastructure for the economic and social development of all countries." Progress towards the goals established by the Maitland Commission was reviewed in the World Telecommunication Development Report (WTDR) - 1994 (Ref. 2, "Box 5.1: The Missing Link", p. 74), concluding that "Progress towards meeting these recommendations ... has been mixed."

The World Telecommunication Development Conference (WTDC) confirmed the importance of global telecommunication development, and in the Buenos Aires Declaration "declared that:

a) Telecommunications is an essential component of political, economic, social and cultural development...

b) New technological developments in telecommunication and information technologies have the potential to close the development gaps between developing and developed countries and ... between densely and sparsely populated areas...

c) Any strategic cooperation for the development of telecommunications must recognize the varying levels of development in developing countries ..." (Ref. 3, pp. 6 and 7).

The WTDC created two Study Groups in the ITU-D. Question 4/2, "Communications for rural and remote areas", is being addressed by Working Party A/2 of Study Group 2.

The Final Report of the initial Study Group meeting, referring to Question 4/2, indicates the following: "It is often thought that investment for rural areas is unprofitable. This is not always the case. Promoting telecommunication development in areas with low and medium population densities may well be a key factor for smooth and integrated development of rural areas where the majority of the population of the developing world lives ... Study Group 2 is expected to come up with recommendations that address the equitable provision of telecommunication services to all levels of society. Priority will be given to issues of quality of service, and the strengthening of institutional arrangements for telecommunications to have a positive impact on the development of the rural and remote areas of the world ..." (Ref. 4, p. 2).

3 The context of 1996

The dilemma of Rural Telecommunications for developing countries in 1996 is the promise offered by new, more capable, more efficient and evolving technologies, apparently precluded by the lack of possible resource assistance. Despite minimal availability of external resources, there are clear examples and role models that demonstrate what can be accomplished in serving rural and remote territory, and which provide excellent opportunities for emulation.

In introducing telecommunications to rural and remote territory, it is well recognized that the appropriate "Service Model" provides "Universal Access" to telecommunication services, as opposed to "Universal Service" - i.e. a telephone in every home and business - which is more ambitious and more costly. Of course, service must be provided without discrimination and at an affordable cost. Residents in the served territory typically access these services at a Public Call Office (PCO), which is centrally located in the community.

It is important to provide the level of service to suit the community, so that service needs are fully met, in both capacity and variety, and recognizing that experience indicates that these needs will increase with time. Depending on the community needs and wants, the PCO may add telematics-based services, for example facsimile, electronic mail, and data services, and may evolve to become a Community TeleService Centre (CTSC). In time, the CTSC may well expand its role further, to support service applications such as telemedicine, distance education, electronic transactions (financial and other), and database access.

The realities of 1996 require the Rural Service to achieve or at least approach economic viability in its own right. There are a variety of examples and models that demonstrate how to accomplish this, and clearly understandable principles that support this objective.

It is an underlying principle that the Service Provider must ***ALWAYS*** understand, respect, and be sensitive to the overall economics of providing service to the rural territory. The Service Provider must be permitted, and in fact encouraged and directed, to use commercially based management, planning, and operating processes. The Service Provider (PTT or ROA) need not be privatized, but it must be "corporatized", so as to ensure that business economics take their necessary, crucial, and often dominant role in the organization's operations and decision-making processes, and in the criteria by which the organization is judged.

Examples of important principles to be embraced include the following:

- The service must be of good quality, providing both voice and data service.
- The service must be reliable and dependable. The customers must be able to rely on its availability and quality. Reliance is earned, not imposed.
- It is ***ESSENTIAL*** to take steps to bring out ***ALL*** the potential revenue for calls both from and to the rural area served. For example, PCOs should be equipped with enough lines that calls are not cut short because other callers are waiting, and inward calls to the PCO will almost always find a line available. Lines will also be provided to commercial and institutional users.
- Good quality service must be sustainable on a continuing basis. This requires fully adequate provision of test sets and spare equipment, and training of operations and maintenance personnel. There must be satisfactory network management and service management, which includes monitoring performance results, both technical and commercial, through "Key Indicators" and other management techniques.
- Appropriate revenue settlement arrangements are essential. Noting that ***ALL*** the calls both from and to the PCOs will be "long distance" ("message toll", and will earn "message toll" revenue), the revenue settlement arrangements are the key factor in rural territory service revenue. It must be recognized that inward calling to the PCOs, both national and international, is a very valuable source of revenue, which will often far exceed the revenue from outward calling from the PCOs.

- Economics must ***ALWAYS BE RECOGNIZED.*** The alternative with the lowest economic cost may not always be selected, but if it is not, the cost difference of the chosen alternative, and the additional "relative intangible benefits" that it provides, must be clearly evident and understood, and must make commercial sense.

The government's understanding and support in National Policy matters is very important in providing rural telecommunication service which achieves a positive business case. For example, import tariffs on equipment and test sets, which are often substantial, may greatly increase the investment costs of the Rural Programme, increasing the financial burden which must eventually be recouped through the service revenue.

The Canadian International Development Agency (CIDA) paper, "Making Rural Telecommunications Profitable" (Ref. 6), explores profitability of Rural Telecommunications in Pakistan, Botswana, and Zimbabwe. Experience in these countries indicates that the optimum rural telecom strategy provides telephone lines for PCOs and institutions and businesses, maximizing revenue from these high usage customers. This also contributes the greatest economic and social development benefit to the rural area served. In addition, it generates significant foreign currency, as a result of inward international calls to the newly served rural territory, from emigrants and expatriate workers.

CIDA has also explored this question through its work in Latin America. An economic analysis of CIDA's involvement in rural telecommunications in Bolivia cites the Bolivian experience in rural territory served by three point-to-multipoint radio systems. The resulting Internal Rate of Return exceeds 16%, and the payback period is four years. These findings are described in more detail in the CIDA paper titled "Development of a Profitable Telecommunications Infrastructure - Bolivia Case Study" (Ref. 7).

4 The growing consensus on rural infrastructure - Ref. SG 2, Question 4/2

a) Low-cost appropriate technology options for rural telecommunications

There is no single best "magic" technology solution for servicing rural and remote areas. Network extension into unserved or underserved rural territory must consider many current and potentially appropriate technology alternatives. While these technology alternatives are often considered to be competitive with each other, they should more properly be regarded as primarily complementary. The "best" technology will depend on many factors, e.g. population size and distribution, location and capacity of the existing telecommunication network, and topography. Mountainous terrain and areas with many rivers and lakes favour radio transmission solutions, while flat arable land tends to favour plowed cable solutions.

As the WTDR - 1994 notes, (Ref. 2, "Box 3.1: Copper, fibre, satellite or radio?", p. 32), "**Radio** is the great unknown ..." Radio technology is evolving quickly, and offers great promise. However, the appropriate choices of technology require careful engineering economic analysis, factoring in ***both cost and revenue***, over the full life cycle of the systems being compared. Comparisons must always be between the provision of ***comparable services and comparable coverage.*** Future network evolution must be carefully considered.

This analysis will lead to a good understanding of the preferred technologies, and their applications. In general, it will be found that a small number of technologies will be selected, and each will serve an extensive portion of the rural territory which is to be served.

b) Planning and implementation of national rural telecom development plans

Experience indicates that ***MAJOR SAVINGS*** can be gained by planning and implementing an orderly, progressive, multi-year Rural Telecom Programme. This encourages the equipment vendors to compete aggressively for the business, offering substantially lower prices while providing the appropriate and necessary depth of support, including training for the Service Provider's operations and maintenance staff, and in-country technical expertise and equipment support.

The Service Provider's employees will develop knowledge and skill as their experience grows, in technical areas such as network planning, equipment provisioning and project management, and also in commercial operations, e.g. in establishing PCOs and the selection, training and management of the agents who operate the PCOs in the villages.

Experience suggests that an orderly, progressive, multi-year Rural Telecom Programme can lower the "cost per village served" by one third to one half, compared to ad hoc service provision to individual villages. The other economic efficiency is to provide enough lines in each village to meet the traffic requirement for both outward and inward calling. The first line in each village is very costly, both because of the inherent network technology costs and because of the "start-up" costs of establishing the in-village presence and the commercial agency. Additional lines are relative inexpensive, often one tenth or less of the cost of the first line, and yet will earn almost as much revenue as the first line. Providing a sufficient number of lines drops the average cost per line dramatically, and is a key factor in achieving a Positive Business Case.

As noted in the WTDR - 1995 (Ref. 5, "Figure 4.1: Raking it in", p. 50), two of the most profitable Telecom Service Providers in the world are Telmex (Mexico) and the Telephone Organization of Thailand (TOT - Thailand). Both these organizations have implemented major and successful Rural Telecom Programmes. While this does not prove that Rural Programmes are profitable, it clearly establishes that it is possible to be profitable while implementing a major Rural Programme.

c) Promoting the application of telecommunication facilities for developing various sectors of rural infrastructure and rural economy

To maximize the benefit of telecommunications for economic, social and cultural development of the millions of people who live in the world's rural territory, modern telecommunication services are needed, including facsimile, electronic mail and voice messaging. These services require high quality data network services.

Good telecommunications support all aspects of economic, cultural and social development. In agriculture and fisheries, markets can be matched with supply, weather and environmental information can be made available, and "best practice" techniques can be shared. Manufacturing and handicraft activities benefit from more efficient markets, both for input resources and for sale of goods produced. On the service side, tourism is enabled, bringing visitors to new locations, and remote financial and other transactions become possible.

The advantage which telecommunications bring to rural and remote areas is greater than in more densely populated areas because the alternative means of passing information and messages is more costly and time consuming. Without telecommunications, messages and information can only be passed by a personal visit or via a messenger, involving a trip which is often difficult and time consuming, and sometimes dangerous. Alternatively, the message or the information could be withheld, and its benefit lost. In rural and remote areas, the "opportunity cost" of the alternatives to

telecommunications is much higher than in more densely populated areas, and the information or the message is much more likely to be withheld. The relative advantage of being able to communicate electronically, rather than via visit or messenger or not at all, will have a relatively greater positive impact on economic, social and cultural development.

Based on local needs, the PCO will evolve, over time, to a "Community TeleService Centre" (CTSC), supporting knowledge workers in the rural community. The CTSC's capabilities include fax, printers and modems, photocopying, and support facilities. The trend is to handle all transactions that lend themselves to electronic completion, such as financial transactions, e.g. paying bills, and many public sector transactions, e.g. obtaining licenses and permissions of all sorts. The CTSC is described in the ITU/BDT paper "Community Teleservice Centres" (Ref. 8).

The CTSC will also coordinate and manage the other opportunities that rural telecommunications make possible, e.g. various remote health care functions (telemedicine), distance learning (tele-education) of all sorts, and information and database access. Rural telecommunications offers the possibility of reducing or even reversing the urban migration, particularly of young people, which is a problem in many developing countries.

d) Appropriate regulatory structures to encourage the extension of telecommunication services to remote and rural areas

It is now generally agreed that the development of rural telecommunications can most effectively be achieved under the following conditions:

- Service is provided through PCOs, and lines to serve non-residential customers.
- Rural investment is encouraged, in ways which do not distort price/cost relationships.
- Innovation is encouraged in providing rural service.
- Rural PCOs are franchized to the private sector, preferably to local entrepreneurs.
- An independent regulatory authority is in place.
- Appropriate tariffs and revenue settlement arrangements are in place.

The relationship of cost and revenue must be considered, in particular the volume and revenue of inward message toll traffic, including the inward international message toll traffic. The regulator must require an adequate and appropriate, but not excessive, "local revenue contribution" from all the message toll traffic, both outward and inward, both national and international.

A "Universal Service Obligation" (USO) may still be needed, which should be minimal, consistent with assuring the financial integrity and sustainability of the Rural Telecommunication Service. A successful approach is through establishing conditions, in the Service Provider's license or concession, which mandate accelerated rural service provision.

e) Options available for financing rural and remote projects

There is increasingly convincing evidence that a "Positive Business Case" for rural telecommunications is both possible and practical. The provision of Universal Access through PCOs will ensure heavy usage patterns per line in service. Since the PCOs are located in the population centres of the communities, ***all*** of the calls will be "long distance", and ***all,*** both outward and inward, will bear a "message toll" tariff. Since ***none*** of this calling would have been possible if rural telecommunications had not been provided, it is proper to relate ***all*** of the resulting "long-distance" revenue, outward and inward, national and international, to the advent of rural telecommunications. The appropriate sharing of this new revenue is a revenue settlement issue, under regulatory direction and supervision.

Inward international calling to developing countries, specifically by "expatriates" calling to their homes, is rising dramatically. The WTDR - 1994 (Ref. 2, "Box 2.2: International traffic patterns: Social calls are rising", p. 14, and "Figure 2.2: The lines are busy", p. 15), explores this subject, noting that the United States gained 8.7 million new immigrants in the 1980s, and Europe gained over 20 million new immigrants in the same period. Personal international calls are generally far longer than business calls. Total international calling increased by a factor of four between 1983 and 1992, and the trend continues.

Worldwide experience indicates that the demand for "long-distance" service is very elastic. As prices drop, total revenue increases dramatically. Since new technologies greatly reduce the cost per circuit of new long-haul transmission systems, "message toll" tariffs could be reduced, and total revenue increased.

A Rural Telecommunication Programme and service portfolio with a ***Positive Business Case*** will attract private sector capital to invest in and support construction of the required network, and to operate and maintain the service on an ongoing basis. Some modest encouragement through a USO may be essential. In the final analysis, the ***Positive Business Case*** is the ***only way*** that a Rural Telecommunication Service can be assured of being sustainably viable.

5 In conclusion

The cornerstone of successful and sustainable Rural Telecommunication Service is to base the service on commercial business principles. The Service Provider's decisions must be based on business economics, to understand and address both costs and revenues, minimizing the former and maximizing the latter. The Service Provider must be "corporatized", and permitted to set and follow its own agenda, without government direction and interference, other than a sensitive and "minimalist" regulatory function. A USO for the rural territory is very likely to be necessary. Careful attention by the Service Provider to economics and profitability will go far to lighten the burden of the USO.

Major cost savings can be achieved by implementing a carefully planned and orderly Rural Telecommunication Programme. A multi-year Programme will develop expertise in the personnel of both the Service Provider and the equipment vendors. Entrepreneurial PCO operators will find creative new opportunities to provide value to the rural residents they serve.

Applications of telecommunications promote economic, social and cultural development, and will enable major improvements in the lives of rural residents, e.g. telemedicine, distance education, electronic transactions, and database access. Sufficient capacity must be provided to meet all the service needs, so the Service Provider can obtain all the related revenue.

A regulatory function is required, which should be as "light handed" as possible, to act as a safety net, to ensure equitable access to telecommunication services by all income levels of society, to establish the terms and conditions of the Rural Telecommunication Service, and to monitor the Service Provider's performance in delivery.

Ideally, a Positive Business Case can be achieved for the Rural Service, and this will ensure its ongoing viability and sustainability. Minimal regulatory overview will be required, and the continuity of the Rural Service will be assured.

Rapporteur, Q.4/2

David Barr
Canada

Tel: +1 613 741 6640
Fax: +1 613 567 3165
email: davebarr@hookup.net

Coordinator, Q.4/2

Gomes Zita
Mozambique

Tel: +258 1 431 921
Fax: +258 1 431 944

Rapporteur, Q.4/2

Bernard Ouedraogo
Burkina Faso

Tel: +226 306 898
Fax: +226 310 764

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UNION INTERNATIONALE DES TELECOMMUNICATIONS
BUREAU DE DEVELOPPEMENT DES TELECOMMUNICATIONS

CONFERENCE REGIONALE AFRICAINE DE DEVELOPPEMENT DES TELECOMMUNICATIONS
(AF-CRDT-96)
Abidjan (Côte d'Ivoire), 6-10 mai 1996

Corrigendum 1 au Document 20-F/E
3 mai 1996
Original: anglais

Pour information/référence

Point de l'ordre du jour: 1.1
Agenda item:

SÉANCE PLÉNIÈRE
PLENARY MEETING

ORIGINE: BUREAU DE DÉVELOPPEMENT DES TÉLÉCOMMUNICATIONS
SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU

TITRE: L'AFRIQUE AU BOUT DU FIL: TENDANCES DU TRAFIC TÉLÉPHONIQUE INTERNATIONAL AFRICAIN
TITLE: AFRICA CALLING: TRENDS IN AFRICAN INTERNATIONAL TELEPHONE TRAFFIC

Page 9, **"Câbles sous-marins"**, remplacer le deuxième paragraphe par le texte suivant:

Eu égard au nombre de pays enclavés que compte le continent, il est évident que l'instauration de la connectivité internationale passe par l'utilisation combinée de divers systèmes, qu'il s'agisse des satellite, des fibres optiques ou des systèmes de terre existants comme les faisceaux hertziens. La difficulté consistera à étudier les avantages et la complémentarité des différentes solutions possibles, l'ampleur de la coopération régionale nécessaire et l'adoption de structures efficaces en matière de participation au capital et de gestion.

Page 9, **"Submarine cables"**, replace the second paragraph by the following text:

Considering the number of land-locked countries on the continent, it is clear that international connectivity will require a mix of satellite, fibre and existing terrestrial solutions such as microwave. The challenge will be to explore the merits and complementarities of the various alternatives, the level of regional cooperation required and the adoption of effective ownership and management structures.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 20-E
3 April 1996
Original: English

For Information/Support

Agenda item: 1.1

PLENARY MEETING

SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU

TITLE: AFRICA CALLING: TRENDS IN AFRICAN INTERNATIONAL TELEPHONE TRAFFIC

AFRICA CALLING: TRENDS IN AFRICAN INTERNATIONAL TELEPHONE TRAFFIC

Michael Minges

Telecommunication Development Bureau (BDT), International Telecommunication Union (ITU)

The views expressed are those of the author and do not necessarily reflect the opinions of the ITU or its Members.

1 Overview

African telecommunication operators are very dependent on international telephone traffic. International calling accounts for over 40 per cent of telecommunication revenues in the region, a far higher percentage than for other parts of the world (see Table 1). Incoming international calls generate foreign exchange, critical for importing telecommunication equipment to expand the region's inadequate telephone networks. The statistics on international telephone usage in Africa reflect the shortcomings of the region's telecommunication systems. The number of minutes of international conversations per African telephone subscriber is far above the world average, because the few number of lines are heavily used (see Figure 1). On the other hand, international conversations per inhabitant in Africa are the lowest of any region and nine times less than the world average.

This dependency on international revenues may not be sustainable. International telephone traffic is increasingly treated as a trade issue and the accounting rate system, used to determine traffic settlement payments, is under pressure for reform. While most African operators maintain a monopoly in their domestic market, for international services they face indirect competition from alternative calling procedures offered by domestic and foreign competitors, including country direct services, credit card calling, call-back and refile. Private networks and the Internet are also beginning to affect traffic. In addition, developments tied to cellular telephony also pose threats to the international revenue streams of traditional network operators.

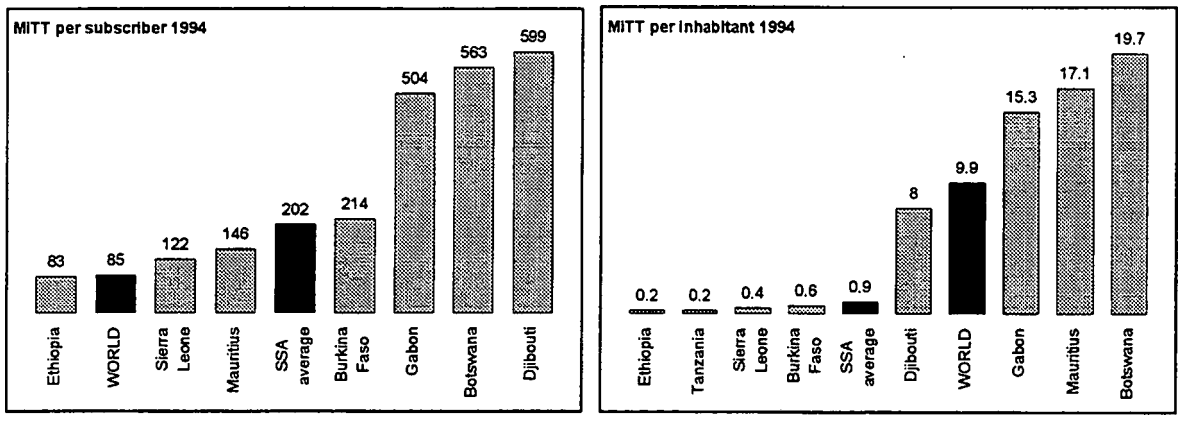
Global telecommunication strategies will also impact the region. The world's largest telecommunication companies are banding together in consortia to handle the global telecommunication needs of multinational companies. Furthermore, a number of satellite systems that promise worldwide coverage for their mobile subscribers are slated for operation by the end of the century. And as the African telecommunication market, hungry for investment, opens to foreign investment, the lucrative area of international calling will be one of the first areas targeted.

Table 1: Africa's top international operators
Ranked by 1994 international telephone outgoing minutes

	Operator	International telephone traffic						International telecom revenue	
		Outgoing		Incoming		Total			
		Minutes (m) 1994	Change 1993-1994	Minutes (m) 1994	Change 1993-1994	Minutes (m) 1994	Change 1993-1994	US$ (m) 1994	As % of total revenue
1	Telkom (South Africa)	263	3.0%	285	10.1%	547	2.2%	370	13%
2	ONPT (Morocco)	130	3.9%	235	17.4%	365	13.1%	*285*	45%
3	MPT (Algeria)	*98*	43.5%	95	18.7%	193	30.1%	*115*	51%
4	ARENTO (Egypt)	93	16.2%	396	6.4%	489	8.1%	277	61%
5	DGT (Tunisia)	64	-4.1%	100	12.8%	164	5.3%	*75*	39%
6	NITEL (Nigeria)	60	11.5%	88	2.5%	148	6.0%	215	48%
7	PTC (Zimbabwe)	43	38.9%	41	17.1%	83	27.3%	*35*	28%
8	GPTC (Libya)	42	10.0%	25	15.5%	68	10.0%	*80*	47%
9	Telecom Namibia	*42*	0.9%	40	14.0%	82	6.9%	*25*	38%
10	BTC (Botswana)	28	-5.0%	17	17.3%	46	2.4%	26	37%
	10 above	**863**	**9.3%**	**1'322**	**9.0%**	**2'184**	**9.1%**	**1'501**	**41%**

Note: Figures in italics are estimates or refer to earlier year. Incoming traffic is estimated.
Source: ITU World Telecommunication Indicators Database.

Figure 1: Busy lines but few callers
Minutes of outgoing international telephone traffic in selected African countries, 1994, per subscriber and per inhabitant



Note: MiTT = Minutes of Telecommunication Traffic. SSA = Sub-Saharan Africa.
Source: Adapted from ITU African Telecommunication Indicators, 1994.

2 Traffic trends

Although international telephone traffic is important for Africa, the continent only accounts for a minuscule 2 per cent of the global total (see Figure 2, left chart). The share of African traffic is declining, reflecting the fact that international telephone traffic in the region is not growing as fast as in the rest of the world. That African traffic is growing at all is an accomplishment considering the region's lacklustre economic growth. International telephone is closely related to economic activity. Growth in African Gross Domestic Product (GDP) has declined in the first half of the 1990s and so has international telephone traffic (see Figure 2, right chart). Global economic agencies such as the World Bank and the International Monetary Fund are predicting an upturn in

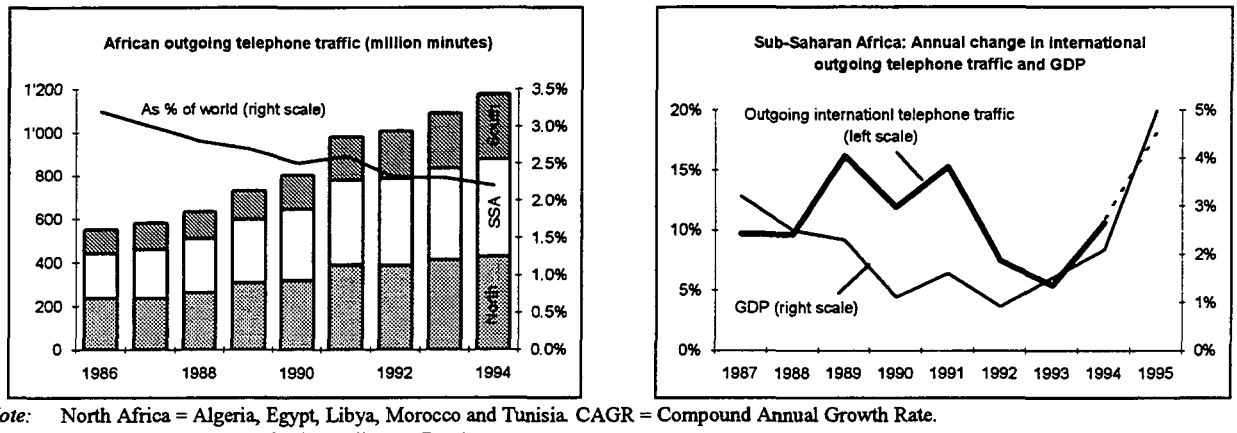
the region's economy. If so, then African international telephone traffic could accelerate in the last half of the decade.

Within the region, the North African countries account for 36 per cent of total outgoing traffic, South Africa for 26 per cent and Sub-Saharan Africa for 38 per cent. Over the last decade, North Africa's share has been declining, South Africa's increasing while the Sub-Saharan share has remained the same.

Incoming calls to Africa have exceeded outgoing ones since 1991. One of the reasons for this traffic imbalance is due to higher tariffs which discourage calling from Africa and encourage calling into Africa. The excess of incoming over outgoing traffic generates badly needed foreign exchange for Africa's telecommunication operators. This is because overseas correspondents must pay African telecommunication operators for terminating the calls.

Figure 2: African international telephone traffic trends

African outgoing international telephone traffic and annual change in Sub-Saharan Africa international telephone traffic and GDP



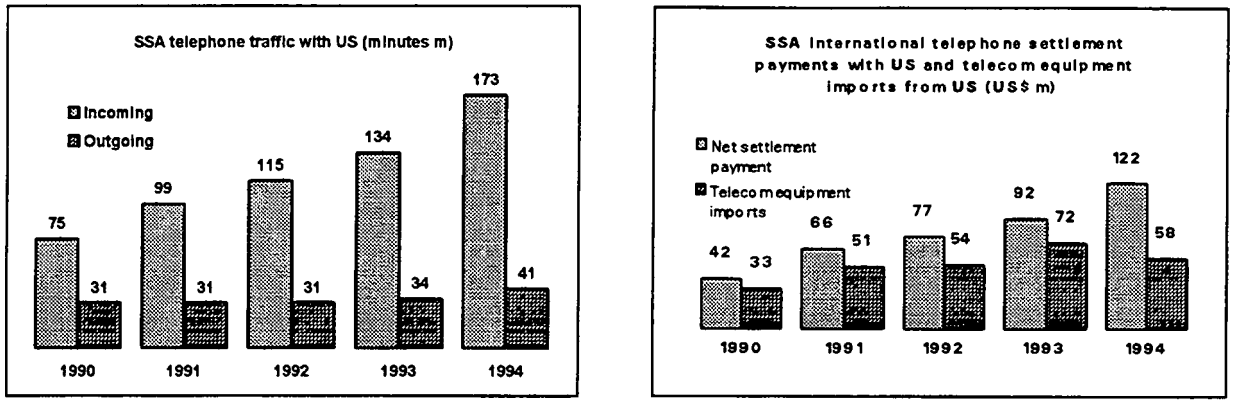
Note: North Africa = Algeria, Egypt, Libya, Morocco and Tunisia. CAGR = Compound Annual Growth Rate.
Source: ITU World Telecommunication Indicators Database.

The increase in incoming telephone traffic is clearly shown in Africa's traffic with the United States. The growth in incoming traffic is likely to continue as long as tariffs are higher in Africa than the discounted rates offered in the United States. One of the factors causing the growing traffic imbalance is that many call-back companies are located in the United States. Call-back works by a user dialling a number connected to a computer in the United States and hanging up before the call is completed, avoiding having to pay for the outgoing call. The computer *calls-back* with a US dial tone, allowing the user to call anywhere in the world and be charged at United States rates. It is likely that a growing portion of the traffic recorded as *incoming* traffic from the United States, is actually *outgoing call-back* traffic to the United States and to other destinations routed via the United States. Although call-back has been declared illegal in a number of African countries, it is technically hard to stop. And since call-back traffic shows up as incoming traffic to Africa, it has a positive affect on foreign exchange earnings.

The net gain the region makes on telephone traffic is offset by its purchases of telecommunication equipment. For example, Sub-Saharan Africa's imports of telecommunication equipment from the United States have been growing in tandem with net settlement payments. United States exports of telecommunication equipment to Sub-Saharan Africa have doubled since 1990 and are growing by 30 per cent a year. Overall, Africa has a huge imbalance in telecommunication equipment trade: its imports are more than 20 times the value of its exports. For example, in 1992, Sub-Saharan Africa

imports of telephone exchange equipment amounted to some $US 200 million, of which just under half came from the United States, against exports of less than $US 5 million.

Figure 3: Telecommunications and trade
Sub-Saharan Africa international telephone traffic, settlement payments and telecom equipment imports from the United States



Note: SSA = Sub-Saharan Africa.
Source: US Federal Communication Commission, Department of Commerce.

3 Where does it come from, where does it go?

The majority of African telephone traffic leaves the region. In 1994, over 70 per cent of the international traffic originated in the region was destined outside Africa (see Table 2). Most countries have a predominant foreign destination, typically as a result of former colonial ties. For francophone countries, the destination is France, in anglophone countries, the United Kingdom, and for lusophone countries it is Portugal.

South Africa has one of the highest percentages of traffic which stays within Africa. This is partly because South Africa offers transit and switching services for neighbouring countries. Other reasons include migrants from neighbouring countries working in South Africa as well as close trade ties. In 1994, 26 per cent of Sub-Saharan traffic was to South Africa while 17 per cent came from South Africa. This percentage is even higher for countries that border South Africa. The seven largest inter-African routes are between South Africa and a neighbour. The biggest is between Namibia and South Africa accounting for 67 million minutes in 1994. This is more than one half times the next biggest route, South Africa-Zimbabwe which accounted for 39 million minutes in 1994.

The North African countries exchanged about 30 million minutes of traffic amongst themselves in 1994, around 7 per cent of their total traffic. They only sent 3 million minutes to other African locations, mainly to Arabic speaking countries such as Mauritania and Sudan. The North African countries also account for the bulk of the 57 million minutes of international traffic destined to Arab countries outside Africa. The biggest route involving an African country is Egypt's traffic with Saudi Arabia. It was 147 million minutes in 1994 of which calls from Saudi Arabia to Egypt were 6 times greater than calls in the other direction.

Most bilateral Sub-Saharan routes are small compared to traffic between South Africa and its neighbours or among the North African countries. The biggest route between one Sub-Saharan country and another is Botswana-Zimbabwe at 6 million minutes followed by Zambia-Zimbabwe at 2.5 million minutes. Routes in French-speaking West Africa come next: Côte d'Ivoire-

Burkina Faso, Côte d'Ivoire-Senegal and Gabon-Cameroon all at just over 2 million minutes. The Côte d'Ivoire-Senegal route is interesting because outside of the South African sphere, it is the largest route between two non-adjacent African countries.[1] Due to the linguistic and cultural variation in Africa, sharing a common border is no guarantee of a significant amount of traffic. The Côte d'Ivoire sends only 1 per cent of its traffic to Ghana and less than ½ per cent to Liberia, both next door neighbours.

The majority of African international telephone traffic revolves around four axis: within Africa (and then mainly with South Africa); with the Arab States (mainly with North Africa); Western Europe; and the United States. There are not many significant South-South routes although they are starting to emerge. There is a growing amount of traffic between India and several East African countries. Other notable South-South routes include South Africa's Asia-Pacific traffic (with Australia, Hong Kong, Japan and Taiwan-China) and the lusophone Angola-Brazil route (close to 2 million minutes).

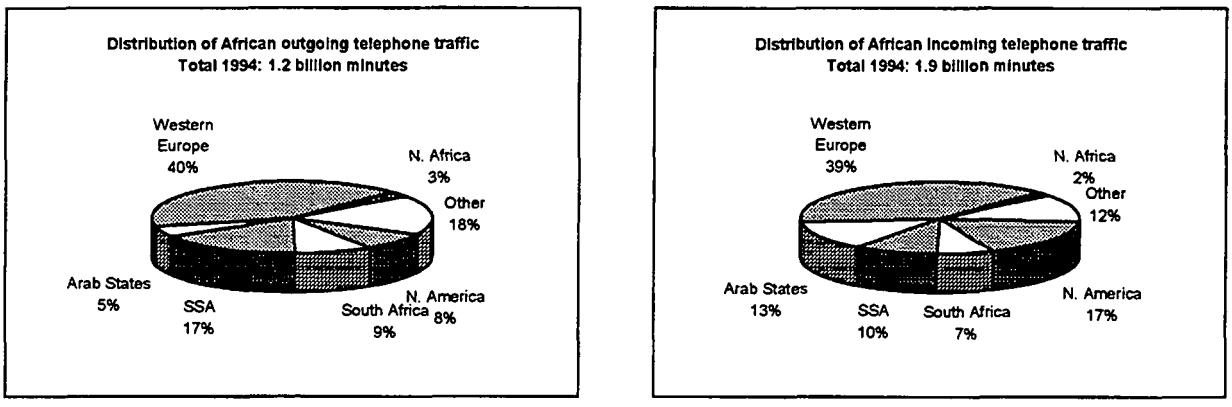
Table 2: Out of Africa
Outgoing international telephone traffic, selected countries, 1994

Country	Total traffic (minutes m)	of which: African (minutes m)	African %	Main bilateral relation	Traffic (minutes)	Bilateral %
Angola	17'785	1'541	9%	Portugal	9'107	51%
Benin	4'460	2'516	56%	France	14'901	33%
Cameroon	22'678	2'802	12%	France	10'046	44%
Cape Verde	3'246	349	11%	Portugal	1'931	59%
Central Afr. Rep.	2'414	802	33%	France	1'235	51%
Gambia	4'228	1'133	27%	United Kingdom	1'043	25%
Senegal	18'125	5'094	28%	France	7'777	43%
Tanzania	4'845	705	15%	United Kingdom	1'157	24%
Togo	9'003	3'929	44%	France	2'929	33%
Uganda	3'533	421	12%	United Kingdom	939	27%
10 above	**90'319**	**19'292**	**21%**		**37'654**	**42%**
All Africa	**1'178'205**	**335'592**	**28%**			

Source: ITU/TeleGeography Direction of Traffic Database.

[1] The largest non-neighbouring routes in Africa are South Africa-Zambia (6 million minutes) and Malawi-South Africa (4.5 million minutes). Of course for island countries, all traffic is to "non-adjacent" countries. Two significant routes in that category are Mauritius-Reunion (4.8 million minutes) and Mauritius-South Africa (3.4 million minutes).

Figure 4: Where it goes and where it comes from
Distribution of African international telephone traffic, 1994



Source: ITU/TeleGeography Direction of Traffic Database.

4 Infrastructure

International telephone calls in Africa pass through several types of infrastructure: terrestrial radio, microwave and cable links; through space via satellites; and undersea submarine cables. In an ideal world, each country would have direct communication links to all other countries. With over 200 countries in the world, this is not economically practical. Therefore countries establish direct connections to their main calling destinations and rely on larger operators with more extensive international networks to deliver their other traffic. This transit traffic is a lucrative business. Estimates of the amount that African operators pay for transit fees range from $US 400-1 000 million a year.[2] Several countries in the region, notably South Africa, Kenya and Morocco, have established themselves as hubs, offering lower cost routing but the majority of transit traffic flows through Europe. As the volume of traffic grows to indirect destinations, countries eventually desire to establish their own direct links so the availability, cost and quality of international infrastructure are critically important.

Terrestrial links

Many inter-African land-based links are based around the Pan-African Telecommunications Network (PANAFTEL). Implementation of the project began in 1975. By 1990, PANAFTEL radio-relay links in the region totalled some 38 000 kilometres in length, with 39 international telephone switching centres and 8 000 kilometres of submarine cable. Forty-two out of 45 countries participating in the project had built international satellite earth stations.[3]

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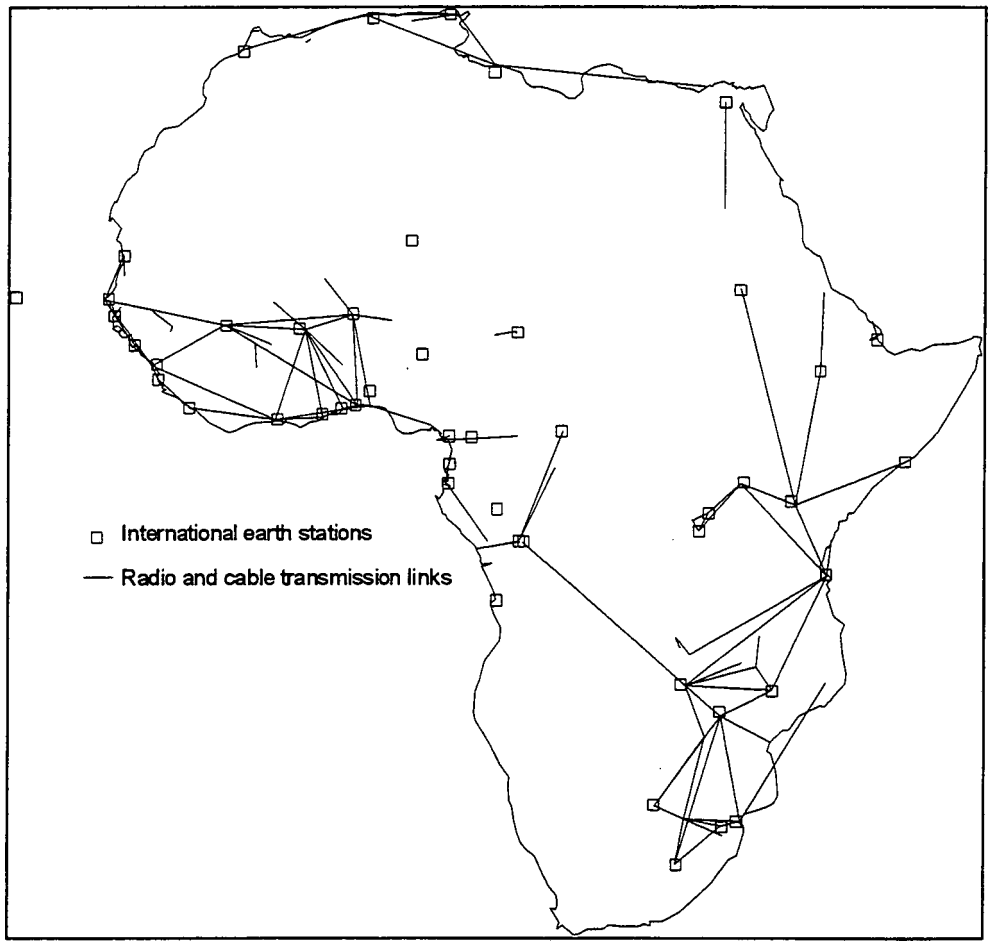
2 "African countries are wasting up to $US 400 million per year through obligatory routing of intra-African telephony traffic through Europe." See L. Perlman. "INTELSAT Flying High." *Telecommunications in Africa*. January/February 1996. The same issue goes on to say: "At this stage, African countries spend $ 900 million a year with overseas switching centres, and this money could be kept within Africa if the necessary infrastructure is available."

3 See I. Girmaw. "The PANAFTEL Project." In *Working Documents*. African Telecommunication Development Conference 1990. Volume II, ITU, Geneva 1991.

Despite the fact that PANAFTEL has grown from a few isolated transmission links, its utilization is not commensurate with the investment made and much telecommunications traffic that could be carried by the system is still being routed through transit centres outside Africa. Part of the problem stems from a lack of commitment on the part of countries involved. A regional network is dependent on each country doing its share. If one country does not maintain its portion of the network, then traffic flowing from other countries will be affected. Most of the proposed links connecting East to West Africa are not operational due to poor maintenance or lack of funding. As a result there are large gaps especially in the centre of the continent (see Figure 5). Another problem is that a relatively low portion of African traffic is inter-regional and tariffs are high between neighbouring countries. Furthermore, a number of African countries use a *sender keeps all* scheme to neighbours, leaving little initiative for receiving countries to terminate calls.

Figure 5: Missing links
Status of PANAFTEL network, 1990



Note: Generated by ITU/BDT PLANITU system.
Source: ITU/BDT.

Satellite

Practically all African countries have international earth stations and due to the lack of terrestrial or submarine cable connections, the majority of African traffic is routed through satellite communications. Most of the traffic is carried by INTELSAT with some of the North African traffic handled by ARABSAT.

Many African countries feel that a regional satellite system would be more economical and efficient. This led to the establishment of the Regional African Satellite Communication System (RASCOM), headquartered in Abidjan, Côte d'Ivoire. Thanks to their collaboration within RASCOM, African countries have been able to negotiate lower charges from INTELSAT by pooling their requirements for transponders. RASCOM is working with INTELSAT on the launch of two new satellites in 1997 that will have extensive African coverage. The PanAmSat PAS-4 satellite also has a footprint which covers most of the continent, though its chief use to date has been for direct-to-home (DTH) satellite television.

Submarine cables

There are a number of initiatives to plug Africa into the global information network through fibre optic undersea cables. At present, the only fibre links from Africa to the rest of the world are from South Africa, several from the Maghreb countries and Djibouti. The French telecommunication equipment manufacturer Alcatel is working with a number of nations to develop a West African undersea fibre optic cable that would connect to Europe. The Africa ONE project, led by AT&T of the United States, plans to build a fibre ring around the continent. Siemens, the German equipment manufacturer, has proposed a 6 000 kilometre series of fibre optic links along the western coast of Africa. A different approach comes from Telkom South Africa through the use of its South Africa Far East (SAFE) cable; overseas African traffic would be relayed via satellite to South Africa and then sent over the SAT-2 fibre optic cable.

All of these proposals aim to reduce the need for switching international traffic overseas which would cut transit costs for the region. However the overwhelming majority of overseas Sub-Saharan African traffic passes through satellite and capacity is sufficient to handle present and short-term forecast traffic volumes. Existing satellite usage, in conjunction with the relatively low volume and growth of African telephone traffic compared to other regions, suggests that four different fibre optic proposals might be an unnecessary duplication of international infrastructure for a region that is desperate for investment in basic telephone service.

5 Threats

Developments such as call-back or credit-card calling merely reverse the billing of international telephone calls. African operators generally benefit from these schemes because they tend to generate incoming traffic, which as mentioned, provides foreign exchange. Also, specialized networks such as the Internet or those used for banks and airlines provide features for which conventional telephone networks are not well suited and in the case of specialized industry applications, require reliability that only a private network can provide. Therefore, they too do not pose a threat to the region's telecommunication operators and can provide them with opportunities such as leasing lines or being Internet access providers. More serious threats arise from the use of alternative infrastructure to transport international telephone calls.

In some African countries, new mobile cellular market entrants are bypassing the international networks of incumbent operators. These cellular systems use satellites to connect dispersed cell sites and provide national and international coverage. In Zaire, the cellular operator is using INTELSAT to tie together its cellular systems in six cities and provide long-distance and international service. In Ghana, one of the cellular operators has leased capacity from INTELSAT to connect its cellular networks in Accra and Kamasi and plans to expand this to other cities. In Guinea, an unlicensed cellular operator does all of its switching through satellite back to an exchange in the United States.

Another looming threat for incumbent operators is cellular roaming. The possibility for roaming is being created through the introduction of compatible cellular systems such as the digital GSM standard. The explosive growth of GSM in South Africa and close trade and communication links in the southern portion of the continent, suggests the possibility of an extended GSM zone stretching from South Africa to Namibia in the north-west and Uganda in the north-east. This zone could provide roaming for around a dozen countries. Namibia and Uganda commenced operation of GSM systems in 1995. In Malawi, a joint venture between the national operator and Telekom Malaysia is building a GSM network while Tanzania, Zambia and Zimbabwe intend to license GSM networks. The treatment of the settlement of international calls with cellular roaming could have repercussions for incumbent fixed-line operators.

Emerging telecommunication alliances may also pose a threat to Africa's incumbent operators. These consortia include Concert (BT and MCI), Global One (France Telecom, Deutsche Telekom and Sprint), Unisource (PTT Telecom Netherlands, Telia (Sweden), Swiss Telecom, Telefónica (Spain) and WorldPartners (founded by AT&T, KDD (Japan) and Singapore Telecom). They are targeting the world's largest multinational corporations, aiming to provide them with global connectivity. Many large multinational companies operate in Africa and are among the incumbent operator's biggest customers.

Finally a number of low-earth orbiting satellite systems (e.g., Globalstar, Ico, Iridium and Odyssey) aim to provide global coverage for mobile subscribers and plan to be operational before the year 2000. One of their target customers is the international business person, which for African telecommunication operators, is an important client.

Conclusion

This article began by illustrating the importance of international telecommunication revenues for the region's telecommunication operators. In the long run, this dependency is not sustainable and African operators need to diversify their revenue base. Local and national services need to be developed, but in order to do that, revenues from international services are needed to build up local infrastructure. Many African countries nationalized previously separate international operations owned by foreign companies after recognizing that distinct international companies do not contribute to development of the local network. The looming threats to international telephone traffic may once again cause a split, with new market entrant interests limited to developing the international telephone network without a parallel development of local networks, especially in rural areas. The benefits of telephony will continue to be restricted to a privileged minority of the African population. This has serious implications not only for economic and social development, but also for the development of democracy in the region.

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The author is indebted to Tim Kelly for his insightful comments. This article also draws on the Telecommunication Foundation of Africa report *Pan-African Connectivity: Responses to Increasing Traffic*.

TABLE 3

Africa - Main lines and international telephone traffic, 1995

Country	Population	Main telephone lines		International outgoing telephone traffic (minutes)			
	Total (m)	Total (000s)	Per 100 people	Total (000s)	CAGR 1990-95	Per subscriber	Per inhabitant
Algeria	27.9	*1'122.4*	4.11	*87'000.0*	-1.4%	77.5	3.1
Egypt b)	58.7	*2'456.2*	4.27	*92'789.3*	17.7%	37.8	1.6
Libya	5.4	318.0	5.88	46'654.8	9.8%	146.7	8.6
Morocco	27.0	*992.8*	3.75	*129'801.4*	11.2%	130.7	4.8
Tunisia	9.0	*474.3*	5.38	*64'000.0*	-0.2%	134.9	7.1
North Africa	**128.1**	**5'363.6**	**4.19**	**420'245.5**	**6.8%**	**78.4**	**3.3**
South Africa a)	42.5	3'844.5	9.24	262'600.0	13.9%	68.3	6.2
South Africa	**42.5**	**3'844.5**	**9.2**	**262'600.0**	**13.9%**	**68.3**	**6.2**
Angola	11.1	60.0	0.54	*17'785.5*	25.1%	296.4	1.6
Benin	5.4	28.2	0.52	5'970.4	12.3%	211.7	1.1
Botswana a)	1.5	50.4	3.50	28'402.0	6.8%	563.0	19.1
Burkina Faso	10.3	*26.3*	0.26	*5'630.2*	29.5%	213.8	0.5
Burundi	6.4	17.2	0.27	2'804.1	17.7%	163.3	0.4
Cameroon	13.2	59.7	0.45	23'809.8	10.4%	399.2	1.8
Cape Verde	0.4	21.5	5.49	3'929.7	19.1%	182.7	10.0
Central African Rep.	3.3	7.8	0.23	2'357.2	8.6%	303.4	0.7
Chad	6.4	5.3	0.08	*1'573.8*	8.0%	295.1	0.2
Comoros	3.5	*4.3*	0.88	*1'299.8*	3.9%	304.3	2.6
Congo	2.6	*20.6*	0.82	*5'000.0*	-6.6%	243.3	1.9
Côte d'Ivoire	14.3	*108.4*	0.79	*27'065.5*	3.9%	249.7	1.9
Djibouti	0.6	*7.5*	1.33	*4'502.9*	2.4%	599.1	7.8
Equatorial Guinea	0.4	*2.5*	0.65	*558.5*	...	222.1	1.4
Eritrea	3.5	17.2	0.49	1'204.3	...	70.2	0.3
Ethiopia	55.1	142.5	0.26	10'499.4	7.5%	73.7	0.2
Gabon	1.1	*31.4*	3.03	*15'811.5*	0.3%	503.6	14.9
Gambia a)	1.1	18.3	1.69	4'228.2	18.4%	231.0	3.8
Ghana	17.5	60.0	0.34	16'758.8	28.6%	279.4	1.0
Guinea	6.7	10.9	0.16	1'670.4	-26.5%	153.9	0.2
Guinea-Bissau	1.1	*9.4*	0.89	*1'965.6*	30.3%	209.7	1.8
Kenya b)	26.7	239.6	0.90	20'884.2	0.3%	87.1	0.8
Lesotho	2.1	*13.1*	0.65	*12'000.0*	8.0%	918.1	5.9
Liberia	3.0	*4.5*	0.15		...	...	...
Madagascar	13.5	*33.7*	0.26	*4'500.0*	9.7%	133.6	0.3
Malawi	11.2	*33.1*	0.31	*7'616.9*	15.8%	230.2	0.7
Mali	9.8	17.2	0.17	7'628.3	7.3%	444.5	0.8
Mauritania	2.3	*8.4*	0.38	*4' 823.4*	14.6%	571.3	2.1
Mauritius	1.1	148.2	13.27	20'022.0	10.0%	135.1	17.9
Mayotte	0.1	*4.3*	4.07		...	...	...

Mozambique	17.7	57.5	0.32	10'793.9	13.0%	187.7	0.6
Namibia c)	1.5	78.5	5.10	*42'000.0*	1.2%	535.0	27.3
Niger	9.2	13.3	0.15	3'529.4	2.9%	264.5	0.4
Nigeria	111.0	405.1	0.36	94'316.0	18.1%	232.8	0.8
Réunion	0.7	*210.2*	32.69		...	...	...
Rwanda	8.0	*15.0*	0.19	*1'342.3*	-9.5%	89.5	0.2
S. Tomé & Principe	0.1	*2.5*	1.97	*452.8*	16.7%	184.1	3.5
Senegal	8.3	82.0	0.99	20'230.7	8.3%	246.8	2.4
Seychelles a)	0.1	13.2	17.87	2'175.9	9.0%	164.6	29.4
Sierra Leone	4.7	16.6	0.35	2'291.8	29.3%	137.8	0.5
Somalia	9.2	*15.0*	0.17		...	...	...
Sudan	28.1	*64.0*	0.23	*11'651.2*	11.6%	182.1	0.4
Swaziland a)	0.9	18.6	2.05	12'500.0	3.2%	671.9	13.4
Tanzania	29.7	90.3	0.30	5'660.1	17.8%	62.7	0.2
Togo	4.1	21.5	0.52	8'487.4	5.6%	394.5	2.1
Uganda b)	19.2	43.2	0.23	4'793.3	-10.4%	110.8	0.2
Zaire	43.9	36.0	0.08	1'311.1	...	36.4	0.0
Zambia a)	9.5	79.8	0.87	10'927.9	0.3%	137.0	1.2
Zimbabwe b)	11.3	154.6	1.37	5'567.6	-19.3%	36.0	0.5
Sub-Saharan Africa	**549.2**	**2'628.1**	**0.48**	**498'334.0**	**8.4%**	**189.6**	**0.9**
Africa	**719.8**	**11'836.2**	**1.64**	**1'181'179.5**	**8.9%**	**99.8**	**1.6**

NOTE - a) Year ending 31 March. b) Year ending 30 June. c) Year ending 30 September. Figures in italics refer to earlier years or are estimates.

Source - ITU World Telecommunication Indicators Database.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 21-E
4 April 1996
Original: French

For Action

Agenda item: 2.4 **PLENARY MEETING**

SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU

TITLE: REVITALIZATION OF THE PANAFTEL AND MANAGEMENT INFORMATION SYSTEM PROJECTS

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1 Introduction

In order to give effect to the recommendations of the mission carried out in 1991 to evaluate the two PANAFTEL projects (RAF/87/011: Operation/Extension and RAF/87/085: Maintenance/Rehabilitation), and the recommendations of the Steering Committee of the two projects, which met in Cotonou in December 1991, a project document was drawn up in collaboration with the African countries and subregional and regional organizations with a view to following up the two PANAFTEL projects during the 1992-1996 programming cycle.

Implementation of the future project was to be undertaken at subregional level, in order both to take account of the realities and conditions of each subregion and to increase the involvement of the African telecommunication administrations in the project activities.

The Steering Committee of the two PANAFTEL projects had also recommended that specific actions be undertaken to help provide the African countries with management information flows and systems at national, subregional and regional levels. A project document was prepared, taking account of BDT's field activities, especially with regard to the technical management of networks.

2 Objectives of the AFRITEL project

The objectives of the project were:

– to have a reliable and high-quality integrated telecommunication network enabling all the countries to communicate between themselves without transiting through countries outside Africa; the African networks should also allow the interconnection of satellite networks which will be implemented within the RASCOM project and terrestrial networks;

- to progressively digitize networks and introduce new services (cellular radiocommunication, data transmission, etc.);
- to have a regional tariff structure based on actual costs in Africa, as well as coherent and efficient management and operational structures of telecommunication services;
- to extend telecommunication services to rural areas for a better participation of the populations of those localities in economic activities and the improvement of their social conditions;
- to improve structures and procedures for management of the network;
- to strengthen regional and subregional telecommunication organizations so as to enable them to undertake coordination and advisory tasks towards the development of intra-African telecommunications*.

3 Objectives of the MIS project

The objects of the MIS project are:

- to position telecommunication policy-makers and senior managers to continuously monitor and react to the changes in the domestic and global environment and to make timely decisions that will lead to business practices that are market-driven and better meet the needs of the African telecommunication users;
- to enable telecommunications to be used as a proactive lever to gain efficiencies in all other sectors of the economy. To develop the capabilities within the telecommunication sector to work with all other sectors in improving their services by adopting telecommunication services to gain operating efficiencies;
- at the national level, to assist the national operators with the establishment of efficient management information flow procedures and management information systems (MIS) within the operating entities and useful to other operators;
- at the subregional and regional levels, to assist with the establishment of efficient information flow procedures from the national level to the subregional and regional organizations and international organizations such as ITU;
- to assist the African telecommunication operators with the use of circuit and traffic route techniques and information tools for reducing cost and increasing profitability of subregional, regional and international telecommunication services;
- to provide targeted training to improve technical skills in management information systems within Africa and to encourage training assistance between African countries through technical cooperation between developing countries (TCDC) arrangements. In particular, to assist telecommunication service providers in implementing data collection and analysis systems and computerized service modelling tools;
- to promote, within the telecommunication sector in Africa, the adoption of market-driven business management techniques and information-based policy-making practices*.

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* Project document available on request.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 22-E
11 April 1996
Original: French

For Action

Agenda item: 0.1 **PLENARY MEETING**

SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU

TITLE: EVALUATION OF THE FOLLOW-UP AND IMPLEMENTATION OF DECISIONS FROM AF-RTDC-90, WTDC-94 AND PP-94

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1 Introduction

In conformity of Article 14 of the Nice Constitution, the Telecommunication Development Bureau (BDT) organized the first African Telecommunication Development Conference (ATDC-90) in Harare, Zimbabwe, from 6 to 11 December 1990. This Conference, it will be remembered, coincided with two important events: the launching of the second Transport and Communications Decade in Africa (1991-2000) and the preparation of the 5th UNDP Programming cycle (1992-1996). The Harare Conference was followed four years later by the first World Telecommunication Development Conference (WTDC-94), held in Buenos Aires from 21 to 29 March 1994.

The actions recommended by the BDT at the Harare Conference revolve around five different themes:

- development of telecommunications in Africa: policy, strategies and financing;
- improvement of telecommunication networks and services;
- improved management and planning in the entities responsible for telecommunications;
- human resources development and management;
- development and promotion of a telecommunications industry in Africa.

The Harare Conference adopted four resolutions and six recommendations, while the World Conference adopted eleven resolutions and two recommendations together with a Plan of Action consisting of 12 programmes, the so-called Buenos Aires Action Plan (BAAP: Table 1). The Kyoto Plenipotentiary Conference (October - November 1994) approved, *inter alia*, Resolution 30 calling for the adoption of special measures for the least developed countries (LDCs) and Resolution 34

calling for assistance and support to Liberia, Somalia and Rwanda for rebuilding their telecommunication networks. Table 2 contains a list of the different resolutions and recommendations adopted by these Conferences that have an impact on the development and improvement of telecommunication networks and services in Africa.

2 Implementation status of the resolutions/recommendations and the BAAP programmes

One of the important achievements is the preparation of the African Green Paper by a group of African experts under the coordination of an international consultant. The Green Paper represents a first attempt to develop a general policy framework for the telecommunication sector in Africa. It should be viewed as a thought-provoking document suggesting a particular approach and offering a number of potential options for defining and bringing about, as harmoniously as possible, the restructuring of the telecommunications sector in Africa. Other follow-up activities have been organized in the form of symposiums, seminars, workshops, guides, handbooks and direct ad hoc assistance, with technical cooperation between the developing countries, in the following areas: telecommunications development policies, strategies and financing, tariffs, human resources development and management, telecommunication indicators, sound and television broadcasting, dissemination campaigns, maritime radiocommunications, network maintenance and improvement, etc. The main activities conducted by the BDT in connection with the implementation of the resolutions/recommendations and the BAAP programmes on behalf of the African countries are summarized in the Annex to this Report.

3 Problems and difficulties encountered in implementing the resolutions/recommendations

Since the Harare Conference in December 1990, the telecommunications environment in Africa has undergone, and continues to undergo, important alterations affecting the BDT's assistance and cooperation activities in the African countries:

- A drastic decrease in UNDP funds for the financing of regional and national telecommunication projects in connection with a policy change involving, *inter alia*, national implementation of projects and programming by country. The direct result of this policy change by UNDP was the sudden termination of all regional telecommunication projects, such as the two PANAFTEL projects involving, respectively, operation and extension, and maintenance and rehabilitation of networks, or AFRALTI and ESMT, two multinational centres for vocational training in telecommunications. This development is particularly regrettable, since owing to the difficulties faced by most of the subregional and regional African organizations involved in telecommunications, the two PANAFTEL projects also served as a framework for the coordination and harmonization of the different efforts to develop and operate telecommunication networks in Africa.
- The political problems that have affected several African countries, resulting in the partial or total destruction of their national telecommunication networks. In certain countries, efforts to implement technical assistance projects were interrupted, or at best considerably delayed.
- The strong pressure on the African countries, exerted principally by the Bretton Woods institutions, to privatize their telecommunication operators through structural adjustment programmes. This restructuring of the telecommunications sector under outside pressure

does not always take place in optimal conditions: insufficient time and perspective fully to perceive the consequences of restructuring, lack of a regulatory body capable of establishing the rules of the game beforehand and lack of specialized and experienced personnel in the fields of liberalization, privatization, etc.

- In spite of the presence of numerous subregional organizations working in the economic area or promoting integration, increased dialogue and cooperation between African countries will clearly be needed if they are to benefit from economies of scale in the purchase of certain installations and the implementation of certain projects. At the same time, there seems to be a certain amount of reluctance to implement certain subregional projects even when their utility and profitability has been proven, for example the subregional maintenance centres.
- Inability on the part of the regional and subregional organizations to carry through the implementation of the resolutions/recommendations adopted by the conferences and meetings due to inadequate means and structures. The situation is different in other regions, where the regional organizations mobilize their forces and assume responsibility for the implementation of the main decisions of the conferences and meetings.
- The introduction of one or several operators in the telecommunication networks of the African countries could jeopardize the application of plans for the routing of inter-African calls if steps are not taken with respect to both regulation and the dimensioning of international exchanges and links so that the different players can be persuaded to use those facilities for the routing of international calls.
- Finally, the ITU as a whole, and the BDT in particular, has been unable to react rapidly to the new context resulting from the almost complete withdrawal of UNDP from the financing of technical assistance and cooperation in the telecommunications sector.

4 Positive aspects

In spite of the enormous difficulties of various sorts (political, economic and social) encountered by the African countries over the past five years and which have weighed heavily on the development of telecommunications, certain initiatives and actions taken during that period by the African countries are worth mentioning and encouraging.

Firstly, the creation of the RASCOM Organization as a logical follow-up to the feasibility studies on the RASCOM project is a clear sign of the desire of the African countries to work together to develop and improve inter-African telecommunications. A number of countries classified as LDCs were not only the first to pay their minimum flat-rate contribution of $US 10 000 for the completion of the feasibility studies, but also among the first to subscribe to the minimum capital required for the actual creation of the RASCOM Organization. It is now up to the African countries and the entities in charge of telecommunications to ensure that the RASCOM Organization achieves the triple objective that it has set itself:

- improvement of inter-African communications;
- improvement of trunk communications within each country;
- extension of telecommunication services to rural and remote areas in the different countries.

Another achievement which is very much to the credit of the group of African experts convened within the framework of the AITPSG is the production of the African Green Paper, to be formally adopted by the African ministers concerned during this Conference.

The third achievement worth mentioning is the success of the Higher Multinational School for Telecommunications (ESMT) in Dakar, which not only survived the loss of UNDP financing in 1991, but contributes decisively to the training of senior managers from the participating countries. Over the past few years, moreover, the ESMT has been able to participate in certain technical cooperation actions between developing countries, organizing courses on digital techniques in Burkina Faso and Madagascar, and carrying out the training of technical staff from local networks in Mali.

With respect to the ITU, the most significant positive development has undoubtedly been the creation of the BDT, the third Sector of the Union, responsible for the development of telecommunication networks throughout the world, and particularly in developing countries. Also worth mentioning among the positive developments is the establishment of two study groups within the BDT, one to study telecommunication development strategies and policies, including financing policies, and the other to study the means to be implemented by the developing countries for applying new technologies. In order to ensure that the decisions/recommendations adopted by the two study groups give due consideration to the concerns and to specific nature of each country, the developing countries, including the African countries, must organize themselves to participate actively in their work.

Finally, there are the special measures adopted by the Plenipotentiary Conference for the least developed countries. Over the past few years, a large proportion of the technical assistance provided by the ITU/BDT to the developing countries was devoted to the LDCs.

5 Future prospects

In spite of these encouraging initiatives, a number of questions remain:

As we enter the third millennium, the telecommunications sector is set to undergo far-reaching and rapid change. In so far as technology goes, three trends are clearly emerging. These are higher mobility, increasing multimedia applications, particularly for information services, and enhanced network intelligence[1].

Faced with this breathtaking evolution of technology, how will Africa deal with the modernization of its telecommunications network, solve the problem of charging for services and thus reduce the gap that separates it from the rest of the world?

How should information networks be integrated into telecommunication networks and how should the different initiatives to facilitate the interconnection of Africa with world information networks such as INTERNET be coordinated?

What impact will new technologies have on the development of telecommunication networks in Africa, for example mobile radiocommunications, particularly low-orbit satellites, or cellular radiocommunications.

It goes without saying that over the next few years, these new technologies and services will be increasingly important in the designing and planning of telecommunication networks in Africa, including rural telecommunication networks.

As for market structures, greater liberalization and competition are very much on the cards. How will Africa prepare itself for these changes, which are often imposed from outside?

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[1] Taken from "ITU, Celebrating 130 years 1865-1995".

These are some of the basic questions that will be discussed during the Conference.

Hopefully the Conference, conscious of how far behind Africa is, will leave the beaten track and come up with appropriate solutions that take due account both of the needs of current and potential users and of the new world telecommunications environment.

TABLE 1

Buenos Aires Action Plan

Programme	Field of activity
Programme No. 1	Policies, strategies and financing
Programme No. 2	Human Resources Management and Development (HRM/HRD)
Programme No. 3	Guidelines for the elaboration of a business-oriented development plan
Programme No. 4	Development of maritime radiocommunication services
Programme No. 5	Computer-aided network planning
Programme No. 6	Frequency management
Programme No. 7	Improvement of maintenance
Programme No. 8	Mobile cellular radio telephone systems
Programme No. 9	Integrated rural development
Programme No. 10	Broadcasting infrastructure
Programme No. 11	Information services
Programme No. 12	Development of telematics and computer networks

TABLE 2

Resolutions and Recommendations adopted by ATDC-90, WTDC-94 and PP-94 concerning Africa

Field of application	Resolution/Recommendation	Title of Resolutions/ Recommendations
Policy, strategies and management	ATDC-90/Res. 1	African information and telecommunication policy and strategy
	Resolution 4 (WTDC-94, Res. 4)	Telecommunication policies and strategies
	ATDC-90/Rec. 1	Development of telecommunication equipment manufacturing industries in Africa
Improvement of telecommunication networks and services	ATDC-90/Rec. 2	Improvement of networks and services
	ATDC-90/Rec. 3	Tariffs
	ATDC-90/Rec. 4	Development of maritime radiocommunications in Africa
	ATDC-90/Rec. 5	Development of sound and television broadcasting in Africa
	ATDC-90/Res. 4	The African satellite television news exchange system
Human resources	ATDC-90/Rec. 6	Improvement of human resources management and development
Issues relating to investment and technical cooperation	ATDC-90/Res. 2	Financing the development of telecommunications in Africa
	ATDC-90/Res. 3	Improved coordination and optimization of international assistance resources
Special assistance	WTDC-94/Res. 1	Special programme of assistance for the least developed countries (LDCs)
	PP-94, Res. 34	Assistance and support to Liberia, Somalia and Rwanda for rebuilding their telecommunication networks

As can be seen, the 12 programmes of the Buenos Aires Action Plan reproduce and incorporate the different Resolutions and Recommendations adopted by the African Telecommunication Development Conference.

ANNEX

Status of implementation of the ATDC-90 Resolutions and Recommendations and the BAAP programmes

Issue	Expected output	Status of implementation
Telecommunications policy and strategies ATDC-90/Res. 1 **African information and telecommunication policies and strategies** BAAP - Programme 1	1 Recommendations to African governments on the restructuring of telecommunication services and the creation of a national coordination committee	1.1 Several administrations have begun restructuring or intend to restructure their telecommunication services. Two joint World Bank/ITU seminars were held on this subject, in Washington in 1991, and in Tunis in 1992. 1.2 A colloquium on telecommunications and economic prosperity was organized in February 1994 in Abidjan. The seminar focused on case studies concerning sectorial policies and strategies. 1.3 Certain countries created national coordination committees, while others already had a similar body. 1.4 In addition, a training seminar was held in November 1995 in Maputo, Mozambique, for the English-speaking African countries.
	2 Creation of a permanent African Information and telecommunication policy study group (AITPSG) tasked with the preparation of a regional telecommunications policy paper (the African Green Paper).	2 Following three meetings, the African Information and Telecommunication Policy Study Group (AITPSG) produced the African Green Paper for consideration and adoption by the second Development Conference in Abidjan as a thought-provoking tool for the continent on telecommunication development policy.

	3 The AITPSG should prepare and draft suitable recommendations for the African countries on the basis of the guidance received from the appropriate political and economic bodies.	3 The third meeting of the AITPSG, held in Praia, Cape Verde, from 21 to 25 November 1994, made proposals for follow-up activities to the African Green Paper and for other future AITPSG activities.
	4 The BDT should conduct case studies and support the AITPSG meetings.	4.1 The World Bank, with the financial participation of the BDT, conducted case studies concerning telecommunication restructuring policies in Benin, Ghana, Mozambique, Tanzania and Uganda. 4.2 A study on the implications of trade in services for Africa was conducted in the framework of UNCTAD's Coordinated Programme for Assistance in Services. Five case studies were conducted: in Ghana, Senegal, Guinea, Uganda and Tanzania. 4.3 Assistance in the restructuring of the telecommunications sector was provided to Zimbabwe, Mali, Cape Verde, Mauritius and Ethiopia.
	5 The ITU/BDT is to submit a report on the implementation of this Resolution to the Abidjan Development Conference.	5 A report will be submitted to the Abidjan Development Conference, which will be called upon to adopt the final version of the African Green Paper.
Financing strategies ATDC-90/Res. 2 **Financing the development of telecommunications in Africa** BAAP - Programmes 1 and 3	1 To supply the African governments with information on policies and procedures for financing.	1 A handbook was prepared and distributed to all of the African countries on the restructuring of telecommunications in developing countries. A revised version was also distributed to all of the participants in the World Telecommunication Development Conference held in Buenos Aires from 21 to 29 March 1994.

	2 To assist the countries in drafting their master plans for telecommunication development.	2.1 A set of guidelines for the elaboration of a business-oriented development plan is currently being finalized. Once it has been translated into the main working languages of the ITU, it will be disseminated in the different countries through subregional workshops/seminars. 2.2 The Round Table on Telecommunication Investment and Financing Strategies held in Gambia (February 1994) focused on modalities for the mobilization of resources and the participation of the domestic private sector in telecommunication investments.
	3 To organize sector studies in telecommunications.	3 Sector studies in telecommunications were conducted in Malawi, Angola, Eritrea, Uganda and the South African Republic with the financial assistance of UNDP.
	4 To recommend African governments and telecommunication administrations to: – create a favourable investment climate; – introduce business practices in the operation of telecommunications; – organize training programmes on the management of services for all staff; – extend the possibilities for financing.	4 A colloquium on financing telecommunications was held in Abidjan from 25 to 29 March 1996. The purpose was to provide the African telecommunication administrations with information on the various forms of financing partnerships for telecommunication projects and to contribute to the current Development Conference. The colloquium also aimed to develop practical strategies to increase financing in the telecommunication sector.

ATDC-90/Res. 3 **Improved coordination and optimization of international assistance resources**	1 To assist in strengthening regional cooperation through the creation of an African experts roster to promote and develop technical cooperation between developing countries, to create a data bank of indicators, to utilize regional training possibilities, to encourage increased participation of national experts in development projects, to strengthen PATU, to increase the use of TCDC assistance mechanisms and to encourage voluntary contributions by governments and the private sector.	1 An African experts roster exists in the BDT recruitment services and is regularly updated. Owing to limited resources and particularly to the sudden termination of regional projects such as PANAFTEL, activities relating to the strengthening of PATU have been fairly limited, with the exception of the ongoing assistance for the restructuring of that organization. The ITU data bank covers the African region, and each year since 1993, the BDT has published a booklet on telecommunication indicators in Africa. The Technical Cooperation among Developing Countries (TCDC) mechanism has been used in several areas, particularly for the digitization of the inter-State networks involving seven countries of West Africa (Benin, Burkina Faso, Côte d'Ivoire, Guinea, Mali, Niger and Senegal), operation, computer-aided planning and vocational training. Particularly worth noting in the field of vocational training is the organization by the ESMT of a course in digital techniques in Burkina Faso and Madagascar, and a course on local networks in Mali.
	2 To assist the African countries in preparing sector studies and telecommunication development plans, identifying and preparing projects and organizing donors' meetings and round tables.	2 As already mentioned, sector studies were conducted in four countries. Others are planned for Liberia, Sierra Leone and Zaire in 1996. A round table was organized in Banjul, Gambia, in February 1994, on telecommunication investment and financing strategies.
	3 To prepare a manual on quality of service indicators.	3 A manual on quality of service indicators was prepared by ITU officials responsible for the management, operation and maintenance of networks in Africa. This manual was broadly disseminated among the telecommunication administrations, *inter alia* through workshops organized in Yaoundé in June 1994 for the French-speaking countries, and in Nairobi in April 1995 for the English-speaking countries.

ATDC-90/Res. 4 **The African Satellite Television News Exchange System** BAAP - Programme 10	1 Recommendation to the Member States, in exercise of their sovereignty, to introduce tariffs which take account of the interests of telecommunication service suppliers and of broadcasters.	1 The States bear full responsibility for the implementation of this Recommendation.
	2 Support for the African Satellite Television News Exchange System (AFROVISION).	2 The BDT and the Friedrich Ebert Stiftung (FES) of Germany have assisted URTNA in its efforts to launch the AFROVISION television service (regional TV news exchange) which continues to operate satisfactorily. The BDT and the Telecommunication Standardization Bureau (TSB), in cooperation with UNESCO and with the financial support of the FES, have conducted a study on the economic constraints to the effective utilization of telecommunications in education, science and culture, and the circulation of the information.
	3 The TSB should conduct whatever studies may be necessary to establish harmonized TV transmission tariffs in Africa.	3 This is one of the regular activities of the TSB, in particular of Study Group 3 to which the regional tariff group for Africa (TAF) belongs.
ATDC-90/Rec. 1 **Development of telecommunication equipment manufacturing industries in Africa**	1 In association with UNIDO, to assist countries in developing strategies for regional cooperation in research/development and manufacturing of telecommunication equipment.	1 UNIDO and ITU/BDT have been trying for several years to conduct a joint feasibility study on the development of telecommunication equipment manufacturing industries in Africa. The aim is to supply the governments and the different partners with technical and economic information on the status and structure of the industries with a view to developing an integrated programme for the manufacture of telecommunication equipment in Africa. There exists an updated project document on a feasibility study for which funding remains to be found.

ATDC-90/Rec. 2 **Harmonization of networks Improvement of networks and services** BAAP - Programmes 6, 7 and 8	1 To coordinate technical cooperation activities with respect to master plans, plans for the improvement of maintenance, new services, tariffs, accounting procedures, routing of traffic, etc. in the region with a view to achieving total integration of the PANAFTEL network.	1 In spite of the UNDP's sudden decision in January/February 1992 to halt the two PANAFTEL projects (operation/extension and maintenance/rehabilitation), a decision which has had a marked impact on African regional coordination actions, the BDT has been able to develop certain activities within the framework of its regular budget, and in cooperation with certain "small-m" members, in the different areas of telecommunication: – Preparation and dissemination of a manual on Signalling System No. 7 through the organization of several training workshops. – Dissemination of a manual on maintenance planning: A colloquium was held in Cotonou (Benin) from 11 to 14 December 1995 on the subregional maintenance centre of Lomé for the countries of West Africa; – Organization of seminars in Nairobi (18 to 22 April 1994) and Yamoussoukro (6 to 10 March 1995) on cellular radiocommunications. – Elaboration of a Basic Automated Spectrum Management (BASM) programme to be disseminated in the different countries with special emphasis on the training of course administrators. A first seminar took place in Nairobi from 27 November to 8 December 1995. These different activities were supported by the BDT which participated in the different meetings of the regional and subregional organizations, such as ARTC, SADCC, ECOWAS and CAPTAC; the BDT also provided ad hoc assistance on several occasions, particularly with respect to the

		Management Information System (MIS) in Burkina Faso, Benin, Congo, Madagascar, Burundi and Chad, and to maintenance (Côte d'Ivoire - network maintenance planning) etc. Guidelines for improved maintenance are currently being prepared for the developing countries by a team of consultants. Another project is currently under way for the development of a Computerized Subscriber Maintenance System (CSMS). This project was initiated in Africa with the participation of four African experts and an international consultant. A seminar on traffic took place in Harare (Zimbabwe) from 15 to 19 August with the assistance of the ITU for the countries of Southern Africa.
ATDC-90/Rec. 3 **Tariffs**	1 To conduct a tariff study, to assist the administrations and the subregional Working Groups on tariffs, and to urge the subregional organizations to coordinate the tariff studies.	1 A review of the tariff situation was conducted with LDC funds. Recommendations were drawn up for a new approach to determining telecommunication tariffs.
ATDC-90/Rec. 4 **Development of maritime radiocommunications in Africa** BAAP - Programme 4	1 To provide advisory services to African countries with significant maritime activities, whether coastal or on inland, and to train qualified staff in each country to produce national master plans for the development of maritime radiocommunications.	1 A guide for the elaboration of radiomaritime master plans was produced and disseminated in the African countries concerned through several seminars. The master plans developed by the different countries were examined and harmonized in the course of several workshops. Thirty-two African countries now have radiomaritime master plans prepared by local engineers and perfected in the course of discussions held at workshops attended by international experts. Three countries (Benin, Ghana and Mauritania) are already in

		the process of implementing their projects, with certain systems already in operation. Other countries, such as Côte d'Ivoire and Cameroon, have gone ahead with a partial implementation of their plans.
ATDC-90/Rec. 5 **Development of sound and television broadcasting in Africa** BAAP - Programme 10	1 To urge the administrations and other partners to take an active part in the ITU radiowave propagation measurement campaigns. 2 To approach UNDP: – to give favourable consideration to proposals for assistance in creating advanced level training institutes or expanding the curricula of the ESMT and AFRALTI to include training and studies in broadcasting engineering, operations and management; – to provide the necessary financial assistance to prepare sound and television broadcasting master plans and to carry out other related studies. 3 To instruct the BDT, in close collaboration with the BR and the administrations concerned as well as with regional organizations, to take the necessary	1 Radiowave propagation measurement campaigns have been conducted successfully in Ghana and Senegal. 2 Several projects for broadcasting master plans, *inter alia* in Nigeria and Gambia, have been prepared and submitted to UNDP for financing without success. 3 See Rec. 5, item 1 above.

	steps to expand propagation measurement to other regions of Africa where available data are insufficient.	
	4 To ask all governments and broadcasting administrations to continue to give high priority to training their personnel at all levels and to setting up and strengthening their training centres.	4 Subregional training for sound and TV broadcasting organized in Cotonou, Benin, in April 1994.
	5 To recommend that the broadcasting and telecommunication entities in the African countries elaborate and implement broadcasting master plans.	5 Partial replanning of the FM broadcasting network plan in Uganda: – Expansion of sound and TV broadcasting in Tanzania; – Elaboration of a sound and TV broadcasting master plan in Mali; – Restructuring of the radio and television broadcasting organization (ORTB) of Benin (HRD/HRM);. – Replanning of the FM broadcasting network plan in Malawi; – Assistance to Gambia in formulating a broadcasting and media policy and replanning of its FM and TV network plan. The BDT and the TSB, in cooperation with UNESCO, have conducted a joint study on economic constraints to the effective use of telecommunications in education, science and culture, and the circulation of information.

ATDC-90/Rec. 6 **Improvement of human resources management in African telecommunication administrations** BAAP - Programme 2	1 To assist the African countries by helping them to define and implement a human resources development and management policy, to organize management courses and produce standards for preparing and following up master plans for telecommunications development.	1 The ITU has played an active role in informing the African region of existing vocational training possibilities through the publication of the Human Resources Development Quarterly, the organization of subregional meetings on vocational training and through regular missions of the two human resources development officers. The International Sharing System is at the disposal of the administrations. Similarly, a preliminary assessment of training needs in the Portuguese-speaking countries was conducted with a view to creating a multinational vocational training centre for those countries. A seminar on management for high-level managers was organized for the English-speaking countries in Maputo, Mozambique, from 13 to 20 October 1993. A similar seminar was organized for the French-speaking countries in Yaoundé, Cameroon, in 1994. In addition, a worldwide interregional meeting on HRD/HRM and vocational training was held in Brasilia, Brazil, from 16 to 22 June 1993. A set of HRD/HRM standards and guidelines was elaborated in 1992 for inclusion in the guidelines for the elaboration of a business-oriented telecommunications master plan currently being prepared. In 1993, the BDT produced a manual to assist administrations in formulating their human resources development and management policies entitled: "Strategic planning - Organizational development and human resources management and development strategy models. A guideline for managers and consultants". The BDT also financed several fellowships for African countries to participate in USTTI courses in the United States. During 1995, the following activities were conducted:

		MANDEVTEL (Management Development For Telecommunications): – A manual and a set of documents for training workshops were produced in Portuguese (tariff structure and accounting systems for Telecom Operators) for use in the Portuguese-speaking African countries. The workshop was held in February 1996. Similar documents were prepared for the French-speaking African countries, and the workshop took place in Ouagadougou, Burkina Faso, in 1995. – A workshop on the restructuring of the telecommunications sector was organized for the English-speaking countries in Maputo, Mozambique, in 1995. Teleprojects for the production and use of technology-based training programmes: – Two workshops on the use of computers in training were organized, one in South Africa for the English-speaking countries and one in Senegal for the French-speaking countries. Fellowship programmes: – In addition to the fellowships granted under the regular BDT programme, several training agreements were concluded with organizations such as INTELSAT, TEMIC, Cable and Wireless, and the Swiss PTT for the organization of different training courses and workshops.

	2 To ask UNDP to continue providing financial support to the ESMT in Dakar and AFRALTI in Nairobi, and to support the creation of a multinational training school for the Portuguese-speaking countries of Africa.	2 In accordance with the recommendations of the ESMT and AFRALTI assessment missions, proposals for projects to consolidate the achievements of those two multinational training institutions did not receive any support from UNDP during the fifth programming cycle (1992-1996).
Integrated rural development BAAP - Programme 9	1 To assist the countries generally in improving access to telecommunication services in rural and remote areas by: – developing political guidelines at the national level; – planning rural networks; – studying and implementing pilot projects; – training through the organization of seminars.	1 In addition to the studies conducted within the framework of the TELERUL project covering Burkina Faso, Tanzania, Kenya, Algeria and Tunisia, two pilot projects are currently being elaborated in the Central African Republic and Uganda. Two seminars, organized jointly with the company Philips TRT, took place in Hammamet, Tunisia, for the French-speaking countries and Pretoria, South Africa, for the English-speaking countries. A call for proposals for pilot projects, and guidelines for preparing such proposals, were elaborated jointly with the Spacecom project. A few African countries made proposals which are currently being studied, and many African countries expressed their intention to submit proposals in 1996.
Development of telematics and computer networks BAAP - Programme 12	1 Generally to ensure better access to the information resources available in certain countries by connecting a large number of towns and villages to computer networks, including the rural communities, in countries which currently have little or no access to such resources.	1 Following the African Regional Symposium on Telematics for Development held in Addis Ababa, Ethiopia, from 1 to 8 April 1995, a High Level Working Group on Information and Communication Technologies was tasked with drawing up policies and strategy guidelines for the development of telematics networks in Africa. The resulting document has been submitted to the UNECA Ministers' Conference and to this Development Conference for adoption. It will be essential to

		coordinate this initiative with other telematics initiatives such as the African Internet Forum (AIF), the World Bank's InfoDev initiative, the Leland Initiative of USAID and the COPINE project of the European Space Agency. Pilot projects for the development of Internet services in Gambia and Ghana (in partnership with the Economic Commission for Africa, UNESCO and the International Development Research Centre, Canada within the framework of the ANI[2]) are currently being studied.
Information services BAAP - Programme 11	1 In general, to establish a data bank covering the entire telecommunications sector and to elaborate indicator series and analytical reports. To help the countries in introducing management information systems (MIS) and to develop the necessary training for their utilization.	1 Since 1993, the BDT has been trying to publish, every year, a booklet on the principal telecommunication indicators. The 1996 booklet should be distributed during this Conference. The BDT has also published a booklet in cooperation with Motorola on indicators for the LDCs.
PP-94/Res. 34 **Assistance and support to Liberia, Somalia and Rwanda for rebuilding their telecommunications networks**	1 To initiate a special action within the framework of the activities of the Telecommunication Development Sector of the Union, with specialized assistance from the two other Sectors, to provide appropriate assistance and support to Liberia, Somalia and Rwanda in rebuilding their telecommunications networks, when the conditions of order and security sought by United Nations resolutions have been achieved.	1.1 Rwanda A sector review mission made up of two experts in transmission and in switching and local networks spent the period from 27 July to 30 August 1995 in Rwanda. It reviewed the situation of telecommunications in the wake of the events that had affected the country and prepared a report, which was submitted to the Rwandan authorities. According to the report, the restoration of the telecommunications network to its pre-events level would require an investment of more than $US 10.5 million. In order to carry out these repairs and to develop the

[2] ANI: African Networking Initiative.

		telecommunications network in a short-term, an investment of some $US 40 million would be required. One of the priority actions recommended by the mission is the training of personnel. Restoration of the telecommunications training centre should be achieved as rapidly as possible in order to overcome the shortage of qualified personnel in the different services. To that end, a project document was prepared, and the total cost of the project is about $US 1.5 million. 1.2 Liberia The BDT intends to organize a telecommunications sector review mission as soon as the conditions of security permit them to do so, following which it plans to carry out its first assistance activities, in close cooperation with the authorities in charge of telecommunications 1.3 Somalia Owing to the continuing difficulties in the country, it has not been possible to conduct any technical assistance activities in the telecommunications sector.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 23-E
11 April 1996
Original: French

For Action

Agenda item: 1.2 **PLENARY MEETING**

SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU

TITLE: ROLE OF THE REGIONAL AND SUBREGIONAL ORGANIZATIONS IN AFRICA

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1 Introduction

The African Region is currently probably the region with the largest number of regional and subregional organizations of an economic or specific nature concerned with telecommunications (OAU, ECA, PATU, AMU, ECOWAS, ECCAS, CAPTAC, CACEU, KBO, SADC, COMESA, etc.). Some of these organizations have played a role, and continue to play a role, in heightening public awareness and in coordinating the development of telecommunications in Africa.

The question of the efficiency and the multiplicity of regional and subregional organizations in Africa was extensively discussed in the African Green Paper. The main ideas are recapitulated below, and could be presented in the form of a Recommendation.

The importance of regional cooperation was already highlighted by a representative at the World Telecommunication Development Conference held in 1985 in Arusha, Tanzania, who said that it was "essential for the countries of the African Region to realize the similarity of their objectives and the complimentarity of their needs, to combine their resources in order to obtain better results and, collectively, to take maximum advantage of the region's resources". Cooperation structures and frameworks exist at both the regional and international levels and the problem is rather one of managing those structures rationally.

Strengthening the role of regional and subregional organizations

Owing to the multiplicity of regional and subregional organizations, some countries currently contribute directly or indirectly to at least a dozen such bodies but, regrettably, they do not seem to draw the full benefits that such profusion suggests. In practice many of these bodies suffer from major shortcomings as to the precise definition of their mission and the means at their disposal.

These difficulties have already led to the dissolution of certain organizations, such as WAEC and UAPT.

It would perhaps be worth considering:

- reducing the number of such organizations; or
- replacing the trend towards creating bodies with permanent headquarters and staff by more flexible solutions, including working groups meeting periodically by rotation in one of the member countries;
- taking greater advantage of the regional telecommunication development conferences organized every four years by the BDT.

Issues that could be addressed in the framework of regional cooperation

Regional and subregional activities should act as a catalyst in:

- creating a homogenous area of an economically attractive size for the imported or locally manufactured telecommunications equipment market;
- harmonizing measures to be taken in the region in connection with the different aspects of development policy, in particular with a view to following up the implementation of the African Green Paper;
- making appropriate technical tools available to States engaged in international negotiations concerning telecommunications and related fields, e.g. the negotiations of the World Trade Organization (WTO), in particular the General Agreement on Trade in Services (GATS), and those of the African, Caribbean and Pacific countries (ACP) with the European Union (EU);
- forming a common African front in the face of the major world operators. If properly thought out and implemented, regional cooperation in the telecommunication sector could well lead to some integration of the more highly performing national networks and thus foreshadow the economic and political integration to which the peoples of Africa aspire.

ANNEX

Regional organizations

OAU

The Organization of African Unity, based in Addis Ababa, Ethiopia, groups together all of the States of the African continent and strives to promote an African Economic Community in which the key role of telecommunications for the development and political, social, economic and cultural integration of Africa is recognized. The OAU is active in the telecommunications sector. Article 10 of the OAU Protocol on Transport and Communications deals specifically with the future commitments of States to the development of communications.

ECA

The Economic Commission for Africa, a United Nations body based in Addis Ababa, Ethiopia, also works, *inter alia*, towards the development of telecommunications in Africa. It has been the leading agency in the two United Nations Transport and Communications Decades in Africa and has participated in many telecommunication projects at the regional level, such as the RASCOM Project.

PATU

The Pan-African Telecommunication Union was created in 1976, with headquarters in Kinshasa (Zaire), in order to coordinate the development of the pan-African telecommunication network. The supreme body of PATU is the Conference of Plenipotentiaries, which meets every four years and elects the Secretary-General and the members of the Administrative Council made up of representatives of the different African subregions. The Administrative Council comprises 12 members.

Arab Maghreb Union

The member countries of the AMU are Algeria, Libya, Morocco, Mauritania and Tunisia.

In the field of telecommunications its aims consist, in particular, in carrying out joint projects, mastering new technologies, conducting prospective studies on the technical development of telecommunications and its impact on economic and social development, and developing the information society.

ECOWAS

The Economic Community of West African States groups together 16 States and has its headquarters in Lagos (Nigeria). Through its telecommunications development fund, it has played a very active role in the implementation of the PANAFTEL network, taking responsibility for the establishment of several sections of the network in West Africa.

ECCAS

The Economic Community of Central African States groups together 11 States of Central Africa, and has its headquarters in Libreville. It is currently faced with difficulties, due essentially to arrears in member country contributions.

CAPTAC

The Conference of Central African Posts and Telecommunications Administrations, with headquarters in Yaounde, is responsible for coordinating and harmonizing the development of posts and telecommunications in Central Africa. It groups together the PTT administrations of the ECCAS member States.

CACEU

The Central African Customs and Economic Union was created, as its name indicates, for the purpose of harmonizing the customs regimes of its different member countries, i.e. Cameroon, Central African Republic, Chad, Congo and Gabon. Its headquarters are in Bangui. It has long been involved in the development of telecommunications and is playing an active role in the creation of the Central African maintenance sub-centre to be based in Yaounde.

RASCOM

Established in May 1992 following a feasibility study of the RASCOM Project, this is a new type of organization designed for the commercial exploitation of satellite communications. RASCOM, whose headquarters are in Abidjan, pursues the triple aim of expanding and improving:

- communication between African States;
- trunk communications within each country;
- communications in rural and remote areas in each country.

The Kagere Basin Organization (KBO)

The KBO comprises Burundi, Rwanda, Tanzania and Uganda, all of which are influenced by the Kagere River and its estuary. The four countries are all LDCs, and three of them are landlocked and densely populated. The ITU started assisting this group of countries in the late 70s with a BADEA-financed survey of the PANAFTEL network linking the four countries. Subsequent assistance was provided in the detailed planning and implementation of the network. Ad hoc assistance was also provided to individual countries; notably, the Swiss financed the rural telecommunication network in Rwanda.

The KBO constituted its own telecommunication team based in Kigali which benefited from ITU technical assistance.

The Southern Africa Development Community (SADC)

SADC is the successor to the Southern African Development and Coordinating Conference (SADCC). The SADC has a telecommunication wing, the Southern Africa Transport and Communications Commission (SATCC), which provides technical advice to countries in the region. The ITU executed a CIDA-financed project with SATCC for several years. The cooperation activities included the implementation of a number of PANAFTEL links in the subregion, the definition of strategies for the introduction of new technologies, and advice in a host of other areas. A telecommunications specialist based in Maputo provided advice to the countries of the subregion.

In the pipeline is a USAID-financed project for the provision of ITU specialists on telecommunication policy and database development for which an agreement has been signed and implementation is due to commence in 1996.

Common Market for Eastern and Southern Africa (COMESA)

COMESA was created when the Preferential Trade Area (PTA) which had existed for 12 years was transformed into this Common Market for the economic integration of the two largely English-speaking subregions of Eastern and Southern Africa. It comprises 22 countries, namely Angola, Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Rwanda, Seychelles, Somalia, Swaziland, Sudan, Tanzania, Uganda, Zambia and Zimbabwe and has its headquarters in Lusaka, Zambia.

COMESA has a huge potential for trade and economic development in which the telecommunication sector will play a key role. The ITU Secretary-General addressed the inaugural COMESA Summit in December 1994 and stressed the important role which telecommunication and information technologies will play in promoting trade as well as facilitating all other sectors of development in the region.

COMESA has a Transport and Communications Division through which the BDT has established technical cooperation on network interconnectivity and tariff study. Cooperation in other areas is in the pipeline.

DRAFT RECOMMENDATION

REGIONAL AND SUBREGIONAL COOPERATION

The African Regional Telecommunication Development Conference (AF-RTDC-96) (Abidjan, 6-10 May 1996),

considering

a) that there exists a multitude of organizations concerned exclusively or partially with the telecommunication sector;

b) that in practice an increasing number of such organizations are encountering great difficulties of an economic and operational nature in fulfilling their mission;

c) Resolution 6 concerning cooperation between the ITU/BDT and regional organizations, adopted by the World Telecommunication Development Conference (WTDC-94) held in Buenos Aires, Argentina, in March 1994, which resolved, *inter alia*:

"to encourage the BDT to exchange information on planned projects and activities in the respective regions so as to avoid duplication between the regional telecommunication organizations and the BDT";

"that the ITU-D identify appropriate mechanisms and studies to address the priority issues as identified by the regional organizations with the intention of developing appropriate recommendations for the next WTDC",

recalling

that it is essential for the countries of the African Region to realize the similarity of their objectives and the complimentarity of their needs, to combine their resources in order to obtain better results and, collectively, to take maximum advantages of the region's resources,

recommends

that the members of the African Region:

1 should examine in depth the mandates and operational structures of the subregional and regional organizations in the telecommunications sector in order to avoid any duplication and, if necessary, reduce the number of such organizations;

2 draw up a strategy for cooperation among international, regional and subregional organizations involved in the development of telecommunications in Africa, taking care to ensure that all actions taken contribute to the same objective and are conducted at optimal cost;

3 encourage the regional and subregional telecommunications organizations of Africa to cooperate with the BDT so that it can define more clearly the needs of the African countries and help it to attain the objectives of the Conference by applying the mechanism for the follow-up of the decisions reached;

4 intensify cooperation between the developing countries with the assistance of the BDT, and carry out periodic evaluations of this type of cooperation in order to improve its cost-effectiveness.

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DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 24-E
11 April 1996
Original: French

For information/reference

Agenda item: 1.2 **PLENARY MEETING**

SOURCE: REPUBLIC OF MALI

TITLE: PAN AFRICAN TELECOMMUNICATION UNION: PROSPECTS FOR THE FUTURE

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1 Introduction

At its last Plenipotentiary Conference (Kampala, 1994), the Pan African Telecommunication Union decided (Resolution 13/5S-CPL/94) to conduct an in-depth study with a view to comprehensive restructuring of the Union, the findings of which will be submitted to an extraordinary session of the Plenipotentiary Conference to be held no later than December 1996.

At its June 1995 session, the Administrative Council, after reviewing the reports of the High Level Committee (H.L.C.) responsible for restructuring and the draft agreement proposed by ITU for the study, considered it would be wise to involve national experts from Member States to a greater extent, in order to complete the study within the prescribed time-frame.

To this end, the Secretary-General of PATU, conscious that the Union's financial resources are inadequate, requested assistance from BDT/ITU.

A group of six experts from the different PATU subregions was set up to gather from a number of States (it was not possible to visit all the States, for lack of financial resources) all relevant information liable to be of help in developing a strategic plan for structuring PATU and laying down the main strands of its work.

On the basis of the information collected from the administrations by the expert missions, the High Level Committee, which met in Kampala from 12 to 19 March 1996, drew up the report on restructuring of PATU.

Mali attaches great importance to the report prepared by the H.L.C. and feels that it would be useful for PATU Member countries to discuss it on the occasion of AF-RTDC, particularly with respect to the following points:

- the Union's future missions;
- PATU's new structure and operation;
- new cooperation relations between PATU and international, regional or subregional agencies or organizations involved in telecommunication financing and/or development.

In the light of the foregoing, the Administration of Mali suggests that some thought be given to the issues outlined below, in order to enable our Union to take up the challenges faced as the world moves into the third millennium.

2 Impact of the changing telecommunication environment on PATU

The Administration of Mali believes that PATU's structure, operation and fundamental missions must evolve and adjust to the telecommunication environment at the national, subregional and international level.

At the national level

Dazzling progress in the telecommunication sector has prompted radical changes, characterized among other things by:

- the globalization of telecommunication service provision and equipment manufacturing industries;
- the convergence of computing and telecommunications;
- liberalization or privatization of the telecommunication sector in many countries.

In these circumstances, it may be asserted that the most rational policy decision for each of our States is to introduce appropriate structures capable of breathing new life into the telecommunication sector.

Thus, when designing and conducting any restructuring process, those who will be deciding on the future of the telecommunication sector will have to consider the future of subregional and regional organizations, including PATU. To this end, there is a need to:

- start reflecting on how PATU may be integrated and its interaction with new national structures, namely the regulatory bodies and operating agencies;
- take steps to ensure that the new wave of efficiency sought or achieved is reflected in the new PATU;
- give effect to a much vaunted political desire for regional and subregional integration, by agreeing to entrust the management of telecommunication development in Africa to a renovated PATU.

Only then will the momentum and competence of national structures be mirrored in PATU as a regional structure.

At the subregional level

Throughout the world, we are witnessing the emergence of large units, born of arduous attempts and experiments to achieve economic and/or political integration. Our continent is no exception to this worldwide trend. Thus, new subregional organizations are being set up such as the West African Economic and Monetary Union (UEMOA) in West Africa.

In view of the crucial role of telecommunications for a country's development, these subregional organizations are becoming increasingly interested in telecommunications as a factor of integration and are incorporating telecommunication development in their medium- and long-term programmes.

All existing and newly created subregional organizations are called upon to develop and implement common sectoral policies in areas such as transport and telecommunications. In determining these sectoral policies, attention has to be given to the issues involved in rationalization and harmonization of the prevailing legislative and regulatory framework in our States.

Given what is at stake, the key question is what impact these new trends will have on PATU's activities.

At the international level

As has already been mentioned, the international environment is in the throes of change, leading to the formation of large regional or multinational groups. The field of activity of these groups has gone far beyond equipment manufacture, and we are moving towards the globalization not only of infrastructure establishment, but also of the operation of telecommunication services. This is reflected in mergers of companies or cross-border shareholding.

The telecommunication sector in the African countries cannot just stand by and watch this inexorable trend. Like other regions of the world, Africa must avoid a piecemeal approach to the inevitable restructuring of its telecommunication sector. Harmonization of national or subregional legislation is absolutely necessary, but not sufficient in itself. Change should be introduced in a coordinated and ordered manner, in line with properly developed and implemented guidelines and strategies. It is with this in mind that the African Green Paper has been drafted. Nevertheless, given what is at stake and the time factor, a revitalized PATU may act as a catalyst, facilitator or coordinator in order, where appropriate, to harmonize and defend the different positions and interests of its Member States.

Another feature of the changing international environment is the restructuring of ITU, which has seen and felt the need to adjust to the new telecommunication environment. The restructured ITU aims to be more efficient, dynamic, flexible and competitive. PATU must learn from ITU's example.

ITU was restructured in 1992, around three main functions: standardization, regulation and development. The first two functions, which chiefly handle matters related to interworking and interconnection of telecommunication networks and the drafting and application of treaties which have force of law internationally, may be mirrored in a single unit within the restructured PATU. Faced with the emergence of large global or regional networks like Iridium and Africa One, Africa must adopt a judicious common strategy as to the most rational and effective way of participating in such alliances, whatever their form or type of partnership.

PATU has a key role to play in the development and implementation of a strategy for participation in these large units, as it is doing for the Africa One project in collaboration with ITU.

ITU's third function, namely to assist the developing countries in strengthening their telecommunication networks, must be of paramount importance in a restructured PATU.

3 PATU's reaction to change

Like other international organizations, PATU has in turn felt the wind of change at a time when it was no doubt prey to its most serious crisis yet.

Having grasped the compelling need to restructure, PATU set up a High Level Committee comprising five countries, which elected a Bureau and adopted Rules of Procedure. It also requested each administration to establish a national committee. To ensure financing of the restructuring study, PATU called upon each administration to settle its contribution.

We have reason to believe that the work of the High Level Committee is progressing only slowly mainly for lack of financial resources. Thus, pending a solution to the financial problem, other avenues have to be explored, including recourse to work by correspondence (using fax) or taking advantage of AF-RTDC to discuss the report drawn up by the group of experts. Since the different administrations have very little experience of work by correspondence, we recommend that PATU Member countries should meet on the occasion of AF-RTDC to exchange ideas on the draft strategic restructuring plan proposed by the group of experts and its implementation in accordance with the terms of reference of the study.

Following that exchange of ideas, a revised document would be sent to the administrations for detailed study, possibly requesting contributions on topics of their choice.

Whatever procedure is followed, PATU's successful restructuring depends first and foremost on the political will of the Member States. No one else is going to carry out the restructuring in their place. And the time factor is crucial in view of the many challenges facing the African administrations in an international environment which has no pity for weak "backmarkers".

4 Future prospects

More than ever before, the African States are concerned by the development of their telecommunication sector.

Needs in terms of telecommunication infrastructures are immense, and top urgent. In seeking solutions to these difficulties, Africa faces problems of coordination and execution of community projects, harmonization of national and subregional legislations, restructuring and development of a strategy with regard to the management of large global networks.

To solve all these problems, there is a need for a powerful, dynamic regional structure enjoying universal recognition. A restructured PATU would be in a perfect position to fulfil this role, with the following two units:

- development;
- regulation and harmonization.

The first unit (development) will be responsible for handling issues relating to:

- planning, management, operation and maintenance of telecommunication networks;
- human resources development and management;
- planning and integration of large networks and introduction of new technologies.

The second unit will cover the following fields of activity:

- telecommunication policy, institutional and regulatory aspects;
- policy and mechanisms for financing of telecommunication infrastructures;

– industrialization and transfer of technology.

In view of the increasingly important role which the private sector is called upon to play in the socio-economic development of African populations in general and development of the telecommunication sector in particular, PATU must change its working methods and find a way of opening up to African private companies, which could become "small-m" members, and to subregional organizations, which could be granted specific rights.

Once restructured, PATU must set a programme of priority objectives and develop corresponding action plans. These must take account of constraints in terms of financial resources, but sufficient resources must be available for their implementation. Implementation of the action plans must be constantly monitored and systematically evaluated.

However PATU may be restructured, this will not hide two serious debilitating problems which still remain, namely:

– collecting contributions in arrears;

– operating problems at headquarters.

These issues should be matters of major concern for all the Member countries, and Mali intends to submit a contribution on the subject to the next meeting of the PATU Administrative Council. In this connection, Mali invites all Member countries to give some thought to the two problems and come to the table at the Council meeting with constructive contributions.

5 Conclusion

Faced with deregulation of the telecommunication sector, Africa needs to close ranks under the leadership of a powerful, dynamic and farsighted organization.

This role can be fulfilled by PATU, provided that it is given suitable means and enjoys the political support of its Member States.

Learning the lessons of the past, it will be necessary to avoid making the new structure too bureaucratic. To this end, it should be assigned two primary functions (development and regulation) and should be set priorities.

When carrying out the restructuring, it is important to take account of the specific characteristics and potential role of subregional organizations, and of the private sector, which is called upon to play an increasing role and whose concerns have to be heeded.

It would be worth discussing the thoughts outlined above in greater depth within all the Union's bodies. We therefore appeal to all the administrations to participate very actively in the debate which has been launched, since the restructuring of PATU is vitally urgent for the organization's very survival.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 25-E
11 April 1996
Original: English

For Information/Support

Agenda item: 1.3

PLENARY MEETING

SOURCE: RAPPORTEUR FOR Q.5/1 - INDUSTRIALIZATION AND TRANSFER OF TECHNOLOGY

TITLE: TELEBRÁS INDUCTIVE CARD PAYPHONE SYSTEM: A SUCCESSFUL CASE OF TELECOMMUNICATIONS IMPROVEMENT THROUGH TECHNOLOGICAL DEVELOPMENT, TRANSFERENCE OF TECHNOLOGY AND INDUSTRIALIZATION IN BRAZIL

Introduction

Before 1992, all efforts of TELEBRÁS system to expand the payphone plant were frustrated by a set of factors:

- the high maintenance costs;
- the volume of operational costs mainly due to the token collection device malfunctioning;
- the breaks due to vandalism for stealing the tokens;
- the lack of an efficient telesupervision system; and
- the logistics necessary to collect, clean, package and distribute the tokens.

During the Earth Summit, held in Rio de Janeiro in 1992, a new payphone concept was introduced in Brazil, namely the TELEBRÁS inductive card payphone system.

The results have been so good that TELEBRÁS decided to install only card payphones since then. In comparison to token payphones, the operating and maintenance costs have decreased in some areas by a factor of four. The acquisition investments for long-distance payphones have been cut by half. Besides that, usage rates per payphone have increased by factors above ten times.

The modern services options, e.g. virtual telephone and information services, together with new revenue sources, e.g. media associated with cards, combined with the much lower implementation, operating and maintenance costs, all related to the inductive card payphone system, are making it possible to establish goals never before imagined to be achieved.

Regarding expansion, TELEBRÁS established the goal to implement 600 000 inductive card payphones by the year 2000. At the end of 1996, it is expected that more than 200 000 of these payphones will be in operation.

The main reason for TELEBRÁS to assume such a challenge is the success of its Research and Development Centre's inductive card development project. It is a very good example of a successful telecommunications quality improvement programme involving technological development, transference of technology and industrialization.

Reference situation

The situation of the payphone system in Brazil at the end of June 1991 has been taken as a reference for future comparisons.

At this point of time, the users' opinion gathered through OPUS market research data processing ranked the payphone services as the worst provided by TELEBRÁS system in Brazil. Backing the users' opinion, the physical operational data indicated that out of a plant of 175 000 token payphones about one third used to be out of order every month. The major causes for these problems, were related to the token collection devices and the lack of telesupervision, in addition to vandalism due to both, breaking the safes for stealing tokens and because the payphones were not working well.

The financial data showed that considering the tokens collected, the annual token revenue of a token payphone was $US 546, against an annual cost of $US 570. The picture then was complete: besides being the worst service provider, the payphone system was also a money loser.

Taking the above into account, a task force was established to propose a technical solution for this telecommunications quality problem. The work of this task force, coordinated by TELEBRÁS Services Planning Department, was performed by professionals from the engineering and operations areas, and especially from TELEBRÁS Research and Development Centre-CPqD.

The technical configuration proposed

The task force divided the work into three steps. Initially, considering that cards are more and more becoming key components of the telecommunications services, it was a consensus that cards should replace the tokens. Moreover, since the card payphones would not require safes, one of the major causes of vandalism would be eliminated. The second step was an extensive technological assessment covering all systems components. The third and last job of the group was a technical configuration proposal, which should be jointly developed by TELBRÁS CPqD and the industrial sector.

Technological assessment

The technological assessment emphasized the points listed below, in terms of four components: payphones, cards, telesupervision and switching.

Payphones

1) Only one type of payphone for all kinds of calls (local, long distance and international).

2) Minimization of the movable parts in the payphone (these parts were identified as the major causes of problems).

3) Working in very different climates (from very humid and hot in the north, to very dry in the north-east, to mild and sometimes cold in the south).

4) Working in a variety of environmental conditions (besides pollution of the big cities, many of the Brazilian capitals are located at the coast).

5) No need for commercial energy (energy provided by the telephone line).

6) Possibility of development of a wireless payphone for isolated areas (energy provided by solar panels).

7) Possibility of the development of a payphone for internal use (less robust and consequently requiring less investment).

8) Brazilian industrial capacity to manufacture payphones (two existing suppliers of token payphones, possibility of three additional ones).

Cards

1) Expected card technology evolution (long-term future vision indicates a trend towards a contactless chip card energized through magnetic induction).

2) Low production costs for cards (to make it feasible to produce cards with a small number of call units for both local calls and low-income people).

3) Brazilian industrial capacity to produce cards (non-existing capacity, possibility of establishing from three to five suppliers out of the conventional card manufacturers).

Telesupervision

1) Possibility of development of a user friendly telesupervision system (preferably in an environment extensively used, e.g. Windows).

2) Messages oriented to both operational and commercial uses.

3) Alarms to point specific trouble situations.

Switching

1) Ability to work in an environment of many switching vendors (different technologies, multiplicity of facilities available, polarity inversion and 12/16 kHz pulse signalling).

2) Possibility of transferring functions from the switching equipment to the payphone (essentially tariffing functions, which means portability in different plant situations).

3) Possibility to develop the concept of a platform of small size digital switching centres fully dedicated to payphones.

Technical configuration

The technical solution proposed by the task force was a card payphone system completely integrated into the multi-vendor existing network, able to work within the concept of a fully dedicated platform of small size digital switching centres, and having user friendly telesupervision facilities.

The development of such a system was established to be done according to the following schedule: initially inductive contactless solution for prepaid cards, followed by a solution encompassing the inductive contactless and some type of metallic contact chip card. The ultimate solution will be a family of inductive contactless cards, including chip cards, for many kinds of applications.

Even knowing that especially in Europe the credit cards with a magnetic strip are in the process of being substituted by the chip cards, a high volume of magnetic cards are still in use today. Addressing this share of the market, a simple magnetic card reader that could be attached to the payphones located in specific locations is in the prototype stage.

Regarding the fully dedicated platform of small size digital switching centres for payphones, this concept is being implemented within the card payphones expansion plans of the TELEBRÁS system operating companies. It is expected that by the end of 1996 there will be a statewide platform implemented in the state of Rio de Janeiro by TELERJ, the local TELEBRÁS system operating company.

Transference of technology

The transference of the technology process followed by TELEBRÁS for the payphones and the associated telesupervision system started at the initial stage of development. At that point, the two existing suppliers of token payphones were invited to participate in the development of the card payphone.

The reason for the invitation was the expected similarity between the manufacturing processes of the card payphone and the token payphone. The same reasoning was used for the telesupervision system, because the two token payphone suppliers had experience in developing software.

In order to guarantee additional suppliers, a mandatory condition of non-exclusivity after the development was established. As a consequence, today there is a total of five suppliers, which means more competition into the TELEBRÁS system bidding processes for acquiring payphones.

Besides being the first to enter the market, the only permanent tangible advantage for the two inductive card payphone suppliers that participate in the development effort refers to the royalties paid, which are a bit lower than those to be paid by the latter licensees.

Starting in 1992, the TELEBRÁS system operating companies are acquiring the inductive card payphones through decentralized bidding processes.

Regarding the cards, the manufacturing and handling processes involve three distinct groups of activities:

- chemical processing for creating the card basis on plastic boards;
- printing the plastic boards, and individual card cutting and testing; and
- handling of products having face value ("quasi money") with security.

Due to the fact that there were no similar in the world for the inductive cards production, TELEBRÁS considered the experience in handling products with face values as the important characteristic to be emphasized.

According to this view, three manufacturers of products with face value (two real money producers) were invited to participate in the card development process. Out of the three, one had experience in chemical processing (gold melting), and the other two were manufacturers of conventional cards.

The major challenge for producing cards came a few months before the Earth Summit. The facilities available at CPqD were able to manually produce a few thousand cards per month, against requirements for the event of more than three hundred thousand cards. For coping with this problem, one existing chemical line at CPqD was then transformed into a semi-automatic card

production line working 24 hours a day, with people and material from the three invited manufacturers.

At the end of this effort, that can be considered as the turning point of the project, more than 300 000 valid inductive cards had been produced.

Regarding additional suppliers, a fourth manufacturer was licensed in 1995, and another one is starting the process of receiving the technology. It is worthwhile to say that these two new entrants were chosen through public selection processes.

Since the security of the payphone system against fraud relies heavily on the delicate chemical production processing, TELEBRÁS is playing a centralization role in the acquisition of cards.

The development of the concept of fully dedicated platforms for payphones is not expected to generate relevant transference of technology.

Industrialization achieved

The implementation of the TELEBRÁS inductive card payphone system has resulted in real industrialization as described below:

- **Growth of the payphone manufacturing sector:** from a duopoly of token payphones, to a situation of five suppliers, with a total installed capacity close to 20 000 payphones per month.
- **Creation of new capacity in the card sector:** from a null capacity, to the existence of four suppliers (one more in the process of licensing), with a total installed capacity of more than 80 million cards per month expected to be achieved during the first semester of 1996.
- **Growth of the switching manufacturing sector:** from a situation where the payphones were considered marginal within the conventional telephone expansion, to a new vision of fully dedicated platforms to payphones.

Taking into account the goals established for the TELEBRÁS system during 1996 (implementation of more than 100 000 payphones with the associated switching facilities and usage of more than 600 million cards), the TELEBRÁS inductive card payphone system alone will be responsible for more than 3 000 jobs in the industrial sector.

Besides the industrial jobs, in the new service providers business levels to be established in the near future, the creation of additional jobs related to messaging, virtual telephone, information services and media is expected .

As a final remark, the transference of a technology model adopted by TELEBRÁS is allowing competitive advantages abroad for the Brazilian industrial sector.

According to this model, the industrial sector is responsible for manufacturing activities of the telecommunications production chain that lies in between development and operations, both conducted by TELEBRÁS. This means that the acquisition of products with TELEBRÁS technology brings together the perspective that future versions will be constantly updated, since such improvements are mandatory for keeping the TELEBRÁS system competitive.

In addition, as the technology holder, TELEBRÁS permits the transference of technology according to a schedule encompassing SKD/CKD activities, before full local production.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 26-E
11 April 1996
Original: French

For Information/Support

Agenda item: 1.2 **PLENARY MEETING**

SOURCE: REGIONAL AFRICAN SATELLITE COMMUNICATIONS ORGANIZATION

TITLE: RASCOM, AN OPERATIONAL REGIONAL ORGANIZATION FOR THE DEVELOPMENT OF AN INTEGRATED AFRICAN TELECOMMUNICATION NETWORK

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1 Why RASCOM?

The Regional African Satellite Communications Organization is the outcome of several years of consultation, reflection and studies carried out by African countries with a view to finding joint solutions to problems relating to communications in Africa.

With a population of approximately 800 million and an annual gross domestic product of about 300 billion US dollars, Africa appears to be the continent with the most ground to make up in the establishment of telecommunication infrastructures and the development and provision of telecommunication services.

The less than rosy situation in African telecommunications displays the following features:

- a very low telephone density of less than 1 per 100 inhabitants;
- a negligible share (2%) of the global telecommunication market;
- a concentration of existing facilities in the urban areas of countries, especially the capital cities;
- triangular traffic for communication between African countries resulting in high transit costs.
- high telecommunication service costs;
- inadequate coverage provided by radio and television services;
- virtually no telecommunication industries.

Aware of the detrimental effect of the telecommunication development gap on the overall economic, social and cultural development of the countries of Africa, the African Transport, Communication and Planning Ministers decided in the early 1980s to launch a feasibility study for a single project, merging the various existing initiatives, the aim of which would be to examine the

African countries' telecommunication and radio and television broadcasting requirements as a whole. This would take due account of the rural areas and identify the most appropriate means for providing efficient, well-managed communication infrastructures capable of facilitating and sustaining the development of the entire African continent.

The feasibility study concluded that:

- the supply of telecommunication services in rural areas should be based on the principle of accessibility to those services;
- satellite technology has a unique and highly important role to play in the development of the telecommunication network of the African continent, particularly in serving rural areas;
- a dedicated space system meeting clearly defined specifications and linked to appropriate earth systems is technically feasible and is considered to be the best choice for satisfying the African countries' long-term requirements. While serving to connect up all the countries, such a system would also permit the establishment in rural and remote areas of small earth stations providing a range of applications, and would facilitate the exchange of news and of radio and television programmes between the African countries;
- the establishment of this system should be considered a prime objective by the African countries.

The results of the feasibility study were adopted in Abuja, Nigeria, in February 1991 by the African telecommunication ministers, who also decided on immediate implementation of the project.

This decision reflects the political will that is emerging on the continent and which shows that the African countries are prepared to pool their efforts for the overall development of telecommunications in Africa.

At their May 1992 meeting in Abidjan in Côte d'Ivoire, the telecommunication ministers agreed to set up the Regional African Satellite Communications Organization (RASCOM), and adopted the legal instruments governing RASCOM, namely the Convention and the Operating Agreement.

RASCOM was thus established as a means of enabling Africa to emerge from its disadvantaged position in the field of telecommunications.

2 Legal instruments and organs of RASCOM

2.1 The legal instruments of RASCOM

These are:

- the CONVENTION establishing RASCOM;
- the OPERATING AGREEMENT, which deals with the operational aspects;
- the NON-SIGNATORY SHAREHOLDER AGREEMENT, by which the Assembly of Parties authorizes private investors to acquire shares in RASCOM.

2.2 The organs of RASCOM

These are:

- the ASSEMBLY OF PARTIES, which brings together the representatives of governments having signed the Convention;

- the BOARD OF DIRECTORS, which is the authentic management organ of RASCOM and consists of:
  - fifteen representatives of the Signatories or group of Signatories each holding the fifteen largest shares in RASCOM;
  - five representatives of Signatories not represented on the Board of Directors and selected in each of the five regions of Africa;
  - the representatives of the Non-Signatories Shareholders selected in accordance with the provisions of the Non-Signatory Shareholder Agreement;
- the EXECUTIVE ORGAN, which takes care of the day-to-day management of RASCOM and is responsible for implementing decisions of the Board of Directors.

3 Mission and objectives of RASCOM

The mission of RASCOM is to: "Place at the disposal of all the regions of African countries, efficient and inexpensive telecommunications facilities and meet their radio and television broadcast requirements, by having recourse to all the appropriate technologies, including a regional satellite communication system well integrated into the existing national and/or planned system with a view to facilitating the development of the countries of Africa".

Within the scope of this mission, the specific objectives are to:

- establish direct links between all the countries of Africa without exception;
- provide and improve inter-urban communications at the individual country level;
- provide service to rural and remote areas.

4 RASCOM programme

The programme defined by RASCOM to achieve its objectives and fulfil its mission breaks down into two phases:

- the pooling of space capacities leased by African countries on various satellites, particularly those operating domestic satellite services (DOMSAT); and
- the definition and putting in place of a dedicated satellite system for Africa.

4.1 Pooling of transponders

This operation is supported by an agreement between RASCOM and INTELSAT signed in April 1994 in Bamako. This agreement sets out the framework and conditions under which the pooling of transponders is to be carried out. The pooling of transponders aims at consolidating and optimizing the use of capacities leased by African countries operating DOMSAT services.

The operating began in January 1994 and enables RASCOM to generate sufficient revenue not only to cover operational costs, but also to offer discounts to countries whose capacities have been leased.

The pooling of transponders has generated a pool of capacity enabling RASCOM to become operational and meet needs expressed by some operators wishing to provide services in several African countries. Services such as VSAT and television are currently supplied via RASCOM facilities.

This arrangement, however, has some limitations in terms of the coverage required by the various operators for the supply of their services.

In view of this, and of the interest that major international groups have shown in the development of telecommunications in Africa, RASCOM has undertaken, within the framework of its cooperation with INTELSAT, to accelerate the setting up of a regional dedicated satellite communication system for Africa through the prepayment of leased and/or planned capacities by African DOMSAT countries using a single INTELSAT satellite expected to be launched in the third quarter of 1997.

RASCOM has thus made a consolidated global reservation with INTELSAT, taking up on its own account all existing and/or planned reservations made by the individual countries. The reservation covers 35 transponders operating at 36 MHz.

The prepayment and transfer of these capacities will result in:

- an enhancement of interconnectivity between African countries, notably those with domestic satellite services;
- a drastic scaling down of transit costs in the countries thus connected;
- the joint leasing by countries of space segments according to their actual needs and the reaping of the financial benefits that accrue from this economy of scale;
- RASCOM availing itself of a streamlined pool of space capacities offering greater flexibility for satisfying more efficiently the numerous demands for services.

In order to strengthen the pooling of transponders, the prepayment of DOMSAT transponders and their transfer onto a transitional satellite (RASCOM-TS) is essential and must be ensured in order to accelerate the ultimate goal of implementing a dedicated satellite system for Africa.

4.2 Establishment of a dedicated satellite system for Africa

Even if the RASCOM-TS transitional satellite enables RASCOM to have a much more homogeneous pool of space capacities and partially to achieve its objectives, it is not sufficient to meet all of the needs expressed by African countries. The fact of the matter is that only a dedicated satellite system designed on the basis of Africa's specific needs can meet the present dire needs in terms of complete interconnectivity and power (required for serving rural areas at least cost).

The first dedicated satellite for Africa is scheduled to be in place by 1999.

Through the facilities provided by RASCOM, in addition to the Pan-African coverage that RASCOM will offer to Africa and which will enable all the countries of Africa to establish direct links between themselves in respect of basic public services, with transit outside the continent no longer necessary, the following services will be among those available:

- high speed data transmission;
- multimedia services;
- telemedicine;
- distance learning;
- live satellite radio and TV news reports;
- exchange of television and radio programmes.

Furthermore, RASCOM will facilitate, among other things:

- accessibility of the various communication systems in the regions of Africa;
- an increase in telephone density;
- economic and social development in rural and remote areas;
- technology transfer;
- the emergence of new markets and the signing of trade agreements among the countries of Africa;
- the economic and cultural integration of Africa;
- improvement in the African quality of life.

5 Development prospects for RASCOM

RASCOM's future development prospects are inherent in the very nature of its mission.

RASCOM was created by the African countries for the purpose of managing their space resources, with a clearly expressed wish to make the Organization a high-class operational tool of regional cooperation and integration in telecommunications for the establishment of infrastructures designed to ensure the sustained, integrated development of telecommunications in Africa.

In addition, given that Africa is one of the continents where unmet demand is very high because the supply of appropriate services is lacking, RASCOM, by making suitable space and terrestrial infrastructures available to the countries of Africa, will promote the accessibility of communication services in all regions of Africa, and will enable substantial traffic, including in rural areas, to be stimulated.

RASCOM will, moreover, promote the establishment and progressive development of industrial structures capable of providing Africa with most of the telecommunication equipment which it needs for its development. This equipment will have to meet Africa's and RASCOM's own specifications, at the same time as conforming to the international standards of the ITU.

RASCOM's development prospects are promising, as can be seen not only from the success, albeit relative, of its start-up activities, but also, and especially, from the essential role which the organization has to play in the sustained, integrated development of African telecommunications. For this reason it is highly desirable that the ITU, which played a leading role in conducting the project feasibility study and participated in establishing the organization, should continue to supply solid, sustained support for RASCOM's activities. This concerns in particular the Telecommunication Development Bureau (BDT), which is now supervising the construction of the "missing link" in worldwide telecommunications.

6 Financing of RASCOM programmes and activities

RASCOM is an intergovernmental, commercial organization, open to the private sector, which operates on a sound economic and financial base in accordance with approved commercial principles.

The financing of RASCOM is mainly ensured by:

- financial participation of each shareholder; and
- loans.

The Shareholders of RASCOM are divided into two categories; namely:

- Signatory Shareholders, i.e. telecommunication organizations which have signed the RASCOM Operating Agreement and have been designated by the Parties (State) which have signed the Convention; and
- Non-Signatory Shareholders, i.e. African or non-African private investors who wish to invest in RASCOM.

The Non-Signatory Shareholders are themselves divided into two sub-categories:

- those sponsored and introduced by the Parties (member countries) to support the Signatory Shareholders; and
- those who apply directly to RASCOM and are selected on the basis of criteria previously defined for that purpose.

In short, the Shareholders of RASCOM are divided into three classes:

- class A: Signatory Shareholders
- class B: Non-Signatory Shareholders sponsored by the Parties
- class C: direct Non-Signatory Shareholders.

It should be noted that participation of a Non-Signatory Shareholder is subject to the signature of a Non-Signatory Shareholder Agreement.

The distribution of capital between shareholders is as follows:

- classes A and B together hold 2/3. However, under no circumstances may class B hold more than half of this share; i.e. 2/3 of the total at a given time;
- class C holds 1/3.

In order to finance these investment programmes, the financing structure envisaged by RASCOM, according to the subscription capacity of its shareholders and its level of indebtedness, will be as follows for the financing of a given programme:

- 1/3 of the total investment amount paid up by the shareholder in accordance with the capital distribution principle adopted;
- 2/3 of the total investment amount to be sought in the financial market.

7 RASCOM: A unique example of regional cooperation

Never has any African project involved such a mobilization of resources, with six hundred (600) African experts having taken part in the RASCOM feasibility study at national and continental level.

- This study was conducted under the supervision of an inter-institutional committee comprising: ADB, CAFAC, ECA, OAU, UNDP, PATU, UAPT, ITU, UNESCO, URTNA, with the ITU as the executing agency.
- The RASCOM feasibility study was financed mainly by: ADB, UNDP, Italy and Germany.
- Forty (40) African countries voluntarily contributed to the financing of the transitional phase.

The wide support for the project culminated in signature of the Convention on 31 December 1995 by forty-two (42) African countries, of which 39 also signed the Operating Agreement.

The following countries have indicated that they plan to sign the legal instruments of RASCOM in the near future:

- Madagascar;
- Mauritius;
- South Africa;
- Rwanda.

The almost total support and keen interest displayed by the African countries make RASCOM an excellent example of cooperation at the continental level, gives it a strategic position and provides it with an undoubted credibility. This cooperation is a mobilizing factor for the achievement of the objectives and programme laid down by RASCOM, and should reassure the sponsors and financing institutions. The community created through RASCOM represents a vast and viable market.

Moreover, some significant economies of scale can be realized through the grouping together of countries' investment and purchase requirements, for example, through collective purchases.

This active cooperation also makes RASCOM the ideal partner for every Africa-wide project, with RASCOM negotiating and acting on behalf of countries while taking into account their respective regulatory frameworks.

By virtue of its position, RASCOM can also, in agreement with countries, seek and give practical shape to service opportunities which will occur and which will be likely to generate adequate revenues to sustain the development of their telecommunication networks.

In addition, RASCOM is currently in contact with several promoters of regional or worldwide projects directly affecting the development of telecommunication services in Africa. These contacts aim to ensure that the various projects take African countries' interests into account, do not worsen their financial situation or produce duplication of effort, and that the projects may be integrated harmoniously into a global continental network fostering sustainable development in Africa.

8 Conclusions and proposals

8.1 RASCOM is now an operational Organization whose successful start-up activities and the universal interest and support which they have aroused on the part of the African countries demonstrate that the Organization will play a key role in the future development of African telecommunications.

By interconnecting all the African countries without exception, providing inter-urban links within each country and serving rural and remote areas, the RASCOM network, based on a regional system of communication satellites designed on the basis of the African countries' requirements, is not only a powerful tool for regional integration but also a generator of traffic, with in-depth and therefore sustainable telecommunication development in Africa as an additional spin-off.

The approach adopted for the progressive establishment of this network - starting from the pooling of space resources already in operation in the African countries - has proved to be a sound choice in practice. The results of RASCOM's initial activities confirm the technical feasibility and economic and financial viability of a network of this type.

Thus RASCOM is the concrete manifestation of the common will of the African countries to put an end to the tremendous backwardness that has thus far characterized the continent in the field of telecommunications.

It is highly desirable that the International Telecommunication Union should continue, in particular via the Telecommunication Development Bureau (BDT), to support the joint efforts of the African countries.

Indeed, as the executing agency of the RASCOM project feasibility study and a member of the Inter-Institution Coordination Committee which supervised the study, the ITU has played a fundamental role in the genesis and development of RASCOM.

The support expected of the ITU for RASCOM's operational activities may take various forms (studies, training, and support for, among other things: RASCOM programmes involving the use and/or exchange of African experts; RASCOM programmes for collective purchases; technical specification work; and the establishment of procedures).

8.2 To this end, it is proposed that the African Regional Telecommunication Development Conference (Abidjan, 6-10 May 1996),

recommends

that the ITU should

1 closely monitor the development of RASCOM activities by establishing and/or maintaining permanent contact with the Organization;

2 give RASCOM sustained assistance to the maximum extent possible to enable it to achieve its objectives rapidly, in particular the setting up of a dedicated regional African satellite communication system;

3 support RASCOM operational activities with technical assistance, in particular in the fields of studies, human resource development, technical specifications, various evaluations, the establishment of structures and procedures, etc.,

that all African Member countries

should continue to direct their efforts in line with the RASCOM objectives and participate actively in its work, with a view to accelerating the development of an integrated African telecommunication network.

UNION INTERNATIONALE DES TÉLÉCOMMUNICATIONS
BUREAU DE DÉVELOPPEMENT DES TÉLÉCOMMUNICATIONS

CONFÉRENCE RÉGIONALE AFRICAINE DE DÉVELOPPEMENT DES TÉLÉCOMMUNICATIONS
(AF-CRDT-96)
Abidjan (Côte d'Ivoire), 6-10 mai 1996

Document 27-F/E
15 avril 1996
Original: français
anglais

Pour information/référence
For information/support

Point de l'ordre du jour: 0.2
Agenda item

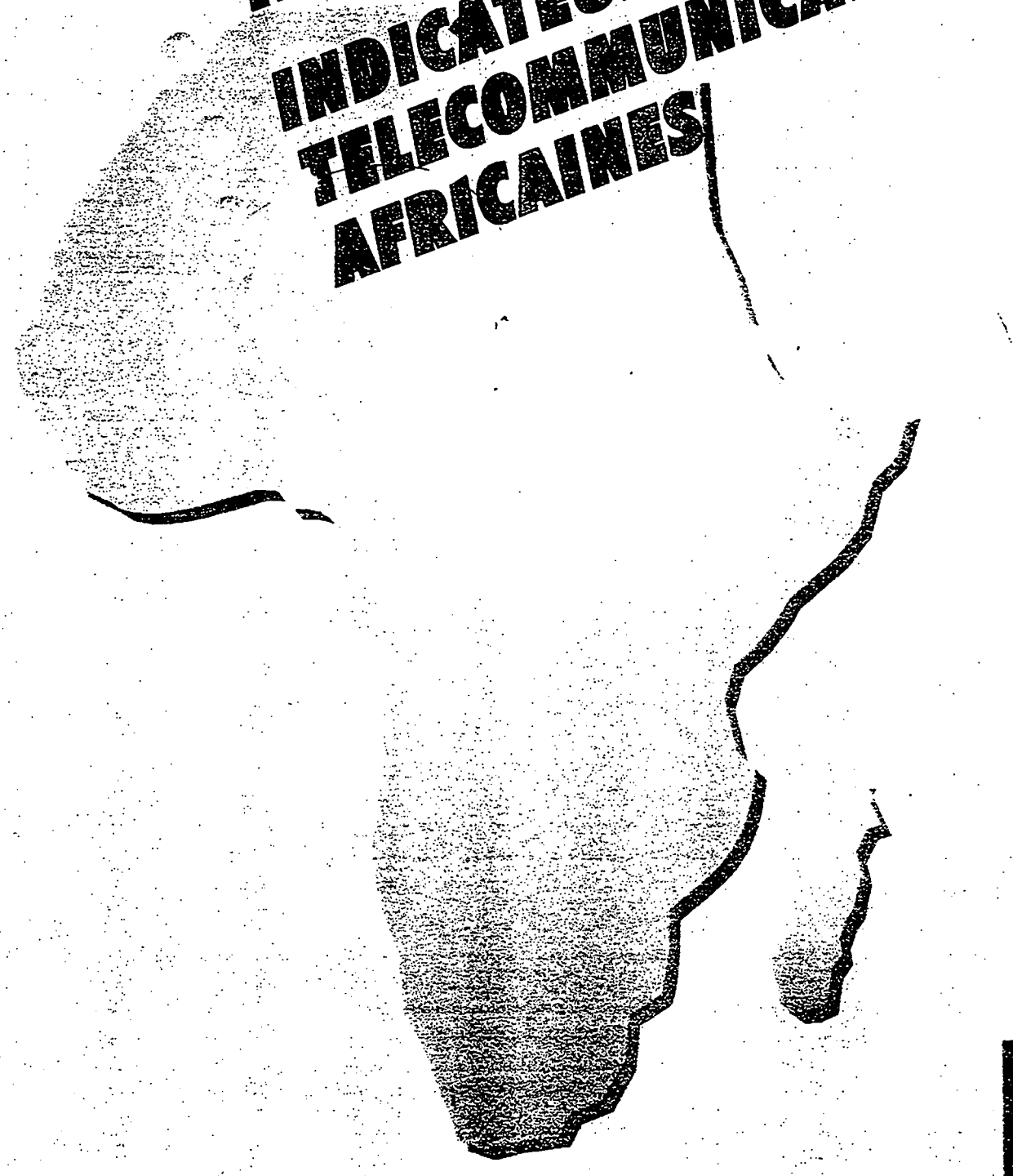
SÉANCE PLÉNIÈRE
PLENARY MEETING

ORIGINE: BUREAU DE DÉVELOPPEMENT DES TÉLÉCOMMUNICATIONS
SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU

TITRE: INDICATEURS DES TÉLÉCOMMUNICATIONS AFRICAINES
TITLE: AFRICAN TELECOMMUNICATION INDICATORS

AFRICAN TELECOMMUNICATION INDICATORS

INDICATEURS DES TELECOMMUNICATIONS AFRICAINES



INTERNATIONAL TELECOMMUNICATION UNION
UNION INTERNATIONALE DES TELECOMMUNICATIONS

1996

AFRICAN TELECOMMUNICATION INDICATORS

INDICATEURS DES TELECOMMUNICATIONS AFRICAINES

1996

May / Mai

1996

Telecommunication Development Bureau
Bureau de développement des télécommunications

INTERNATIONAL TELECOMMUNICATION UNION

UNION INTERNATIONALE DES TELECOMMUNICATIONS

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ISBN 92-61-06187-7

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Foreword

I am pleased to present *African Telecommunication Indicators 1996* containing an analysis of trends in the telecommunication sector and statistics for 55 economies in the region. This is our fourth indicator publication on the African region and is the most comprehensive ever. The report has been specially prepared for the African Regional Telecommunication Development Conference (AF-RTDC) taking place in Abidjan, Côte d'Ivoire from 6 to 10 May 1996.

The purpose of the document is to review developments in the African telecommunication sector and to provide a comprehensive and comparable set of telecommunication indicators, comprising the latest available data for the region. The data in the document are also available separately on diskette. I hope that the information contained in the document will enrich awareness of the state of telecommunications and highlight some of the particular complexities the countries on the continent face in the challenge to expand their telecommunication networks.

It is clear that an efficient communications infrastructure is critical for economic development. In that regard, this year is exceptional for Africa in terms of major conferences that will take place in the region whose themes are to improve communication networks and promote economic development. In addition to the AF-RTDC, the ninth session of the United Nations Conference on Trade and Development (UNCTAD-IX) will take place in South Africa beginning the April 27. The Information Society and Development Conference, which emerges from the Group of Seven (G-7) Ministerial Conference on the Information Society held in Brussels in February 1995, will follow the AF-RTDC and be held in South Africa from 13 -15 May 1996.

The views expressed in this publication are those of the authors and do not necessarily reflect the opinions of the ITU or its Members.

Préface

J'ai le plaisir de présenter l'édition de 1996 des Indicateurs des télécommunications africaines, qui fournit une analyse de l'évolution du secteur des télécommunications et des statistiques concernant 55 pays de la région. Ce rapport constitue la quatrième édition - la plus complète à ce jour - des indicateurs pour l'Afrique. Il a été élaboré spécialement en vue de la Conférence régionale africaine de développement des télécommunications (AF-CRDT), qui se tiendra à Abidjan (Côte d'Ivoire) du 6 au 10 mai 1996.

Le but de ce document est de faire le point sur le développement du secteur des télécommunications africaines et de présenter un vaste ensemble d'indicateurs des télécommunications comparables fondés sur les dernières données disponibles pour la région. Les données figurant dans ce document sont également disponibles sur disquette. J'espère que ces informations enrichiront les connaissances sur le développement des télécommunications et mettront en relief certains des problèmes particuliers auxquels les pays du continent sont confrontés pour développer leurs réseaux de télécommunication.

Il est évident qu'une infrastructure de communication efficace est primordiale pour le développement économique. A cet égard, 1996 est une année exceptionnelle pour l'Afrique, en raison des conférences importantes qui se tiendront dans la région en vue d'améliorer les réseaux de communication et de promouvoir le développement économique. Outre l'AF CRDT, la neuvième session de la Conférence des Nations Unies sur le commerce et le développement (CNUCED-IX) s'ouvrira le 27 avril en Afrique du Sud. La Conférence sur la société de l'information et le développement issue de la Conférence ministérielle du G-7 (Groupe des Sept) sur la société de l'information, qui s'est tenue à Bruxelles en février 1995, aura lieu du 13 au 15 mai 1996 en Afrique du Sud, après l'AF-CRDT.

Les vues exprimées sont celles des auteurs et ne reflètent pas nécessairement l'opinion de l'UIT ou de ses Membres.

Ahmed Laouyane
Director
Telecommunication Development Bureau
Bureau de développement des télécommunications
6 May 1996

The report was prepared in the BDT Policies, Strategies and Programming Department under the direction of Domenico Stagliano. The text was drafted by Michael Minges (BDT) and Tim Kelly of the Strategic Planning Unit. Doreen Bogdan also contributed. The statistical tables were prepared by Maria Beatrice Vinci Gigliucci and Maria Concetta Gasbarro. Production of the document was led by Olivier Beauvais.

The report also benefited from numerous comments both within and outside the ITU. The suggestions of Y. Kourouma, W. Richter , B. Sanou, P. Smith, M. Werner and M. Jensen were particularly important. The report would not have been possible without the collaboration of the telecommunication administrations throughout the region.

Le présent rapport a été élaboré au Département des politiques, des stratégies et de la programmation du BDT, sous la direction de Domenico Stagliano. Le texte a été rédigé par Michael Minges (BDT) et Tim Kelly, de l'Unité de planification stratégique. Doreen Bogdan a également contribué à la rédaction du rapport. Les tableaux statistiques ont été préparés par Maria Beatrice Vinci Gigliuccci et Maria Concetta Gasbarro. La production du document a été assurée par Olivier Beauvais.

Le présent rapport a également fait l'objet de nombreuses observations, tant à l'intérieur qu'à l'extérieur de l'UIT. Les suggestions formulées par Y. Kourouma, W.Richter, B.Sanou, P. Smith, M. Werner et M. Jensen ont été particulièrement importantes. Le rapport n'aurait pas pu être réalisé sans la collaboration des Administrations des télécommunications de l'ensemble de la région.

Contents

I. OVERVIEW
1. Falling behind I-1
2. Improving telephone access I-2
3. Telecommunication revenue I-5
4. Telecommunication investment I-7
5. International traffic I-10
6. International infrastructures I-11
7. Cellular trends I-12
8. Restructuring I-14
9. Performance I-16
10. Broadcasting I-18
11. Internet I-19
12. Within, Without I-20

II. TELECOMMUNICATION INDICATORS
Regional tables II-1
Country tables II-21

III. TELECOMMUNICATION ORGANIZATIONS ..... III-i

Table des matières

I. VUE GENERALE
1. Un continent à la traîne I-23
2. Amélioration de l'accès au téléphone I-24
3. Recettes des télécommunications I-27
4. Investissements en télécommunications I-30
5. Trafic international I-33
6. Infrastructures internationales I-34
7. Evolution des radiocommunications cellulaires I-35
8. Restructuration I-37
9. Résultats I-40
10. Radiodiffusion I-42
11. Internet I-43
12. Solutions exogènes, solutions endogènes I-44

II. INDICATEURS DES TELECOMMUNICATIONS
Tableaux régionaux II-1
Tableaux par pays II-21

III. ORGANISATIONS DES TELECOMMUNICATIONS ..... III-i

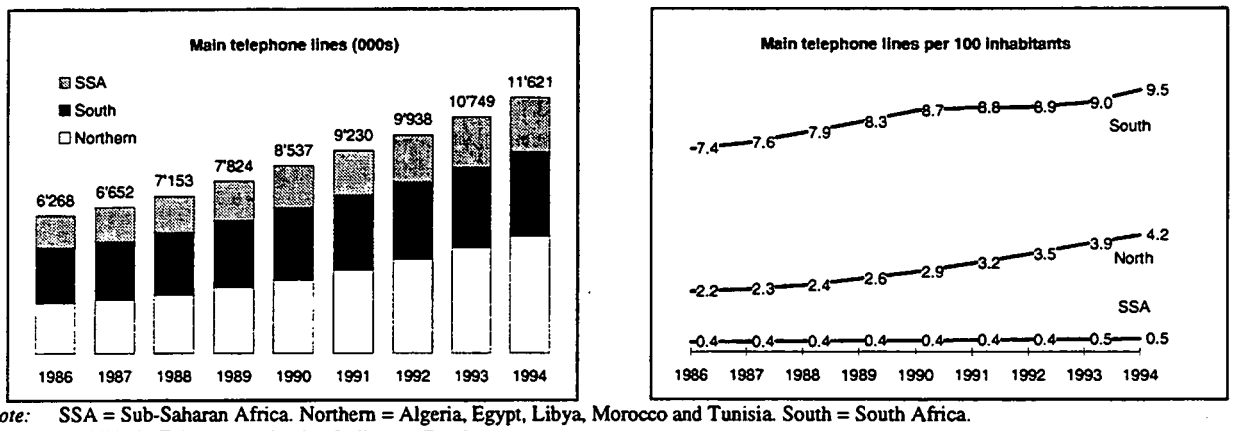
1. Falling behind?

The 1990 African Telecommunication Development Conference expressed concerned about "the slow progress of telecommunications development in Africa."[1] Five years later, that concern is even greater. Though the number of telephone lines in Africa has increased in absolute terms, the effect on overall access has been negligible, especially for Sub-Saharan Africa (see Figure 1). There has been no change in the growth rate of telephone lines in Africa in the five years before or since the conference. While network growth continues at 8 per cent per year, this is much lower than other developing regions where growth rates have reached double figures (see Figure 2, left chart). The first half of the 1990s were a period of accelerating telecommunications growth for many developing regions, but this has not been the case for Africa. A little over a decade ago, it would have been easier to find a telephone in Accra than New Delhi, but now the African continent is increasingly falling behind (see Figure 2, right chart).

This survey examines why African telecommunications did not share in the telecommunications boom experienced in other developing regions in the first half of the 1990s and why the *trigger mechanisms* which prompted the boom elsewhere were missing. In particular, the report examines whether the causes for this malaise were external or internal to the telecommunication sector. Positive achievements are highlighted and proposals are advanced for accelerating African telecommunications growth.

Figure 1: Rambling growth

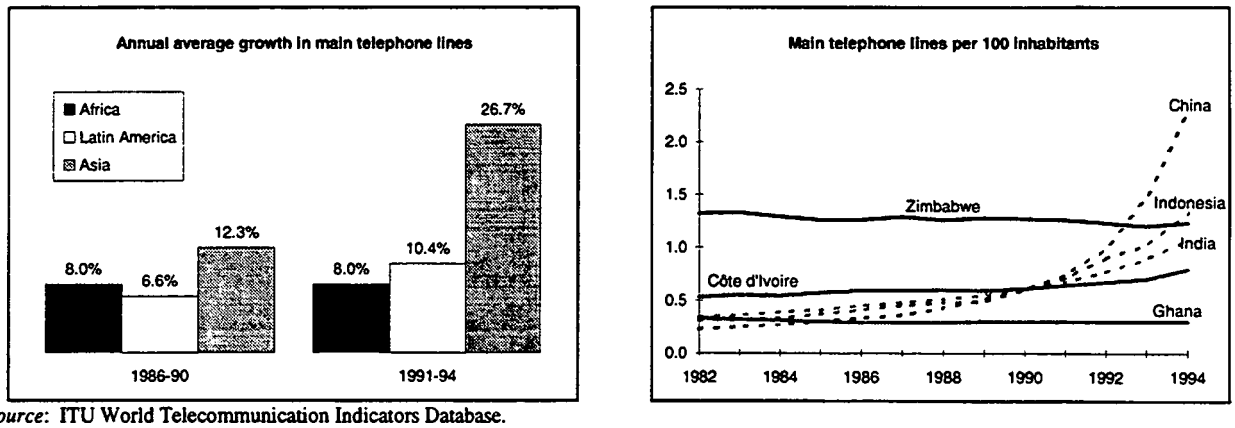
Main telephone lines and main telephone lines per 100 inhabitants, Africa, 1986-94



Note: SSA = Sub-Saharan Africa. Northern = Algeria, Egypt, Libya, Morocco and Tunisia. South = South Africa.
Source: ITU World Telecommunication Indicators Database.

Figure 2: Diverging

Annual average growth in main telephone lines and main telephone lines per 100 inhabitants



Source: ITU World Telecommunication Indicators Database.

1. See Resolution ATDC-90 / RES1 in ITU. 1991. African Telecommunication Development Conference (ATDC-90) Final Report, Volume 1. ITU, Geneva.

2. Improving telephone access

In the period 1990-94, *teledensity* (the number of main telephone lines per 100 inhabitants) in South Africa rose from 8.7 to 9.5. In North Africa it rose from 2.9 to 4.2, but in Sub-Saharan Africa it has remained stuck at below 0.5, or less than one telephone line for every 200 inhabitants. Consequently, the telecommunication development gap has widened substantially within the continent of Africa. The lack of progress in developing telephone access in Sub-Saharan Africa (SSA) over the last five years can be broken down into four factors:

- **Rates of growth of new main lines** have not been as fast as in other developing regions. There are, of course some exceptions to this general pattern: Senegal and the Gambia, for instance, two countries which corporatised their Public Telecommunication Operators (PTOs) in the mid 1980s, have succeeded in improving their ranking within the region substantially (see Table 1).
- **Rates of network utilisation** have been low. A significant percentage of lines are not being connected to potential subscribers (see Box 1). Non-payment of telephone bills are a contributory factor, and indeed in some countries the number of connected subscribers has gone down, due to disconnections, at a time when capacity continues to grow. During 1994, at least three countries in the region—Guinea, Madagascar and Mozambique—experienced a net decline in the number of operational lines. A related problem is that of lines being disconnected due to poor maintenance, vandalism or the theft of copper wire. This latter problem is reported, amongst other countries, by Zambia which is a major exporter of copper.
- **Rates of population growth** in the region remain substantially higher than elsewhere. Since 1990, population growth in Sub-Saharan Africa has averaged 3.2 per cent per year, which is the highest of all developing regions. That means that network growth in Sub-Saharan Africa would need to be much higher than elsewhere just in order for growth of teledensity to keep pace. In practice, this has not happened. Teledensity has declined in nine countries of the region since 1990, and has grown only slowly in most other countries.
- **Civil disturbances** in a number of countries preclude network growth until order is re-established. In countries such as Angola, Liberia, Rwanda and Somalia, networks cannot develop until the political situation is stabilised.

Table 1: Changing fortunes

Change in teledensity, 1990-94 and change in ranking for selected countries, Sub-Saharan Africa

Country	Teledensity, 1990	Ranking 1990	Teledensity, 1994	Ranking 1994	Change in ranking
Gambia	.67	19	1.69	10	+9
Senegal	.60	22	.89	13	+9
Togo	.30	29	.53	22	+7
Burundi	.14	43	.25	36	+7
Mauritania	.29	31	.38	26	+5
Burkina Faso	.18	38	.26	33	+5
SSA average	.40	—	.46	—	—
Ghana	.29	30	.30	32	-2
Somalia	.17	39	.17	41	-2
Lesotho	.69	18	*.63*	21	-3
Zambia	.80	12	.87	16	-4
Guinea	.20	37	.14	43	-6
Angola	.76	13	*.52*	23	-10

Note: Figures in italics refer to 1993. SSA = Sub-Saharan Africa.
Source: ITU World Telecommunication Indicators Database.

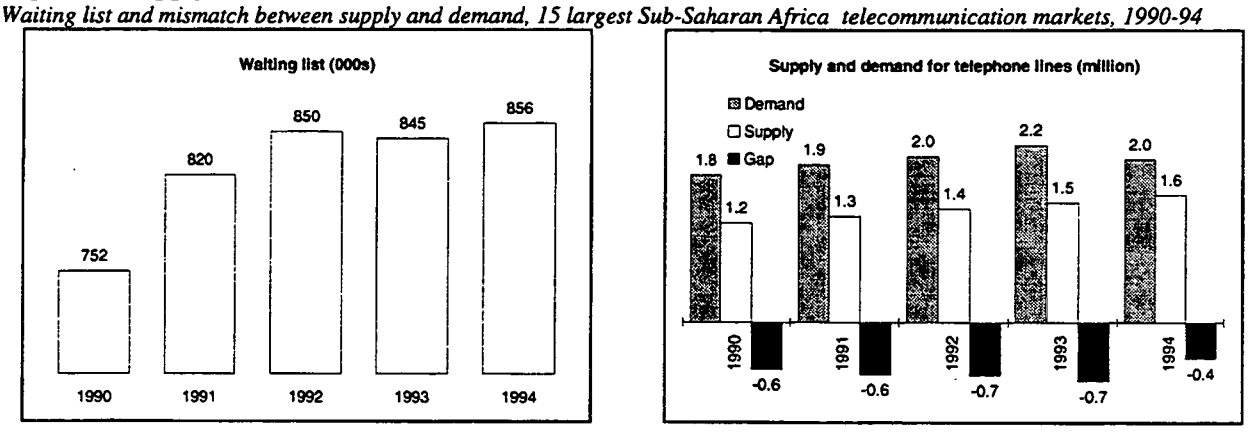
In practice, the situation has improved slightly during the last five years. Between 1990 and 1992, the growth rate of new lines installed each year declined but then picked up again in 1993 and 1994. During 1994, a net total of 176'000 new lines were installed in the region compared with just 129'000 lines added in 1991. Preliminary 1995 results show accelerated line growth in several countries including Ghana, Namibia and Zimbabwe. The official waiting list has stabilised at around 850'000 since 1992 (see Figure 3, left chart). Research on underlying demand for telecommunication services suggests that the gap between supply and demand may actually have fallen in 1994 as a result of the devaluation of the CFA franc at the start of that year (see Figure 3, right chart).

In other developing regions of the world, buoyant demand for telecommunications services has triggered the much faster rates of network growth that have been witnessed since the turn of the decade. In Sub-Saharan Africa, demand growth has not been so rapid but is present nevertheless. The major problem in the region is supply-side constraints which are preventing that demand from being met. While it is undoubtedly true that the state of development of the telecommunication network closely reflects a nation's general economic health, in this region the level of network development is generally below that which would be predicted by the relationship. The reasons why the supply of telecommunication services is failing to keep up with demand are complex. In some cases it may be because the state is reserving for itself the franchise to provide services, preventing new investment from other potential market entrants. In other cases it may be that the local operator is not permitted to borrow money on international capital markets or is already too heavily indebted to be able to do so. In other cases it may be that investors are deterred by civil unrest or lack or political stability. Finally, in some cases limited project implementation capacity inhibits network development even when funds are available.

Whatever the reason, the diagnosis is that reform must begin on the supply-side: policies which create the right regulatory environment for investment, which make it easier for PTOs to invest or which introduce additional investors into the market. Subsequent sections of this report trace these supply-side constraints in terms of the ability of the local telecommunications industry to generate cash (section three) and to re-invest it (section four).

Figure 3: Supply and demand

Waiting list and mismatch between supply and demand, 15 largest Sub-Saharan Africa telecommunication markets, 1990-94



Note: The left hand graphic shows the official waiting list of applicants for telephone connection. The right hand graphic shows predicted demand based on income level.

Source: ITU World Telecommunication Indicators Database.

Box 1. Awakening giant

Nigeria is the largest telecommunication market in Sub-Saharan Africa (excluding South Africa), accounting for over one fifth of telecommunication revenues in the region. The country's main telecommunication provider, Nigerian Telecommunications PLC (Nitel), was created in 1985 from the merger of the telecommunication division of the former Posts and Telecommunications and Nigerian External Telecommunications Ltd. In 1992, Nitel was converted to a public limited company though it presently remains state-owned. The following year, the Nigerian Communications Commission (NCC) was established as the regulatory agency.

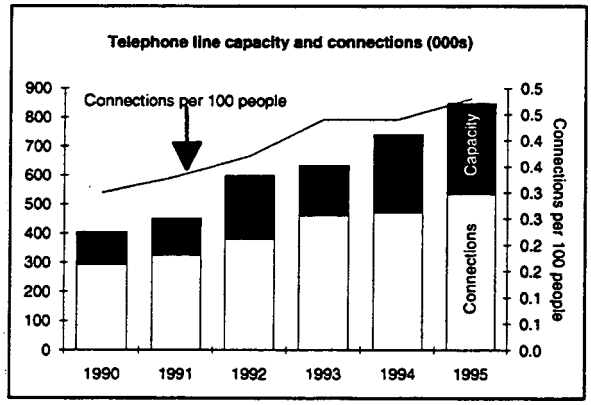
Telecommunications have boomed since Nitel's change of status. Nitel's revenues have risen from US$ 275 million in 1990 to US$ 459 million in 1994 and now account for 1.1 per cent of Nigeria's Gross Domestic Product. The company has also returned to profitability and is no longer a drain on government finances. In 1993 it paid US$ 25.5 million in income taxes, 19 per cent of its profit. International services are a big factor in the turnaround. International telephony accounts for 48 per cent of revenues and received a big boost with the installation of 5'000 new international circuits in 1993. Nitel has also been successful in attracting foreign financing. It has obtained a US$ 225 million World Bank loan covering 47 per cent of a US$ 484 million telecommunication project.

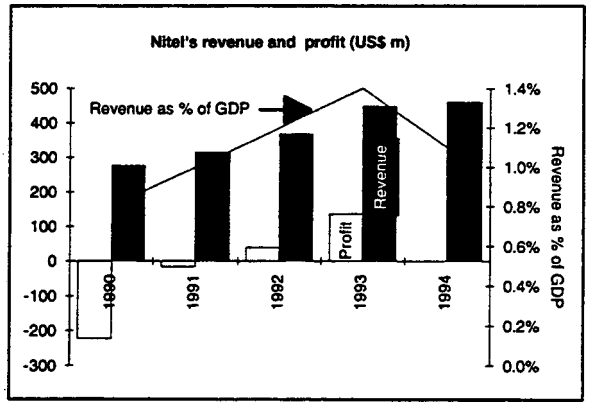
Since 1990, Nitel has increased the capacity of the telephone network by 80 per cent to an estimated 850'000 by the end of 1995. The number of connected lines per 100 people has risen from 0.30 to an estimated 0.48 by 1995. Teledensity could even be higher considering there is significant idle capacity. Indeed, the existing capacity could absorb the present waiting list of around 200'000.

Nitel has also developed other telecommunication services. In 1992, it entered into a joint venture with a United States company to provide cellular services and now operates the largest cellular network in Sub-Saharan Africa. It has begun using cellular technology for providing services to rural areas. Nitel has also established satellite business services for the large oil sector providing voice, text, data and video communications.

The challenge for the Nigerian telecommunication sector will be to sustain the growth, to make better use of the unused capacity in the network, and to reduce its dependence on international traffic. Adding extra lines without connecting them to paying subscribers impacts Nitel's earning potential and delays the boost to the rest of the economy that communications can bring. This suggests that although funds for investment are indispensable, they are not sufficient on their own for boosting telecommunication development and that attention must also be devoted to network planning.

Box Figure 1: How should this spare capacity be exploited?
Nitel's telephone network growth and revenue and profit, 1990-95





Note: 1995 data are ITU estimates.
Source: Nitel Annual Report, ITU World Telecommunication Indicators Database.

3. Telecommunication revenue

The African telecommunication sector has outperformed overall economic growth, increasing its share of Gross Domestic Product (GDP) from 1.4 per cent in 1990 to 2 per cent in 1993. But in 1994, telecommunication revenues dropped in US dollar terms, mainly due to the devaluation of the CFA franc. As a result, the share of the telecommunication sector in African GDP stood at 1.7 per cent in 1994 (see Figure 4, left chart).

Telecommunication revenue, measured in United States dollars, had been steadily increasing in the 14 countries that use the CFA franc. The strong CFA franc—exchanged at a fixed rate to the French franc—stood out in a region where currencies regularly lose value. The strong CFA franc tended to keep inflation low and make imports less expensive. In January 1994, the CFA franc was devalued by 50 per cent. Although telecommunication tariffs were raised in most CFA franc countries to offset the drop in the currency, the devaluation nonetheless reduced telecommunication revenues by 40 per cent (see Figure 4, right chart). Imports will now be more expensive with negative implications for the purchase of telecommunication equipment.

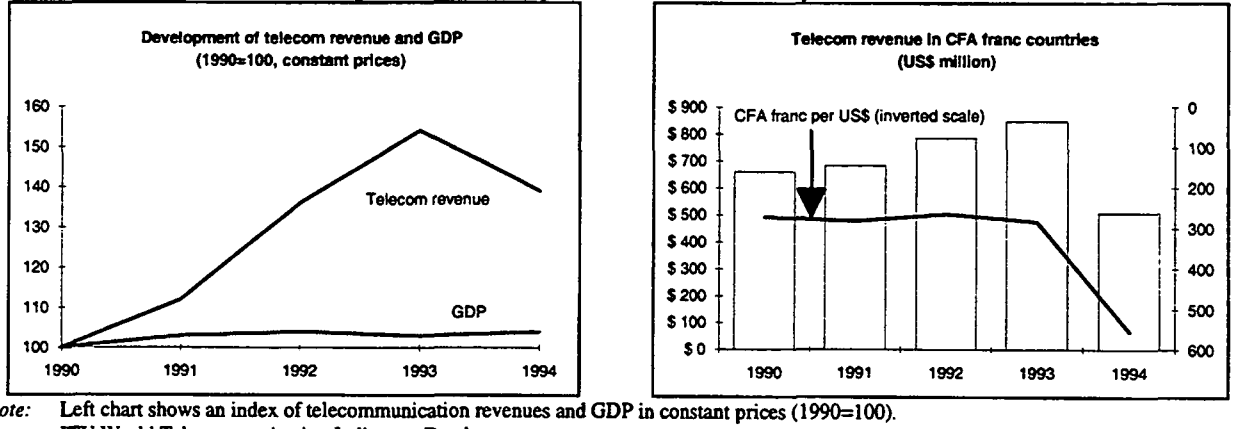
One challenge for operators in the region will be to diversify their revenues from heavy reliance on international telephone calls (more than 50 per cent of revenues are from this source). This diversification of revenues should be done in a way that does not raise prices significantly, or potential subscribers will be discouraged. There has been scarce experimentation in the region to determine whether cheaper tariffs would trigger greater demand and hence additional revenues. Most operators have preferred to target the more affluent segments of the population, particularly expatriates, international hotels and embassies, government officials and export-oriented firms. The common factor among the target group is that they make a lot of international telephone calls. For the rest of the population, tariffs remain too high. Problems with non-payment of bills and growing disconnections, noted earlier, are a sign of this.

One problem is that, unlike food or shelter, telecommunication infrastructure is not produced locally and must be imported and paid for with foreign currency. With weak currencies, tariffs must be set high to recover the costs of purchasing and installing this infrastructure. In contrast, tariffs for international calls in developed countries have been dropping with the result that incoming settlement payments generated by overseas calling partners have been increasing in Africa. These payments are usually made in hard currency. But PTO management often finds that these funds are siphoned off by other parts of government. Worse still, the likely outcome of high international tariffs is that the PTO network will increasingly be bypassed by alternative networks. Thus settlement payments cannot be regarded as a sustainable form of income.

The success of macro-economic policies will to a large extent influence the ability to expand networks to larger segments of the population. If currencies can be stabilised, then a shift to greater domestic revenues would not affect the ability to import telecommunication equipment and will make the region more attractive to foreign investment.

Figure 4: A temporary drop?

Telecommunication revenues in 15 largest Sub-Saharan African markets and in CFA franc countries



Note: Left chart shows an index of telecommunication revenues and GDP in constant prices (1990=100).
Source: ITU World Telecommunication Indicators Database.

Box 2: Tariff challenges

One paradox in African telecommunications is that, despite having some of the world's lowest incomes per capita, tariffs are relatively high. These high tariff charges translate into a level of income per line which is correspondingly above other developing regions. If telecommunication services are to be expanded in the region, then they must be affordable.

Tariffs consist of fixed (installation and subscription), variable (usage) charges plus tax. Effective management of tariff options could result in wider access. Unfortunately many African telecommunication operators are not making sufficient use of the various strategies available to them. Simple options such as charging different tariffs for business and residential users or experimenting with a different blend of installation, subscription and call charges, are not always explored.

The average price charged by operators within the region for installing a line is less than US$ 50, even for businesses. At this level, local PTOs cannot hope to be able to cover their costs which are significantly above other regions due to higher unit investment costs. On the other hand, residential subscription charges in the region can be quite steep which is equally damaging to the long term prospects for the industry. Tariff rebalancing schemes in the region are overdue in a number of countries and could involve a combination of the following moves:

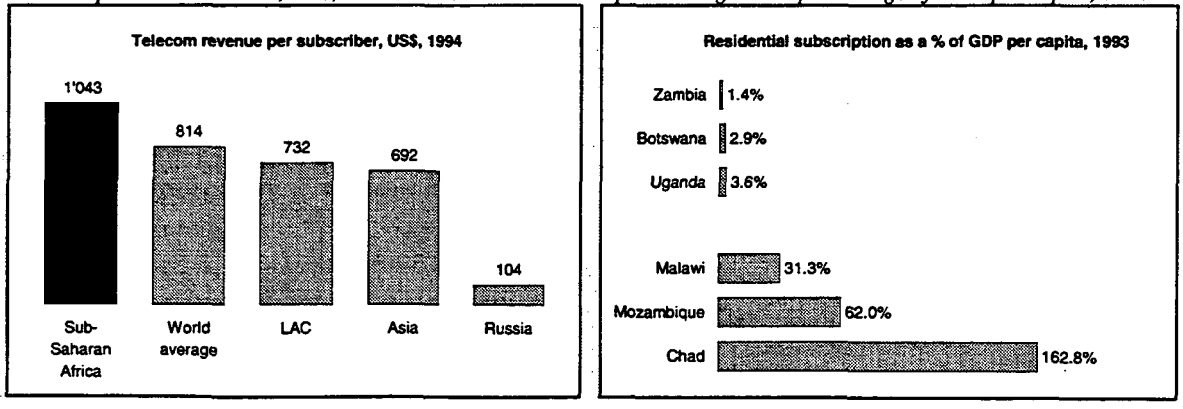
- Raising installation charges to bring them closer to the cost of installing a new line (see Box 3). It is difficult to justify the practice of subsidizing installation charges in countries which still have a substantial waiting list and where there is little existing network capacity. Higher installation charges would provide a ready source of income for investment for the operator.[2] On the other hand, countries with significant idle capacity might want to consider lowering installation charges to encourage more subscribers.
- Setting residential subscription charges in relation to the average level of family incomes. A target figure for the region could be around 3-5 per cent of GDP per capita. Given that the average GDP per capita in Africa in 1994 was around US$ 600 per year, this would suggest an average monthly residential subscription charge of US$ 1.50 to US$ 2.50, which could increase as incomes rise.
- Setting separate installation and subscription charges for business subscribers. This would reflect not only the greater ability to pay of business subscribers but also the greater demands they place on the network and on maintenance staff. A mark-up of at least 3-4 times the residential subscription charge would seem reasonable but in return PTOs should strive to deliver better reliability and quality of service.
- Providing discounts to entrepreneurs operating public telephone centres (see Box 5) and other resellers.

These steps would provide a platform for revenue generation from which a richer and more diversified range of tariff options could be introduced. Many countries in the region have not yet introduced off-peak discounts to encourage social calls in the evening or at weekends. Also many countries still maintain distance-based tariff charges for inter-urban calls which rise steeply, even though this practice is no longer cost-based.

Ultimately tariffs must recover costs for telecommunications to be financially viable and not incurr losses. In this respect, one of the best ways to lower tarrifs and make telephone service more affordable in the region is to strive to obtain cheaper unit investment costs.

Box Figure 2: Is the price right?

Revenue per subscriber line, US$, 1994 and residential subscription charges as a percentage of GDP per capita, 1993



Note: LAC = Latin America and the Caribbean. Residential subscription fees defined as an annual residential subscription charge plus 700 local telephone calls. This is expressed as a percentage of Gross Domestic Product per capita.

Source: ITU World Telecommunication Indicators Database.

[2] See Paltridge, S. 1994. *A Survey of the Tariff Structures in Africa.* Paper presented at Africa Telecom 94.

4. Telecommunication investment

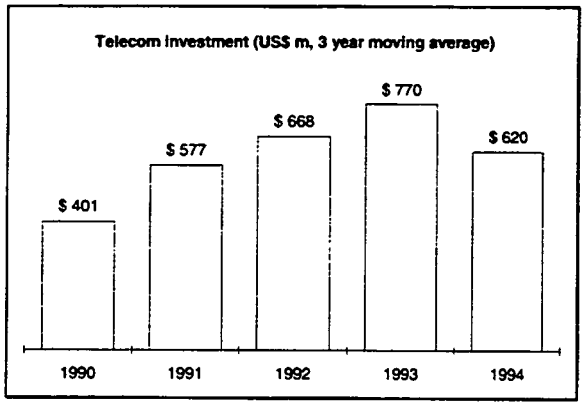
Telecommunication investment in Africa grew between 1990 and 1993. However, like revenues, investment declined in 1994, by 19 per cent. Around 60 per cent of investment was self-financed from the earnings of operators. This percentage of auto-financing is relatively high compared with other developing country regions, suggesting a lack of capital from other sources. Multilateral assistance accounted for a further 20 per cent of telecommunication investment while the remainder came from bi-lateral and other sources (grants, reserve drawing, commercial lending). Bilateral lending peaked at US$ 431 million in 1989 but had fallen to just US$ 97 million by 1994. The major bilateral donors, by some margin, are Japan and France.

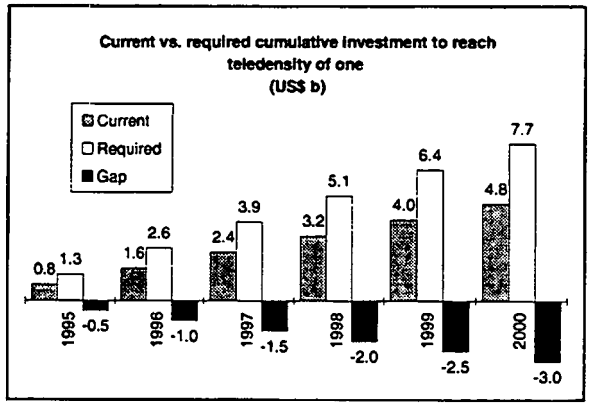
Multilateral lending institutions such as the European Investment Bank (EIB), African Development Bank and the World Bank lent some US$ 750 million to Sub-Saharan Africa for telecommunications during the period 1986-1994. This is just 0.3 per cent of their total lending for all infrastructure projects around the world. By contrast, the European Bank for Reconstruction and Development, set up to provide assistance to Central and Eastern Europe, has loaned over US$ 900 million for telecommunications to the countries of that region just since 1990. It should be noted that Central and Eastern Europe, like Africa, is a region without a significant private sector. Multilateral lending *has* had a significant impact on telecommunication development for Sub-Saharan Africa; countries receiving loans have shown noticeable increases in teledensity. For example, Benin and Togo, which received multilateral loans in the late 1980s, have seen teledensity rise by 46 and 88 per cent respectively. Yet lending is declining; in 1994 only the EIB made telecommunication loans to the region. Increasingly, multilateral loans are being tied to sector reform.

A frequently cited goal for Sub-Saharan Africa is to raise teledensity to one line per every 100 inhabitants by the year 2000. One problem in trying to put a price on attaining this goal is that investment costs vary tremendously throughout the region. Investment per line in most countries of Sub-Saharan Africa is far higher than the industry yardstick of US$ 1'500 per line. If industry standards prevailed, just US$ 8 billion would be required between now and the turn of the century for the region reach a teledensity of one. It is estimated that around US$ 5 billion will be available from self-financing, leaving an investment gap of around US$ 3 billion. However, significantly greater funds would be needed if the current investment per line costs in the region are taken into account. Consequently, reducing the costs per unit of investment, for instance through competitive tendering or by bulk purchasing, will be equally significant as identifying new sources of funding.

Figure 5: Investment trends

Telecommunication investment in 15 largest Sub-Saharan African markets and Sub-Saharan Africa investment projection





Note: The figures shown in the right-hand diagram are based on an estimated cost of US$ 1'500 per new line installed. The projections for investment generation are based on the growth in investment observed 1990-93, and discount the decline in investment experienced in 1994 due to the devaluation of the CFA Franc.

Source: ITU World Telecommunication Indicators Database.

Table 2: Pick a scenario

Telecommunication investment scenarios for Sub-Saharan Africa, 1995-2000

Scenario	Main lines to add (000s) (1995-2000)	Estimated investment (1995-2000) US$ million		Main lines per 100 inhabitants 2000
		Cost low a)	Cost high b)	
Current trends	1'519	2'279	8'357	0.62
To reach 1 main line per 100 inhabitants	5'144	7'715	28'306	1

Note: a) Assuming US$ 1'500 per line. b) Assuming US$ 5'500 per line, the average for 1990-94.
Source: ITU projections based on data from World Telecommunication Indicators Database.

The conclusion that a four-fold investment efficiency gain can be achieved through improved tendering procedures (see Box 3) is encouraging for the countries of the region. Three other developments hold further promise:

- In South Africa, which is attempting to raise the teledensity level in the former black homelands and townships to match that of the predominantly white suburbs, the incumbent PTO Telkom SA is planning a tender for the construction of five million new lines by the year 2001. The initial invitation to tender specifies that the contracts should not add to Telkom's debt burden, which probably implies that construction will be undertaken through some sort of Build-Operate-Transfer (BOT) mechanism. Telkom had previously purchased equipment under long-term (fifteen year) supply agreements with locally-based manufacturers. The move to competitive bidding, and the issue of a major purchase order, should substantially reduce unit investment costs;
- In Eastern Africa, a proposal has been floated by WorldTel to pool investment requirements in a single one million line order, estimated to cost 1.3 billion dollars. Pooling investment needs provides a way of creating economies of scale and creating competition among potential suppliers.
- At the international level there are a number of different investment schemes aimed at leveraging revenues from international traffic to promote private sector driven infrastructure projects. These are discussed further in section six.

Box 3: The cost of a line

One of biggest challenges for African telecommunication operators is to reduce unit investment costs. Installation costs in Sub-Saharan Africa are four times higher than the average for developing countries.[3] If the Sub-Saharan figure were closer to the world average of US$ 1'500 per line, the region would be adding three times as many lines a year with the same amount of investment.

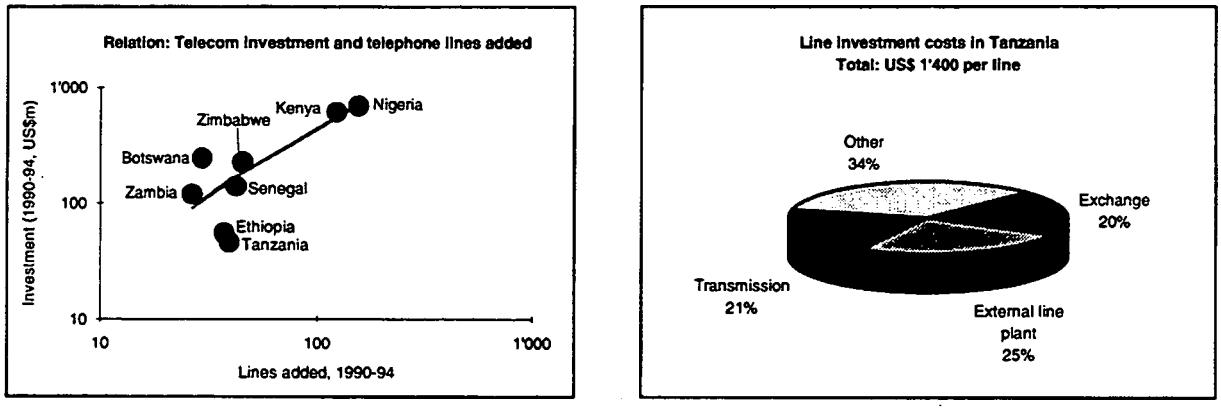
Technological improvements are pushing down telecommunication equipment costs. One of the most promising areas for achieving lower costs is the use of wireless technology. Mobile cellular networks can now be cost competitive with wired networks and are typically installed far quicker. One vendor cites two months to install a cellular system compared to 36 months for a fixed-link system.[4] In Malawi, a cellular joint venture with the national telecommunication operator will have installed a 10'000 subscriber network in less than a year at a cost of US$ 1'000 per subscriber. Fixed cellular is also becoming an attractive alternative to copper wire. One study shows fixed cellular costs declining from US$ 5'000 per subscriber in 1985 to US$ 500 today.[5]

One reason for elevated unit investment costs in the region are large rural areas which tend to cost more to serve. In this area too, telecommunication equipment costs are falling.[6] Investment costs vary significantly within Sub-Saharan Africa. An analysis of telecommunication investment in eight countries over the period from 1990 to 1994 found that costs vary between US$ 1'000 and US$ 8'000 per subscriber line, with an average of around US$ 4'250. A regression analysis found a close relation between investment and the number of new lines added with most of the countries landing on, or close to, the regression line. But two countries, Ethiopia and Tanzania, fell well below the regression line suggesting significantly lower investment costs. They were both recipients of large multilateral loans for financing their telecommunication projects. These loans typically stipulate that equipment procurement must be transparent and open to international bidding. Competitive tendering tends to reduce unit investment costs. The results of the research are borne out by data from Tanzania which show its unit investment cost, at US$ 1'400 per line, is just below the industry average and considerably below the regional average.

What this suggests is that if Ethiopia and Tanzania can achieve investment costs below the industry average, then so could other Sub-Saharan African countries. Both of these countries have large land areas, so costs should be even lower in other countries that are smaller or more urbanized. Achieving lower investment costs is a relatively easy way for Sub-Saharan Africa to generate investment since, with the same level of investment, a country can purchase more lines.

Box Figure 3: How much does a telephone line cost?

Relation between investment and lines added and line investment costs in Tanzania



Note: Logarithmic scale used in left-hand diagram.

Source: ITU World Telecommunication Indicators Database, World Bank.

[3] See ITU. 1994. *World Telecommunication Development Report*. ITU, Geneva.

[4] See Lawton, G. "Out of Africa". *Global Telephony*. February 1996.

[5] See Herschel Shosteck Associates Ltd. 1995. *World Demand for Wireless Local Loop Systems*. Herschel Shosteck, Wheaton, MD (USA).

[6] See "Mapping a route to Africa's remotest regions." *Telecommunications in Africa*. January/February 1996.

5. International traffic

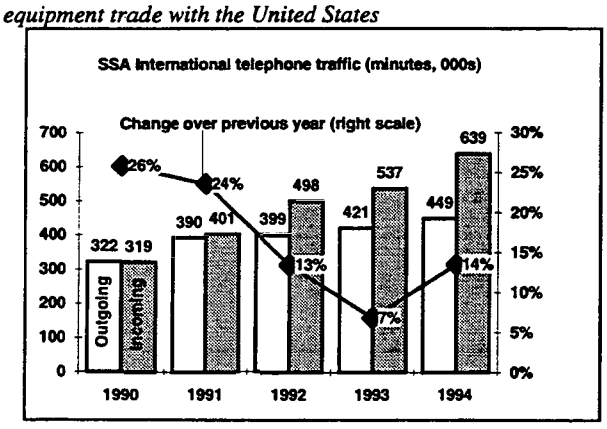
The African telecommunication sector is very dependent on international telephone calls which account for over 40 per cent of revenues in the region.[7] Although the volume of international traffic has grown in the region, the rate of growth has been declining in Sub-Saharan Africa since the start of the 1990s (see Figure 6, left chart). This is in line with global trends and the overall decline in the African economy. In 1994, the growth rate increased, reflecting an upswing in economic activity. Within the region, the North African countries account for 36 per cent of the traffic, South Africa 26 per cent and Sub-Saharan countries 38 per cent. Over the last decade, North Africa's share has been declining, South Africa's increasing while the Sub-Saharan share has remained the same. Over 60 per cent of the traffic leaves the region. The bulk of the regional traffic is generated between South Africa and its neighbours.

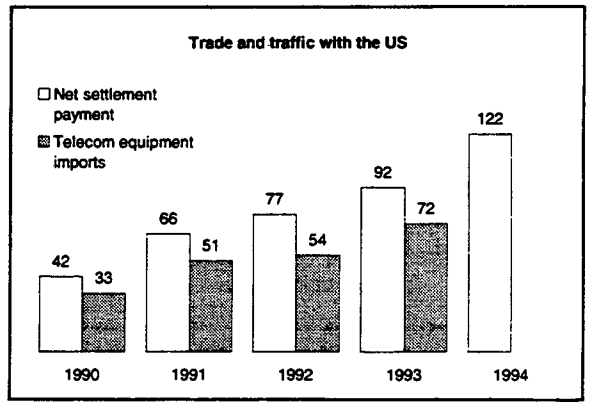
Incoming traffic has exceeded outgoing traffic since 1991. The excess of incoming over outgoing traffic is generating badly needed foreign exchange for telecommunication operators in Sub-Saharan Africa. The increase in incoming telephone traffic is reflected in Africa's traffic with the United States; incoming calls from the United States have grown from 75 million minutes in 1990 to 173 million minutes in 1994. The growth in incoming traffic is likely to continue as long as tariffs are higher in Africa than the United States. The discrepancy in tariffs has led to growing use of United States-based call-back companies. Call-back exploits this difference by reversing the billing. It is likely that a portion of the traffic recorded as incoming traffic from the United States, is actually *outgoing call-back* traffic to the United States and other destinations routed via the United States. Although call-back has been declared illegal in a number of African countries, it is technically difficult to stop. As long as the majority of call-back traffic is carried over the public switched network, call-back should have a positive effect on foreign exchange earnings.

The net gain the region makes on telephone traffic is offset by its purchases of telecommunication equipment. For example, Sub-Saharan Africa imports of telecommunication equipment from the United States have been growing in conjunction with net settlement payments (see Figure 6, right chart). United States exports of telecommunication equipment to Sub-Saharan Africa have doubled since 1990 and are growing 30 per cent a year. Overall, Africa has a huge imbalance in telecommunication equipment trade: its imports are more than 20 times the value of its exports. For example, in 1992, Sub-Saharan Africa imports of telephone exchange equipment amounted to some US$ 200 million against exports of less than US$ 5 million.

Figure 6: Telecommunications and trade

Sub-Saharan Africa international telephone traffic, trends 1990-94 and Sub-Saharan Africa net settlement payments, telecom equipment trade with the United States





Note: SSA = Sub-Saharan Africa.
Source: ITU World Telecommunication Indicators Database, FCC, US Department of Commerce.

[7] For a detailed look at African international telephone traffic see: M. Minges. 1996. "Africa Calling". In *Communications Technology Handbook* 1996 (forthcoming). BMI-TechKnowldege, South Africa.

6. International infrastructures

Various efforts are underway to increase Africa's international telecommunication connectivity. On the satellite front, the Regional African Satellite Communications System (RASCOM) organization has been established with headquarters in Abidjan, Côte d'Ivoire. One of RASCOM's goals is the launch of a Pan-African satellite system. In the meantime it is coordinating African requirements with INTELSAT, the global satellite system used by a majority of countries on the continent. A cooperation agreement was signed in 1994. INTELSAT will launch two satellites in 1997 that will have extensive African coverage. By pooling their satellite requirements within RASCOM, the African countries have been able to negotiate lower charges. In addition to existing satellite solutions, a number of international consortiums are proposing Low Earth Orbit (LEO) systems aimed at mobile subscribers. With a world-wide umbrella, these LEO systems will thus also cover Africa and are scheduled for operation before the end of the century.

There are a number of initiatives to plug Africa into the global information network through fibre optic undersea cables. At present, the only fibre links from Africa to the rest of the world are from South Africa, from several of the Maghreb countries and from Djibouti. The French telecommunication equipment manufacturer, Alcatel, is working with a number of nations to develop a West African undersea fibre optic cable that would connect to Europe. The United States company AT&T intends to develop a fibre ring around the continent called Africa ONE. Siemens, the German equipment manufacturer, has proposed a '6'000 kilometre series of fibre optic links along the western coast of Africa. A different approach comes from Telkom South Africa which proposes the use of its South Africa Far East (SAFE) cable; overseas African traffic would be relayed via satellite to South Africa and then sent over the SAT-2 fibre optic cable.

The fibre proposals aim to reduce the need for switching international traffic via third countries outside the region and thereby to cut transit costs and promote traffic growth. However the overwhelming majority of overseas Sub-Saharan African traffic passes through satellite where there is adequate capacity to handle current and short-term forecast traffic volumes. Existing satellite usage, in conjunction with the relatively low volume and growth of African telephone traffic compared to other regions, suggests that four different fibre optic systems may not be viable. Indeed an earlier proposal from the Fiberoptic Link Across the Globe (FLAG) consortium for an African spur was withdrawn in June 1994 on the assumption that forecast traffic growth would not justify the investment. Recent developments suggest a rationalisation of the different schemes with Alcatel and AT&T agreeing to join forces.

Considering the number of land-locked countries on the continent, it is clear that international connectivity will require a mix of satellite, fibre and existing terrestrial solutions such as microwave. The challenge will be to explore the merits and complementarities of the various alternatives, the level of regional cooperation required and the adoption of effective ownership and management structures.[8]

Table 3: Rings around Africa

Proposed submarine fibre optic cable projects for Africa

Name	Lead company	Investment (US$ m)	Note
Africa One	AT&T	2'650	Repeatered. To encircle the entire continent. Total length 32'000 km.
Afrilink	Siemens	500	Unrepeatered. To be built in phases based on demand. Total length to be approximately 6'000 km.
Pan-African Project	Alcatel	1'000	Repeatered. Connecting a number of West African countries. Possible 2nd route along the Indian Ocean.
SAFE	Telkom SA	No additional investment	Sharing South Africa's SAT-2 fibre optic cable by combining traffic from other countries via satellite.

Source: ITU, company reports, TFA.

[8] See Telecommunications Foundation of Africa (TFA). 1995. *Pan-African Connectivity: Responses to Increasing Traffic.* TFA: Nairobi, Kenya.

7. Cellular trends

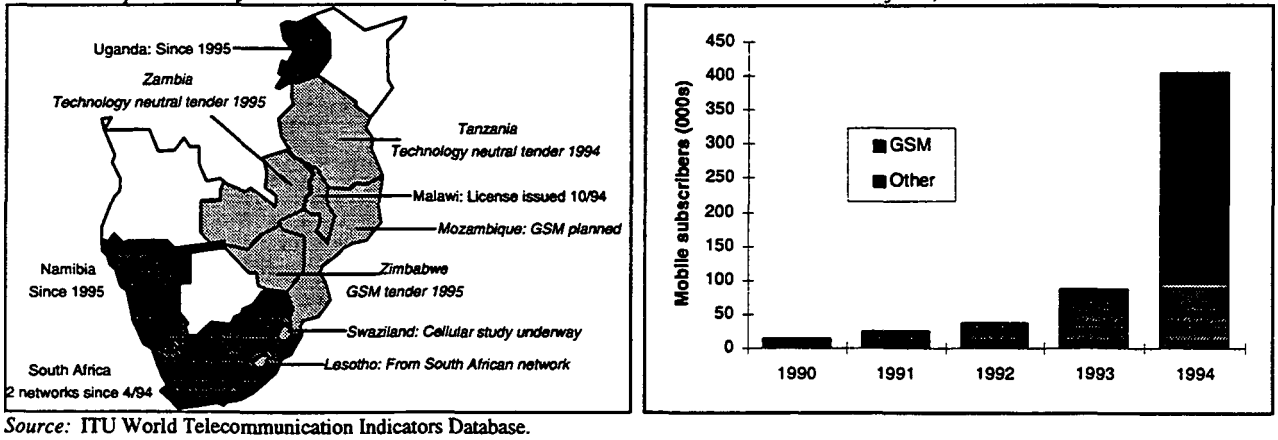
Mobile communication, though slow to take-off in Africa, is now becoming more widely accepted. Some 23 African countries had cellular systems in operation by the end of 1995. The vast majority of subscribers are in South Africa where growth has been explosive since the launch of a digital GSM system by two competitors in 1994. Compared to South Africa, as well as rapid growth in the rest of the world, cellular take-up in the rest of Africa has been modest. Security concerns have dampened growth in Northern Africa (except Morocco which has seen subscriber numbers double since the launch of a digital GSM system) and by high prices in Sub-Saharan Africa. It is noteworthy that cellular is one of the few market segments where private investment and competition has been allowed in the African telecommunication sector. Of the twenty-six networks in operation, eleven are joint ventures with foreign investors while three countries—Ghana, Guinea and South Africa—currently allow competition.

Sub-Saharan Africa is an ideal environment for cellular technology. The poor state of the fixed-link network makes cellular—with quicker installation times and competitive investment costs—an ideal substitute. There are a number of developments that could transform the African cellular landscape, and help to more fully realise the potential of wireless technology:

- **Greater GSM zone**. The explosive growth of GSM in South Africa, which has growing trade and communication links in the southern portion of the continent, suggests the possibility of an extended GSM zone stretching from South Africa to Namibia in the Northwest and Uganda in the Northeast. This zone could provide roaming for around a dozen countries. Namibia and Uganda commenced operation of GSM systems in 1995. In Malawi, a joint venture between the national operator and Telekom Malaysia plans to operate a GSM network while Tanzania, Zambia and Zimbabwe intend to license GSM networks.
- **Satellite links**. The use of satellites to connect dispersed cell sites and provide national and international coverage is growing. In Zaire, Telecel is using INTELSAT to tie together its cellular systems in six cities and provide long-distance and international service.[9] In Ghana, Millicom has leased capacity from INTELSAT to connect its cellular networks in Accra and Kamasi and plans to expand this to other cities.
- **Fixed cellular**. So-called Wireless Local Loop (WLL) technology utilises cellular radio in a stationary mode just like a fixed line. Instead of the traditional copper cable connecting the subscriber to the telephone exchange, cellular technology is used. WLL continues to fall in price and is now arguably as cheap as copper wire. In Ghana, Capital Telecom, is installing WLL systems under a Build-Operate-Transfer (BOT) project that should serve up to 50'000 subscribers in rural areas by 1998.

Figure 7: A greater GSM zone?

GSM developments in Africa's southern cone, and mobile communications subscribers in Africa, 1990-1994



Source: ITU World Telecommunication Indicators Database.

[9]"Satellite Cellular Links Move Zaire Ahead." *Via INTELSAT*. April 1993 and "Ghana Goes Global Using Cellular Solution." *Via INTELSAT*. October 1995

Table 4: Cellular subscribers in Africa

Number of mobile cellular subscribers in Africa, 1990-1995

Economy	Operator / System / Owners	1990	1991	1992	1993	1994	1995
Angola	Angola Telecom [AMPS]	0	0	0	1'100	*1'500*	1'994
Benin	OPT [AMPS]	0	0	0	0	0	1'050
Burundi	Telecel Burundi [AMPS] - ONATEL (30%), Telecel Zaire (40%), Burundi government (30%)	0	0	0	320	343	480
Cameroon	Dirtel [GSM]	0	0	0	*1'000*	1'700	2'485
Cent. Afr. Rep.	CARATEL [AMPS] - Telecel International and Central African investors.	0	0	0	0	0	79
Gabon	OPT [AMPS]	0	0	280	1'200	2'581	*3'000*
Gambia [a]	Gamtel [TACS]	0	0	204	379	810	*1'000*
Ghana	Mobitel [TACS] - Millicom (80%), Others (20%)	0	0	400	1'742	3'336	3'637
	Celltel [AMPS] - Ghanaians (95%), AT&T (5%)	0	0	0	0	0	2'563
Guinea	Telecel Guinée [AMPS] - Telecel International (60%), Guinean partners (40%)	0	0	0	0	312	480
	Spacetel-Guinée [AMPS] - Guinean and US investors. Not interconnected to public telephone network.	0	0	0	0	0	...
Kenya [b]	KPTC [TACS]	0	0	1'100	1'162	1'990	2'279
Malawi	Telekom Networks Ltd. [GSM] (end 1995) -Telekom Malaysia, PTC	0	0	0	0	0	...
Mauritius	Emtel [TACS] - Millicom (46%), Others (54%)	2'200	2'556	2'912	4'037	5'706	11'735
Namibia [c]	Mobile Telecom. Ltd. [GSM] - Namibia Telecom (51%), Telia, Swedfund (49%)	0	0	0	0	0	3'500
Nigeria	MTS [TACS] - Nitel, Digital Telecom	0	0	0	9'049	12'800	*15'000*
Senegal	Sonatel [AMPS]	0	0	0	0	98	122
Tanzania	MIC Tanzania Limited [TACS] - TTCL (25%), Millicom (46%), Others (29%)	0	0	0	0	371	2'303
Uganda [b]	Clovergem Celtel Ltd. [GSM] (June 1995) - Vodafone (UK) (35%), Clovergem (20%), MSI (20%), IFC (10%), CDC (10%), Others (5%)	0	0	0	0	0	1'747
Zaire	Telecel [AMPS] - Zairian, US and Belgian investors	0	*2'000*	*4'000*	*6'000*	*7'000*	*10'000*
	Sub-Saharan Africa	**2'200**	**4'556**	**8'896**	**24'989**	**38'547**	***63'554***
Algeria	PTT [NMT]	470	4'780	4'781	4'781	1'348	*1'500*
Egypt [b]	Arento [TACS]	4'000	5'240	6'944	7'550	7'371	*7'500*
Morocco	ONPT [NMT, GSM]	904	1'500	3'228	6'725	13'794	*20'000*
Tunisia	DGT [NMT]	953	1'239	1'889	2'269	2'709	*7'000*
	Northern Africa	**6'327**	**12'759**	**16'842**	**21'325**	**25'222**	***36'000***
South Africa [a]	Mobile Telephone Networks [GSM] - Multichoice (25%); Cable & Wireless (25%); Transtel, Naftel, FABCOS, Cosatu (50%)	0	0	0	0	120'000	190'000
	Vodacom Group [GSM] - Telkom South Africa (50%); Vodafone (UK) (35%); Rembrandt Group (15%)	5'680	7'100	12'510	40'000	220'000	330'000
	South Africa	**5'680**	**7'100**	**12'510**	**40'000**	**340'000**	***520'000***
	AFRICA	**14'207**	**24'415**	**38'248**	**86'314**	**403'769**	***619'554***
	- CAGR		**72%**	**57%**	**126%**	**368%**	**53%**
	No. of countries with cellular	**6**	**7**	**10**	**15**	**18**	**23**
	No. of countries without cellular	**46**	**45**	**43**	**38**	**35**	**30**

Note: Figures in italics are estimates. Number of countries in Africa increased in 1992 with independence of Eritrea.
a). Year beginning April 1. b). Year ending 30 June. c). Year ending 30 September. All others year ending 31 December.

Source: ITU PTO Database.

8. Restructuring

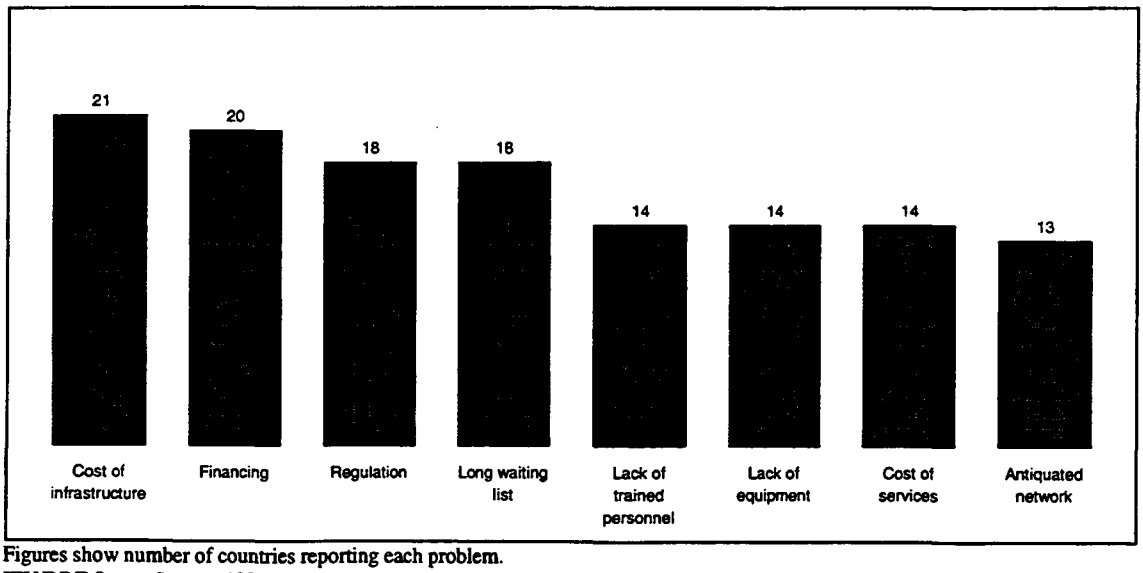
The pace of restructuring in the African telecommunication sector has been accelerating since 1990. Telecommunications is being separated from posts, telecommunication operators established as joint stock companies, regulatory agencies created and private participation in the cellular industry is growing. In a recent ITU survey, 28 African countries responded indicating that four countries had separated posts and telecommunication in the past two years while five others indicated their intent to separate in the next two years. Furthermore, 14 of 21 countries indicated that they planned to create regulatory agencies in the next two to three years.

The privatization of public telecommunication operators and the introduction of competition in specific markets is also beginning to occur. The national telecommunication operator in Guinea was partly privatized in early 1996; in Cape Verde, the government announced a tender for 40 per cent of the national operator in 1995. In Ghana, there are two and soon to be three cellular competitors while Tanzania has issued tenders for additional cellular operators. A significant development is the planned partial privatization of incumbent operators and the introduction of second fixed-link operators in Ghana and Uganda, which was announced early in 1996.

As privatization and liberalization spread throughout the region, many complexities need to be resolved. Responses to the 1995 ITU/BDT sector survey indicate that regulation follows closely after infrastructure costs and network financing as the major problems of the region (see Figure 8). Issues such as defining licensing terms, procedures and fees; interconnection agreements; universal service and tariff policies must also be addressed. One problem has been in the area of human resources. In Mozambique, for example, a regulator was established and the operator corporatized in 1993. There were difficulties in deciding who would stay with the ministry, who would go to the regulator, and who would go to the operator. In other countries, fears among telecommunication staff about possible displacement due to restructuring are delaying reform.

Another difficulty is financing the regulatory authority and ensuring its neutrality and independence. In general, the new regulatory bodies in Sub-Saharan Africa report to the relevant Ministry and are funded by license fees. In Mauritius, the regulator reports to the Prime Minister and is funded by the government. The regulator is charged with most tasks, except the establishment of license fees which is performed by the Ministry. In Côte d'Ivoire, the regulator reports to a council. In Nigeria, the regulator serves most functions, the only exception being frequency allocation which remains the responsibility of the Ministry.

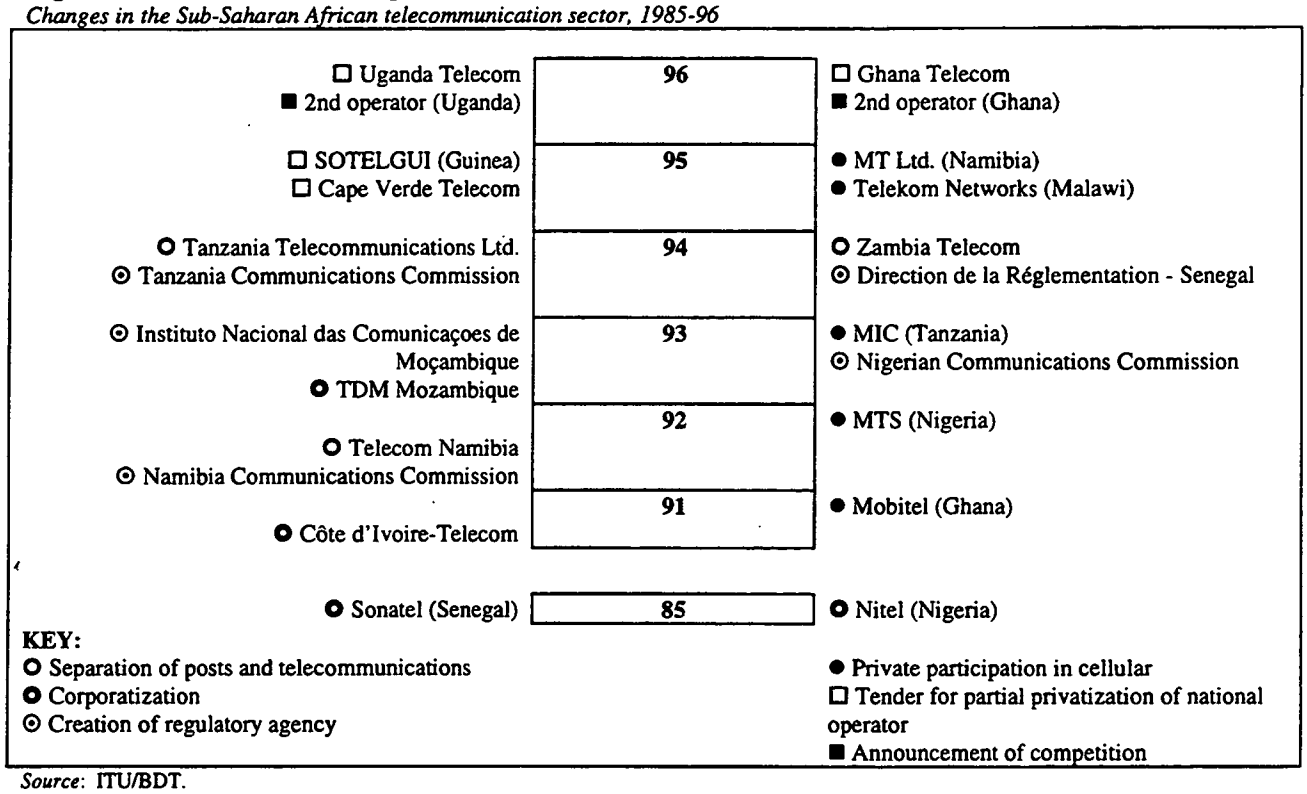
Figure 8: So what's the problem?
Ranking of problems expressed by African telecommunication administrations, 1995



Note: Figures show number of countries reporting each problem.
Source: ITU/BDT Sector Survey, 1995.

Figure 9: Sector restructuring

Changes in the Sub-Saharan African telecommunication sector, 1985-96



Source: ITU/BDT.

Box 4: The African Green Paper

At the 1990 African Regional Telecommunication Development Conference, it was resolved to create an African Information and Telecommunication Policy Study Group (AITPSG). The main task of the AITPSG was to elaborate *The African Green Paper: Telecommunications Policies for Africa* which would serve as a guideline for the region.

The African Green Paper was inspired by the 1987 European Commission Green Paper "Development of a common market for telecommunications services and equipment". As the situation is Africa is quite distinct from the conditions of the members of the European Union, the African Green Paper is to be viewed as a thought-provoking document suggesting approaches and options for restructuring the telecommunication sector in Africa.

The Paper was prepared by a group of African experts and is structured around eight chapters. It reviews the global and regional situation; addresses legal considerations in the restructuring process; discusses appropriate regulatory frameworks; explores options for reforming network operations and services; raises economic, financial and tariff issues; and looks at network development.

The following list highlights some of the key recommendations of the Paper:

- Separation of regulatory and operational functions;
- Separation of the postal and telecommunication functions;
- Creation of a separate national body charged with regulating telecommunications;
- Provision for financial and managerial autonomy for the telecommunication operators;
- Opening to regulated competition of those market segments in which demand remains unsatisfied;
- Investment in the development and management of human resources;
- Creation of a consultative mechanism that allows the involvement of users and other parties concerned with the improvement of efficiency of the sector.

The African Green Paper will be presented to the second African Regional Telecommunications Development Conference in Abidjan, in May 1996, for adoption.

9. Performance

How has performance changed in the African telecommunication market since 1990? An analysis of the 15 largest Sub-Saharan telecommunication markets reveals contrasting results. Performance is compared in two categories: network development and productivity and finance.

In terms of network performance, the 15 largest telecommunication operators increased **teledensity** by an average of 32 per cent from 1990 to 1994, raising it to over one. Botswana, Gabon and Senegal had the highest increase while in Ghana and Zimbabwe, teledensity declined because the number of lines added did not keep pace with population growth.

The number of **telephone faults** increased in several countries between 1990 and 1994. This decline in quality of service is disturbing. The overall rate of faults per 100 main lines remains far above world averages. Senegal performs best in this category, partly a reflection of the high degree of digitization of Sonatel's network (76 per cent of main lines are connected to digital exchanges).

Productivity, as measured by the **number of main telephone lines per telecommunication employee**, increased by 37 per cent from 1990 to 1994 for the 15 countries as a whole. However, in line with trends in the rest of the world, most of the gain in productivity came from staff reductions rather than dramatic increases in the number of lines. Botswana was an exception; even though the number of employees increased by around 500, there was a one third gain in productivity.

Overall, the francophone countries seem to have performed better during the first half of the 1990s. The countries showing the biggest improvements in performance were Senegal, Côte d'Ivoire, Cameroon, and Gabon while Botswana and Senegal currently perform best in the three indicators.

Table 5: Network performance and productivity indicators
15 largest Sub-Saharan Africa telecommunication markets, 1994

	Teledensity		Main lines per employee		Faults per 100 main lines		Rank	
Country	1994	Change 1990-94	1994	Change 1990-94	1994	Change 1990-94	1994 a)	Change 1994 b)
1 Botswana	3.50	69.3%	31	34%	55	-4%	1 =	6
2 Cameroon	0.46	33.1%	30	54%	74	3%	5	3
3 Congo	0.82	17.3%	22	41%	61	55%	6 =	5
4 Côte d'Ivoire	0.79	29.5%	30	61%	80	34%	6 =	2
5 Ethiopia	0.26	5.2%	26	25%	74	57%	11	9
6 Gabon	3.03	65.9%	40	52%	74	-21%	3	4
7 Ghana	0.30	-0.8%	13	35%	176	-32%	14 =	13 =
8 Kenya	0.88	11.9%	22	53%			12	8
9 Mozambique	0.37	22.0%	24	37%	60	-83%	9	11
10 Namibia	4.65	26.3%	34	3%	78		4	12
11 Nigeria	0.34	13.1%	25	45%	327	7%	13	7
12 Senegal	0.89	48.5%	38	65%	39	7%	1 =	1
13 Tanzania	0.31	2.6%	19	24%	201		14 =	15
14 Zambia	0.87	3.6%	27	56%	124	-44%	6 =	10
15 Zimbabwe	1.23	-3.4%	25	2%	190	18%	10	13 =
AVERAGE c)	**1.25**	**32%**	**27**	**37%**	**115**	**-18%**		
WORLD d)	**19.95**	**32%**	**127**	**52%**	**55**	**7%**		

Note: a) Ranking of the sum of the ranks of the three indicators in 1994. b) Ranking of improvement in three indicators (1990-1994). c) Simple averages (unweighted) of 15 Sub-Saharan operators. d) Simple average of 24 large non-African emerging economies.
Source: ITU World Telecommunication Indicators Database.

Financial indicators are more difficult to interpret. Part of the problem is that they are affected by exchange rates. Thus data for the CFA franc countries will show lower values in 1994 because of that currency's devaluation. Also, investment indicators tend to fluctuate over time making comparisons difficult. Furthermore, while high values in financial performance may be attractive from a corporate perspective, they may not always be so good from an overall economic view. For example, above average revenues per main line may mean that tariffs are simply too high for potential subscribers, discouraging demand. On the other

hand, telecommunication operations must be financially sustainable in order to generate funds for network investment.

Revenue per main line is an important indicator of sustainability as it reflects the ability of the operator to generate sufficient funds to maintain and expand the network. It ranges from US$ 388 in Ethiopia to US$ 2'000 in Congo. US$ 750 per year is used as a target for revenue per line, around half the industry average for line installation costs. Since costs in Africa tend to be much higher, it would take about 12 years to pay for a main line (assuming 40 per cent of revenues are retained as operating profit) based on African line installation costs. However installation costs tend to vary widely within the region, so that even though Ethiopia comes out lowest, it also has one of the lowest line installation costs. Most of the countries already meet or exceed this target.

Revenue as a percentage of Gross Domestic Product (GDP) reflects the importance of the telecommunication sector in the overall economy. This is affected to some extent by the size of the service sector in each country which tends to be a heavy user of telecommunications. This is reflected in the case of Mozambique, whose service sector contributes 55 per cent of GDP, far above the Sub-Saharan average. Consequently, in Mozambique, the share of the telecommunication sector is also highest in the region.

Telecommunication investment as a percentage of revenue reflects what percentage of earnings are being ploughed back into network development. A higher share suggests efficiency since it implies operating costs are low, allowing more money to be reinvested. However this indicator can also be affected by differing depreciation, taxation or government appropriation policies. A target of 40 per cent has been chosen since this has been found to be the minimum level to sustain network growth, though really high levels of growth require correspondingly higher levels of reinvestment. A five year total (1990-94) has been chosen to smooth out fluctuating investment patterns. The results show that most countries have still not reached a level of reinvestment to achieve sustainable network growth. This lack of commitment to infrastructure investment is probably the biggest single reason why the performance of the telecommunications sector in Africa has been disappointing compared with other developing regions.

Table 6: Financial indicators

15 largest Sub-Saharan Africa telecommunication markets, 1994

	Revenue per line, US$	Revenue as a % of GDP	Investment as % of revenue	
Country	1994	1994	1990-1994	Rank
1 Botswana	1'366	1.8%	74%	2
2 Cameroon	708	0.7%	70%	14
3 Congo	2'005	2.6%	...	6
4 Côte d'Ivoire	1'089	1.8%	38%	10
5 Ethiopia	388	1.1%	17%	15
6 Gabon	2'631	2.1%	19%	4
7 Ghana	1'231	1.1%	21%	11
8 Kenya	1'131	3.7%	52%	1
9 Mozambique	1'124	4.5%	12%	6
10 Namibia	886	2.1%	29%	12
11 Nigeria	1'247	1.1%	34%	8
12 Senegal	1'438	2.7%	18%	3
13 Tanzania	794	3.2%	13%	13
14 Zambia	1'007	2.6%	20%	8
15 Zimbabwe	908	2.3%	42%	5
AVERAGE a)	**1'197**	**2.2%**	**31%**	
TARGET	**750**	**1.5%**	**40%**	
WORLD b)	**643**	**1.9% c)**	**46%**	

Note: a) Simple averages (unweighted) of 15 Sub-Saharan operators. b) Simple average of 24 large non-African emerging economies. c) 1993.
Source: ITU World Telecommunication Indicators Database.

10. Broadcasting

There are three times as many television sets as telephone lines in Africa. What makes the African television market interesting is that a growing number of viewers are willing to pay for subscription television even though charges are far higher than basic telephone service. Foreign broadcasting companies and local entrepreneurs are stepping in to exploit this demand.

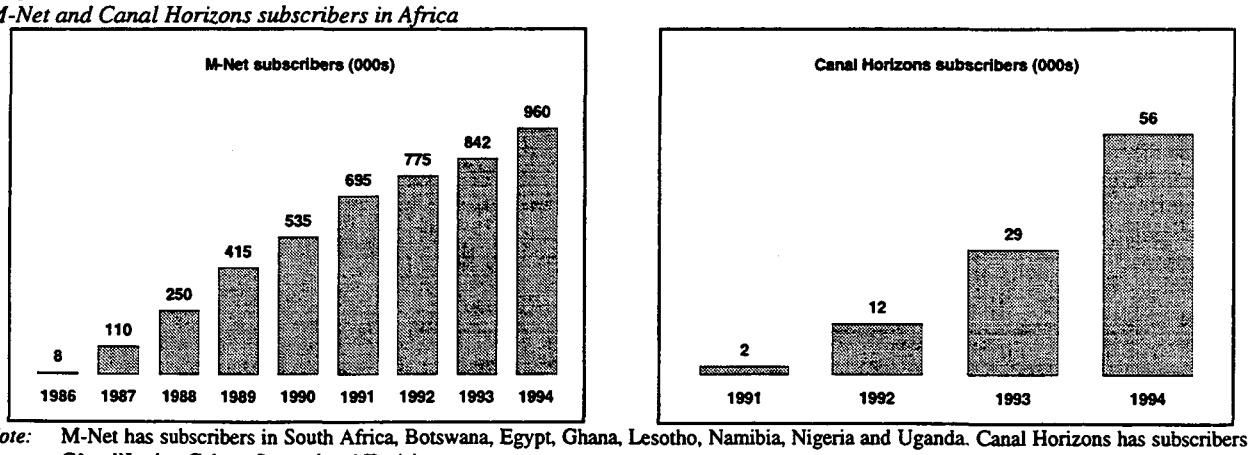
In October 1986, South Africa's M-Net became the first subscription television network launched in the Southern Hemisphere. By March 1995, it had 930'000 subscribers in South Africa, Botswana, Egypt, Ghana, Lesotho, Namibia, Nigeria and Uganda. M-Net is also rebroadcast or can be received by Direct-To-Home (DTH) satellite antennas in 35 countries on the continent. Multichoice, M-Net's parent, works with local partners to develop pay television services. In 1995, Multichoice, launched a digital DTH service, via the PanAmSat 4 satellite, which can be received throughout the entire African continent.

France's Canal+, the world's largest pay-television company (by turnover), is involved in francophone Africa through its Canal Horizons subsidiary. It has subscribers in Côte d'Ivoire, Gabon, Senegal and Tunisia and can be reached by DTH satellite dishes in other countries (though like M-Net, viewers need a decoder). The francophone TV5 station began broadcasting in 1993 via microwave distribution systems (MDS) partially financed by the Canadian government and can be seen in Benin, Burkina Faso, Côte d'Ivoire, Gabon, Mali, Niger and Senegal. MDS systems are popular in Africa because DTH antennas are expensive and because MDS can be installed relatively quickly. One of the most active MDS markets is Nigeria where there are some 15 operators with a potential audience of between 100'000 to one million.[10]

The development of a unified communications network, providing both telephony and pay television service, could save money by avoiding duplicate infrastructure, generate higher revenues so that more funds would be available for expanding the network and provide a rationale for building broadband infrastructure that could also be used for text, data and image transmission. In other regions of the world, PTOs are actively becoming involved in cable television. Thus far, African PTOs have been slow to respond to this opportunity. The involvement of African PTOs in television has other benefits beyond extra revenue generation and providing a rationale for building broadband networks. The combination of voice and television services would be more likely to attract capital than either service on its own. Costs would be lower due to the economies of scale possible with the nation-wide PTO network instead of many fragmented pay television operators. Governments may be more supportive since television transmission over wired infrastructure provides levels of content control not available with DTH satellite reception.

Figure 10: Pay television in Africa

M-Net and Canal Horizons subscribers in Africa



Note: M-Net has subscribers in South Africa, Botswana, Egypt, Ghana, Lesotho, Namibia, Nigeria and Uganda. Canal Horizons has subscribers in Côte d'Ivoire, Gabon, Senegal and Tunisia.

Source: Multichoice Limited, Canal+.

[10] Wittering, S. "MMDS, I presume." *INTERNATIONAL CABLE.* August 1994.

11. Internet

Africa is slowly getting connected to the world-wide Internet network. In 1994, the first Sub-Saharan African countries were connected and by December 1995, 16 African countries had direct Internet connectivity. The number of host computers on the continent connected to the global Internet network stood at around 50'000 although the vast majority (99 per cent) are in South Africa, which is among the top 20 countries ranked by Internet nodes.

Many networking developments taking place in Africa are grass roots initiatives, spearheaded by the international community and serving the academic and scientific community, although there is increasing private sector activity. They typically involve providing researchers with electronic mail with the ultimate goal of providing Internet connectivity. It is estimated that some are some 5'000 electronic mail accounts in Africa (outside South Africa).

High infrastructure and leased line costs are some of the factors holding back Internet connectivity. Cumbersome regulations and high tariffs on imported equipment as well as a lack of trained personnel are contributing to the delay in establishing access to the Internet. The use of VSATs for Internet connectivity is a major new development. They offer reasonably high bandwidth and much lower costs than international leaded lines.

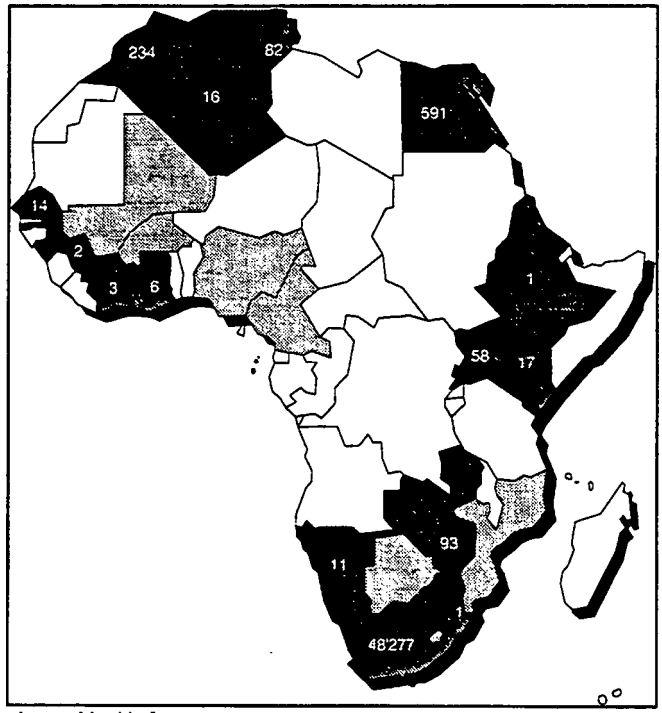
'One important event helping to accelerate Internet connectivity was the Addis Symposium on Telematics for Development in April 1995. The largest gathering ever of African computer and telecommunication experts, it brought together 31 different telecommunication administrations and many leading experts in international computer networking. As a result of the recommendations from the Addis Symposium, a working group has been established to advise decision makers about the best ways to get Africa connected to the emerging global information infrastructure. A White Paper entitled *Building Africa's Information Highway*, is to be presented to African Ministers of Planning for implementation.

Figure 11: Internet in Africa

Selected Internet sites and countries with Internet access, December 1995

Selected Internet sites in Africa

Egypt	http: //ristec_www.com.eg Regional Information Technology and Software Engineering Centre
Kenya	http://www.arcc.or.ke African Regional Centre for Computing
Senegal	http://senet.net Sonatel's WWW server
South Africa	http: //www.telkom.co.za Telkom SA WWW server
Tunisia	URL: gopher://alyssa.rsnet.tn The Tunisian Gopher Server
Zambia	URL: gopher://gopher.unza.zm ZAMNET Zambian National Gopher



Note: Dark shading indicates countries with a direct connection to the world-wide Internet network, together with the number of host computers. Light shading indicates indirect access to Internet.

Source: Adapted from Network Wizards (http://www.nw.com).

12. Within, Without

Africa has historically been the focus of attention from *without*, partly a result of colonial era relations, later because of its strategic geopolitical location in an era of superpower rivalry and more recently, as the focus of the economic development community. This external attention is reflected in its telecommunication network which, on the whole, is much better developed for overseas rather than for national or regional communications. The number of minutes of international traffic per subscriber in Africa is among the highest in world yet the number of telephone subscribers is low, external plant conditions remain poor and local and national traffic unreliable.

External interest in Africa is shifting. In the telecommunication sphere, this is reflected by a fall in the level of multilateral assistance, a result of the new policy by development agencies that private investment should play a bigger role in infrastructure development.[11] Given the limited resources available locally, this means that the continent is faced with a stark choice between accepting that there are less funds available for investment, or opening up telecommunication markets to foreign investors even though it may not be fully ready. Few African countries have completed the necessary regulatory preparations to liberalize their telecommunication sector, for instance by establishing an independent regulatory function. Furthermore, it is fairly certain that the new investors that are attracted to the region will be mostly interested in lucrative market segments, such as overseas calling and mobile communications, rather than developing local networks or extending service to rural areas. Thus this may be the time for Africa to look *within* for solutions to increasing telecommunication access for its inhabitants.

In looking at the success stories in telecommunications in other parts of the world a number of common factors emerge:

- Buoyant local **demand** generated by rising incomes. While average income levels have barely risen in Africa, there is nevertheless evidence that demand is easily sufficient to support much larger networks than currently exist. Lack of demand can thus be discounted as a cause of slow growth in Africa;
- A **political commitment** to infrastructure investment and sector reform. Until recently, this factor has been largely absent in Africa. Post and telecommunications ministries often suffer from a low status in government and are sometimes bypassed on major decisions, such as privatisation programmes. There are signs that this is changing. A few countries have embarked on sector restructuring and the list is growing;
- **Local entrepreneurs.** In Asia and Latin America, much of the new dynamism in the telecommunications sector has come from local entrepreneurs, or well-connected families, that have established consortia to bring together local and foreign capital. In Africa, that element of local entrepreneurship had been almost entirely absent. The state's overarching monopoly for the provision of telecommunication services has not permitted local initiative or community self-help. The expectation has been that, if the state does not provide the service, no one will. The belief in government as prime mover is beginning now to wane in Africa, spurred partly by the move towards democracy, but also by the fact that governments in most African countries have failed to deliver their promises. African governments should encourage the entrepreneurial community to get involved in telecommunications by making rules more transparent and stable and less subject to personal whims and government changes.

Of the three "trigger mechanisms" listed above, the first is already present in the region, the second can be created through external pressure and the emergence of local role-models, but the third has to come from Africa itself. This report has presented a number of different ways in which entrepreneurship is finally beginning to bloom in the African telecommunications sector:

- One example of a new, entrepreneurial approach to improving telecommunication accessibility is the **liberalization of the payphone market** (see Box 5). There has long been a hidden market for the resale of telephone services, which has flourished in the informal sector of the economy. The liberalisation of payphones merely blesses this activity and legitimises the entrepreneurs who have been making a living out of doing it. Téléboutiques in Morocco, telecentres in Senegal and private payphones in Tanzania are all examples of local enterprise and employment creation. Initiatives such as these help to make better use

[11] "A greater role for the private sector is being promoted explicitly as the Bank moves to support and catalyze private sector activities." See The World Bank. 1994. *Annual Report 1994*. World Bank, Washington D.C.

of existing capacity to connect more subscribers, and reduce tariffs to make telecommunications more affordable;

- The spread of **Internet** in Africa is a story of local initiative, enthusiasm and commitment against the odds. Where formal data communications networks barely exist, the philosophy of do-it-yourself must prevail. While some of the efforts have come from international organisations, the local academic community and individual entrepreneurs have also been very active. The Internet philosophy of self-help provides an element which has too long been missing in African telecommunications;
- In the **broadcasting** field, small scale, local initiatives are responding to the demand for entertainment and information. It costs relatively little to establish a Microwave Distribution System for local television broadcasting, or to set-up a satellite dish to capture DTH broadcasts and then string cable to neighbouring homes for a small subscription fee. The demand for television is high in the region and can easily be converted into cash;
- At a more formal level, the creation of consortia to establish **mobile communication services** is also helping local businesses to find their feet. Local businesses are involved in consortia in Ghana, Guinea, South Africa, Uganda and elsewhere.

Individually, these initiatives may not appear significant, but collectively they add up to a new way of doing business. Instead of always looking to others for help, or to the government, local entrepreneurs are quietly getting on with the business of helping themselves. Major projects, to lay a fibre optic cable here or to privatise a public operator there, may continue to grab the headlines, but in the long-run it is local initiative which will bring more sustainable benefits.

From a policy perspective this presents a conundrum. The informal sector thrives better when it is ignored than when it is the subject of big policy drives. Policy-makers might want to turn a blind eye to some of the semi-legal schemes that are in operation. Most Internet access providers in the region, for instance, are probably operating illegally because they may infringe usage restrictions on the resale of leased line capacity and the interconnection of leased lines with the public network. Similarly call-back operates in a grey zone between what is permitted and what is not.

Policy-makers and international donors can help by making finance available, at low interest rates. They can also assist by obliging foreign investors wishing to set up operations to seek out local businesses to ally with. Policy-makers can also indirectly assist entrepreneurship by encouraging the main public operator to purchase from local enterprises more of the services it currently provides itself, such as line installation, maintenance, catering facilities, or debt collection.

As African governments move from providing to regulating telecommunication services, they will certainly be busy. There is little regulatory tradition or expertise in the region. Those international donors that have been quick to promote privatisation and market liberalization should back up their philosophy with concrete assistance to train regulators and to provide transparency and stability in the African telecommunication environment. In telecommunications reform, the *sequencing* of events is vital. Normally it is necessary to begin with the separation of posts and telecommunications and the corporatisation of the incumbent operator. The next step involves the creation of an independent regulatory authority. Market liberalisation, to develop a competitive market for telecommunications equipment and to promote the development of value added services, generally comes next. Only if these phases have already been carried out successfully can privatisation and infrastructure competition be expected to bring the full benefits that policy-makers intend. African governments are being expected to achieve in a few years what other nations took decades to do.

A competent regulatory system can encourage local and foreign investment while fostering indigenous development. The challenge will be to structure regulations that are appropriate to the African market. They should not be too restrictive or the local initiatives described above might be discouraged. At the same time the regulations must guard against new market entrants servicing only lucrative areas and must ensure that they are also obliged to attend to underserved areas. There are no easy answers for breaking out of the cycle of slow growth and low investment, but Africa's leaders must increasingly look to their own people to provide the impetus for a fresh start.

Box 5: Payphone trends in Africa

There are just over 100'000 payphones (coin, card and public call offices) in Africa accounting for around one per cent of all main telephone lines. Almost 60 per cent are in South Africa, 25 per cent in northern Africa with the remainder in Sub-Saharan Africa. Payphone growth has been high in some countries, fueled by the realization that payphones can help improve access in a region underserved by telecommunications and where individual lines are scarce. Cardphones are becoming popular because they reduce vandalism and the use of counterfeit coins. The payphone market in Africa is also one of the few areas that has been opened to liberalization.

There are a variety of ambitious payphone projects under development. Côte d'Ivoire is installing 1'300 cardphones throughout the country. Swaziland plans to install 2'000 payphone by the end of the decade. In South Africa, where the provision of payphones was written as an obligation into the license agreements of the cellular operators, there are plans to achieve a density of 1 payphone per 1'000 people in rural areas and 2 per 1'000 in urban areas.

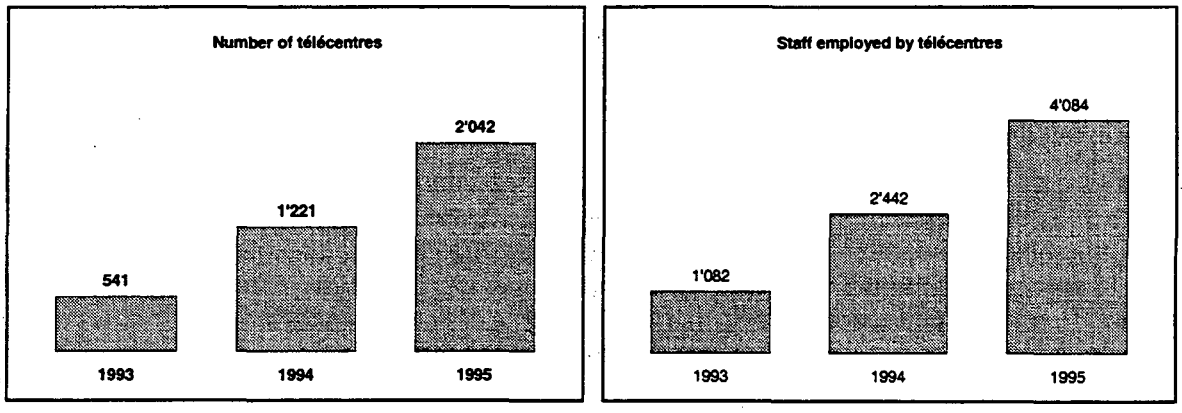
Liberalization of the payphone market is taking place in a number of countries in the region. This includes allowing private companies to install and operate payphones and letting entrepreneurs provide telecommunication services from telephone kiosks. Five payphone operators have been licensed in Nigeria while in Tanzania, a private company plans to install 500 cardphones. The Danish government is funding a programme in Mozambique to install 500 payphones in shops at a cost of US$ 7'000 per payphone; the shopkeeper will be allowed to keep 15 per cent of the revenue.

The lack of telephones on the continent has encouraged the resale of services over private lines. For example in Ghana, it is estimated that over one hundred hotels and small retailers are reselling telephone service. A number of countries are legitimizing this type of activity by licensing public kiosks. These centres operated by entrepreneurs, provide a variety of telecommunication services such as telephone, fax and telex. In Senegal, there are more than 3'200 telecentres employing over 4'000 employees (more than the national telephone operator). [12]

Telecentres have not been without controversy. In Cameroon, existing public payphones are not as heavily used even though tariffs in telecentres are supposed to be 50 per cent higher. The proliferation of "pirate" telecentres has led to tariffs *lower* than those charged by the national telephone company. Converting the single rented line to multiple lines (for example by installing a private branch exchange and multiplexing the traffic) allows the entrepreneur to charge multiple clients while paying for only a single line. This activity by unlicensed telecentres sometimes causes traffic congestion and may result in unpaid bills for international calls. Nevertheless, it shows that there is considerable demand for telephone service which the PTO is failing to meet from its regular service.

Box Figure 5: Private télécentres in Senegal

Number of private télécentres and estimated employees, Senegal 1993-95



Source: African Telecommunication Observatory.

12 The financial benefits for the PTO are also significant. In Senegal, télécentres contribute about 5.5 per cent of the national PTO's revenues. The télécentres also deliver social-economic benefits including making the telephone popular, helping small businesses and providing value-added-services (fax, Internet access). See Zongo, G. 1996. *Social-economic and financial impact of private telecentres: The case of Senegal.* Paper presented at ICTP/ITU Workshop on Economic Quantification of the Impact of Telecommunications in Development (Trieste, Italy, 26 February - 1 March 1996).

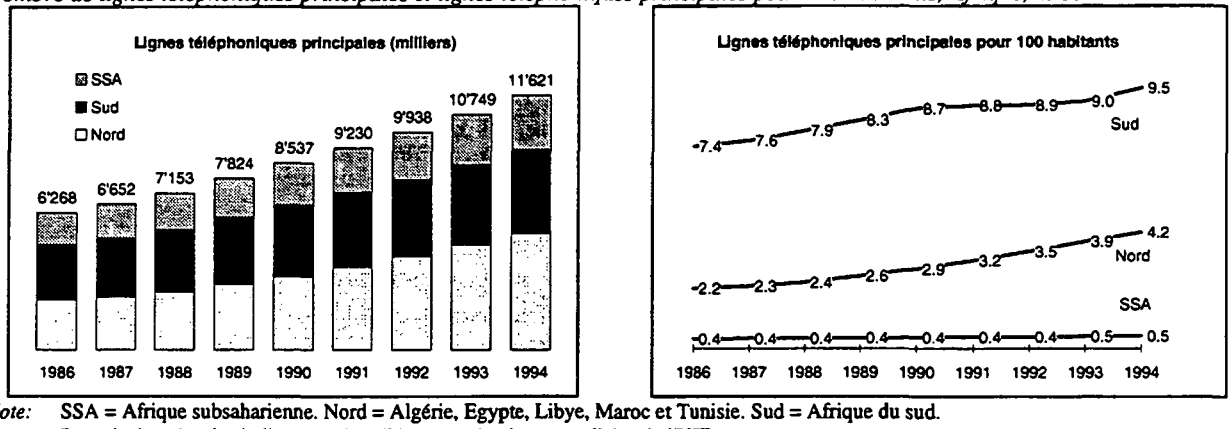
1. Un continent à la traîne?

En 1990, la Conférence africaine de développement des télécommunications a exprimé son inquiétude au sujet de "la lente progression du développement des télécommunications en Afrique"[1]. Cinq années plus tard, la situation est encore plus préoccupante. Le nombre de lignes téléphoniques sur le continent a certes augmenté en valeur absolue, mais les conséquences de cet accroissement sur l'accès en général ont été négligeables, notamment en Afrique subsaharienne (voir la Figure 1). Le taux de croissance des lignes téléphoniques est resté inchangé au cours des cinq années antérieures à la Conférence et depuis lors. Bien que l'expansion du réseau se poursuive (8 pour cent par an), cette progression est beaucoup plus lente que dans d'autres pays en développement, qui ont enregistré des taux de croissance à deux chiffres (voir la Figure 2, graphique de gauche). Au cours de la première moitié des années 90, la croissance des télécommunications s'est accélérée dans un grand nombre de pays en développement, sauf en Afrique. Il y a un peu plus de dix ans, il aurait été plus facile de trouver un poste téléphonique à Accra qu'à New Delhi, mais à l'heure actuelle, le continent africain prend de plus en plus de retard (voir la Figure 2, graphique de droite).

Dans la présente étude, nous examinerons les raisons pour lesquelles les télécommunications africaines n'ont pas connu l'essor que d'autres pays en développement ont enregistré dans le domaine des télécommunications au cours de la première moitié des années 90, ainsi que les raisons pour lesquelles les *mécanismes de déclenchement* qui ont favorisé cet essor ailleurs ne se sont pas mis en action en Afrique. Nous aborderons notamment la question de savoir si les origines de cette situation sont externes ou internes au secteur des télécommunications. Enfin, nous présenterons les résultats positifs qui ont été obtenus et soumettrons des propositions visant à stimuler la croissance des télécommunications sur le continent.

Figure 1: Une croissance irrégulière

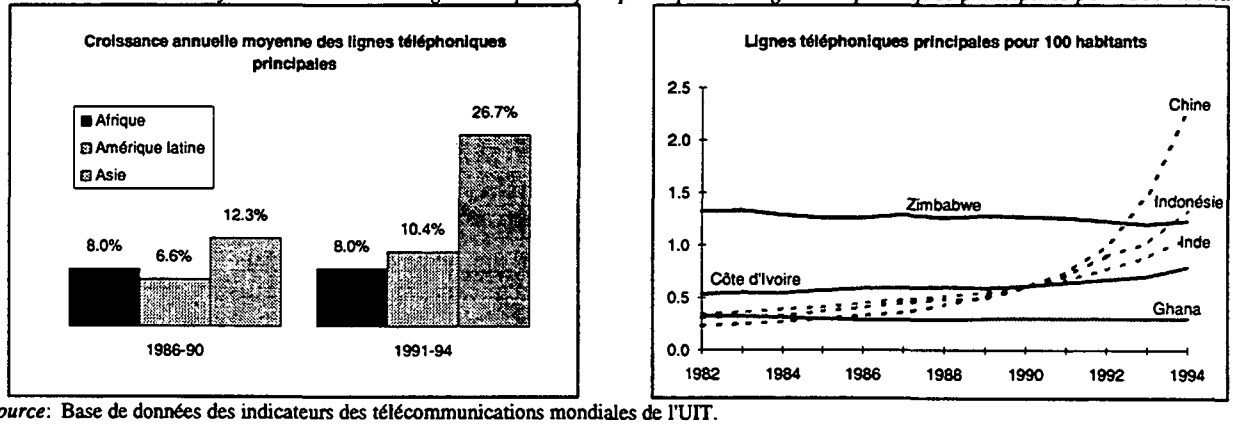
Nombre de lignes téléphoniques principales et lignes téléphoniques principales pour 100 habitants, Afrique, 1986-94



Note: SSA = Afrique subsaharienne. Nord = Algérie, Egypte, Libye, Maroc et Tunisie. Sud = Afrique du sud.
Source: Base de données des indicateurs des télécommunications mondiales de l'UIT.

Figure 2: Divergences

Croissance annuelle moyenne du nombre de lignes téléphoniques principales et lignes téléphoniques principales pour 100 habitants



Source: Base de données des indicateurs des télécommunications mondiales de l'UIT.

[1] Voir la Résolution ATDC-90/RES1 de l'UIT, 1991, Conférence africaine de développement des télécommunications (CADT-90) Rapport final, Volume 1, UIT, Genève.

2. Amélioration de l'accès au téléphone

Au cours de la période 1990-94, la *télédensité* (nombre de lignes téléphoniques principales pour 100 habitants) est passée de 8,7 à 9,5 en Afrique du Sud et de 2,9 à 4,2 en Afrique du Nord, mais elle est restée inférieure à 0,5 en Afrique subsaharienne, ce qui représente moins d'une ligne téléphonique pour 200 habitants. En conséquence, les inégalités de développement dans le domaine des télécommunications se sont considérablement accrues entre les pays du continent africain. Si l'accès au téléphone n'a pas progressé en Afrique subsaharienne (SSA) ces cinq dernières années, c'est parce que quatre facteurs se sont conjugués, à savoir:

- **Les taux de croissance des nouvelles lignes principales** n'ont pas augmenté aussi rapidement que dans d'autres pays en développement. Certains pays font bien entendu exception à cette règle: ainsi, le Sénégal et la Gambie ont privatisé leurs opérateurs de télécommunications publiques (PTO) au milieu des années 80 et ont réussi à améliorer sensiblement leur position dans la région (voir le Tableau 1).

- **Les taux d'utilisation du réseau** ont été faibles. Une proportion importante de lignes ne sont pas raccordées actuellement aux abonnés potentiels (voir l'encadré 1), notamment en raison du non-paiement des factures téléphoniques. Dans certains pays, le nombre d'abonnés raccordés au réseau a même diminué par suite de débranchements, alors que la capacité continue à augmenter. En 1994, le nombre de lignes en service a nettement baissé dans au moins trois pays de la région, à savoir la Guinée, Madagascar et le Mozambique. Un problème du même ordre tient au fait que des lignes sont hors service en raison de la médiocrité de la maintenance, d'actes de vandalisme ou du vol de câbles métalliques. Ce problème a été signalé, notamment, par la Zambie, qui est un grand exportateur de cuivre.

- **Les taux de croissance démographique** dans la région restent nettement plus élevés qu'ailleurs. Depuis 1990, le taux de croissance démographique en Afrique subsaharienne a atteint en moyenne 3,2 pour cent par an, soit le taux le plus élevé de tous les pays en développement. Autrement dit, il faudrait que l'expansion du réseau dans cette région soit beaucoup plus forte qu'ailleurs si l'on voulait que la télédensité augmente au même rythme. Or, cela n'a pas été le cas dans la pratique et la télédensité est en baisse depuis 1990 dans neuf pays de la région, alors qu'elle n'a enregistré qu'une progression modeste dans la plupart des autres pays.

- **Les troubles civils** auxquels plusieurs pays sont en proie entravent l'expansion du réseau tant que l'ordre n'est pas rétabli. Dans des pays tels que l'Angola, le Liberia, le Rwanda et la Somalie, les réseaux ne peuvent pas se développer tant que la situation politique ne s'est pas stabilisée.

Tableau 1: Des fortunes diverses ...

Evolution de la télédensité, 1990-94, et du classement de certains pays, Afrique subsaharienne

Pays	Télédensité, 1990	Classement 1990	Télédensité, 1994	Classement 1994	Evolution du classement
Gambie	.67	19	1.69	10	+9
Sénégal	.60	22	.89	13	+9
Togo	.30	29	.53	22	+7
Burundi	.14	43	.25	36	+7
Mauritanie	.29	31	.38	26	+5
Burkina Faso	.18	38	.26	33	+5
Moyenne SSA	.40	—	.46	—	—
Ghana	.29	30	.30	32	-2
Somalie	.17	39	.17	41	-2
Lesotho	.69	18	*.63*	21	-3
Zambie	.80	12	.87	16	-4
Guinée	.20	37	.14	43	-6
Angola	.76	13	*.52*	23	-10

Note: Les chiffres en italiques se rapportent à l'année 1993. SSA = Afrique subsaharienne.
Source: Base de données des indicateurs des télécommunications mondiales de l'UIT.

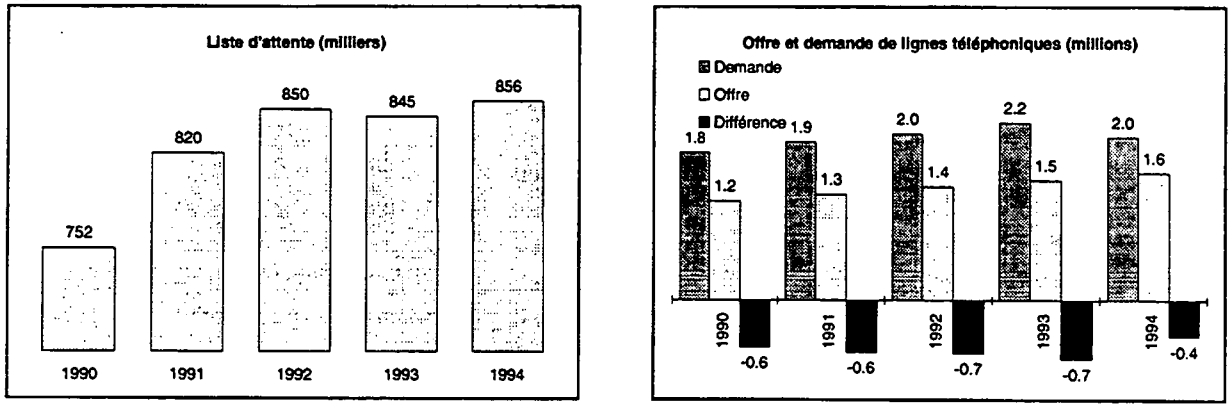
Dans la pratique, la situation s'est légèrement améliorée au cours des cinq dernières années. Le taux de croissance des nouvelles lignes installées chaque année, après avoir fléchi entre 1990 et 1992, s'est redressé en 1993 et 1994. En 1994, 176 000 nouvelles lignes en tout ont été installées dans la région, alors qu'à peine 129 000 lignes ont été ajoutées en 1991. Des résultats préliminaires pour 1995 montrent que la croissance des lignes s'est accélérée dans plusieurs pays, dont le Ghana, la Namibie et le Zimbabwe. La liste d'attente officielle s'est stabilisée aux alentours de 850 000 abonnés depuis 1992 (voir la Figure 3, graphique de gauche). Il ressort de travaux de recherche sur la demande sous-jacente de services de télécommunication que l'écart entre l'offre et la demande pourrait avoir diminué en 1994 par suite de la dévaluation du franc CFA au début de cette année (voir la Figure 3, graphique de droite).

Dans d'autres pays en développement, le dynamisme de la demande de services de télécommunication a permis au réseau de se développer à un rythme beaucoup plus rapide depuis le début de la décennie. La progression de la demande n'a pas été aussi rapide en Afrique subsaharienne, mais elle est néanmoins réelle. Le principal problème de la région tient au fait que des contraintes liées à l'offre empêche de satisfaire cette demande. S'il est indéniable que le degré de développement du réseau de télécommunication d'un pays reflète bien la situation économique générale dudit pays, le niveau de développement dans cette région est généralement inférieur à ce que pourrait laisser prévoir cette comparaison. Les raisons pour lesquelles l'offre de services de télécommunication est inférieure à la demande sont complexes. Dans certains cas, il arrive que l'Etat se réserve le droit de fournir les services, ce qui empêche d'éventuels nouveaux arrivants sur le marché de réaliser de nouveaux investissements. Il se peut aussi que l'exploitant national ne soit pas autorisé à emprunter de l'argent sur les marchés de capitaux internationaux, ou qu'il soit déjà trop endetté pour pouvoir agir de la sorte. Il arrive encore que les investisseurs soient découragés par les troubles civils ou par l'instabilité politique. Enfin, dans certains cas, le fait que la capacité de mise en oeuvre des projets soit limitée freine le développement du réseau, même lorsque des fonds sont disponibles.

Quelles que soient les origines de cette situation, toute réforme passe d'abord par une politique de stimulation de l'offre visant à créer un environnement réglementaire propice aux investissements, à inciter les PTO à investir ou à attirer de nouveaux investisseurs sur le marché. Dans les paragraphes qui suivent, les auteurs analysent ces contraintes au niveau de l'offre du point de vue de la capacité de l'industrie nationale des télécommunications de dégager des ressources (paragraphe 3) et de les réinvestir (paragraphe 4).

Figure 3: Offre et demande

Liste d'attente et différence entre l'offre et la demande, 15 premiers marchés des télécommunication de l'Afrique subsaharienne, 1990-94



Note: Le graphique de gauche indique la liste officielle des personnes en attente d'une ligne téléphonique. Le graphique de droite présente la demande prévue compte tenu du niveau de revenu.

Source: Base de données des indicateurs des télécommunications mondiales de l'UIT

Encadré 1. Naissance d'un géant

Avec plus du cinquième des recettes tirées des télécommunications dans la région, le Nigeria est le principal marché des télécommunications de l'Afrique subsaharienne (à l'exclusion de l'Afrique du Sud). Le principal fournisseur de télécommunications du pays, la Nigerian Telecommunications PLC (Nitel), est née en 1985 de la fusion des anciennes Postes et Télécommunications et de la société Nigerian External Telecommunications Ltd. En 1992, la Nitel est devenue une société anonyme, qui reste cependant aux mains de l'Etat. En 1993, la Nigerian Communications Commission (NCC) a été chargée d'assumer les fonctions d'organisme de réglementation.

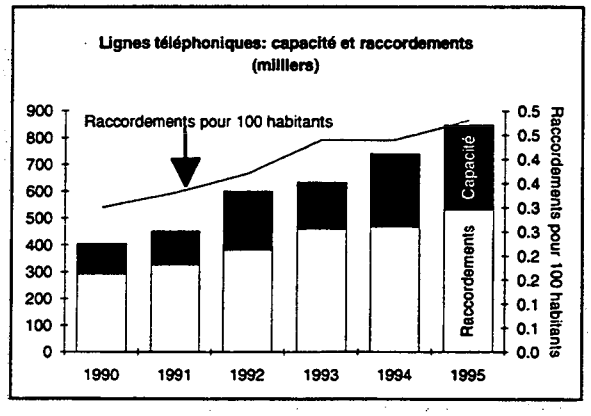
Les télécommunications sont en plein essor depuis que Nitel a changé de statut. Les recettes de cette entreprise, qui sont passées de 275 millions de dollars EU en 1990 à 459 millions de dollars EU en 1994, représentent aujourd'hui 1,1 pour cent du produit intérieur brut du pays. En outre, la société est redevenue rentable et ne grève plus les finances publiques. En 1993, elle a versé 25,5 millions de dollars EU au titre de l'impôt sur le revenu, soit 19 pour cent de ses bénéfices. Les services internationaux contribuent largement à ce renversement de tendance. En effet, la téléphonie internationale représente 48 pour cent des recettes et s'est fortement développée par suite de l'installation de 5 000 nouveaux circuits internationaux en 1993. Nitel a également réussi à attirer des capitaux étrangers et a obtenu 225 millions de dollars EU au titre d'un prêt de la Banque mondiale pour financer, à hauteur de 47 pour cent, un projet de télécommunication d'une valeur de 484 millions de dollars EU.

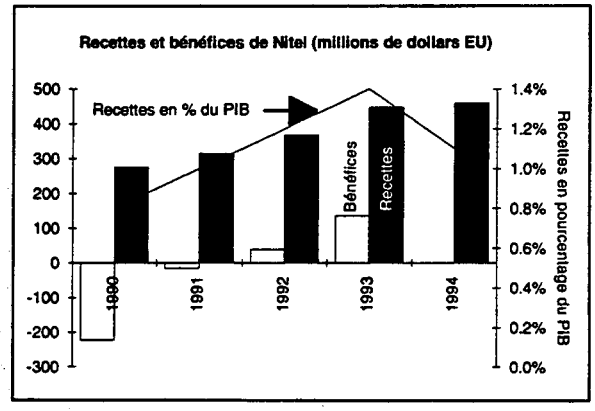
Depuis 1990, Nitel a augmenté de 80 pour cent la capacité du réseau téléphonique, qui desservait, d'après les estimations, 850 000 abonnés à la fin de 1995. On estime que le nombre de lignes pour 100 habitants est passé de 0,30 à 0,48 en 1995. La télédensité pourrait même être plus forte compte tenu du fait qu'une grande partie de la capacité est inutilisée. De fait, la capacité existante pourrait permettre de satisfaire la demande de ceux qui se trouvent actuellement sur une liste d'attente, à savoir environ 200 000 personnes.

Nitel a également développé d'autres services de télécommunication. En 1992, elle a créé une coentreprise avec une société des Etats-Unis en vue de fournir des services cellulaires, ce qui lui permet aujourd'hui d'exploiter le plus vaste réseau de radiocommunications cellulaires de l'Afrique subsaharienne. Nitel a commencé à faire appel aux techniques de radiocommunications cellulaires pour desservir les zones rurales. En outre, elle a créé des services de communication d'entreprise par satellite destinés au secteur important que constitue le secteur pétrolier (transmission de signaux vocaux, de textes, de données et de signaux vidéo).

Le défi que devra relever le secteur des télécommunications du Nigeria consistera à maintenir la croissance, à mieux exploiter la capacité inutilisée du réseau et à réduire sa dépendance à l'égard du trafic international. Si Nitel ajoute des lignes supplémentaires sans les raccorder aux abonnés, sa capacité bénéficiaire s'en ressentira et la relance des autres secteurs de l'économie que les communications peuvent entraîner s'en trouvera retardée. En conséquence, même s'il est indispensable de procéder à des investissements, ceux-ci ne suffisent pas à eux seuls à stimuler le développement des télécommunications, et il faut également attacher de l'importance à la planification du réseau.

Figure de l'encadré 1: Comment faut-il exploiter cette capacité de réserve?
Réseau téléphonique de Nitel: croissance, recettes et bénéfices, 1990-95





Note: Les données pour 1995 sont des estimations de l'UIT.
Source: Rapport annuel de Nitel, base de données des indicateurs des télécommunications mondiales de l'UIT.

3. Recettes des télécommunications

Le secteur des télécommunications africaines a obtenu de meilleurs résultats que la croissance économique globale et sa part du produit intérieur brut (PIB) est passée de 1,4 pour cent en 1990 à 2 pour cent en 1993. Toutefois, en 1994, les recettes des télécommunications exprimées en dollars ont chuté, en raison principalement de la dévaluation du franc CFA. En conséquence, la part du secteur des télécommunications dans le PIB africain s'est maintenue à 1,7 pour cent en 1994 (voir la Figure 4, graphique de gauche).

Les recettes provenant des télécommunications, exprimées en dollars des Etats-Unis, ont progressé régulièrement dans les 14 pays de la zone CFA. Le franc CFA, qui fait l'objet d'un taux de change fixe par rapport au franc français, est resté fort dans une région où les monnaies perdent pourtant régulièrement de leur valeur. Grâce à la fermeté de cette devise, l'inflation a eu tendance à rester faible et le coût des importations a baissé. En janvier 1994, le franc CFA a été dévalué de 50 pour cent. Bien que les tarifs des télécommunications aient été relevés dans la plupart des pays de la zone CFA pour compenser la baisse de la monnaie, la dévaluation a néanmoins entraîné un recul de 40 pour cent des recettes des télécommunications (voir la Figure 4, graphique de droite). Les importations vont donc être plus chères, ce qui aura une incidence négative sur les achats d'équipements de télécommunication.

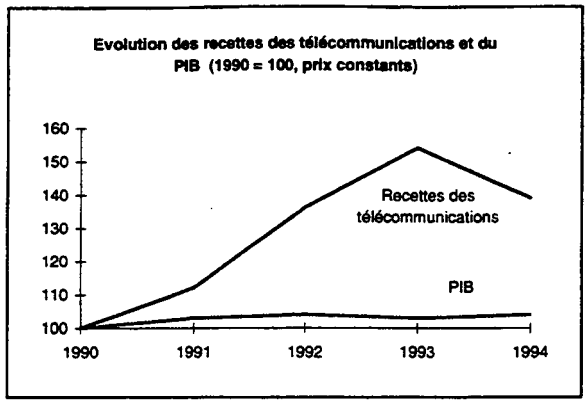
Pour remédier à cette situation, les opérateurs de la région devront notamment diversifier leurs recettes, celles-ci provenant principalement (pour plus de la moitié) des communications téléphoniques internationales. Cette diversification ne devra pas entraîner une augmentation sensible des prix, sans quoi les abonnés potentiels seront découragés. Les opérateurs de la région ont rarement cherché à déterminer si une baisse des tarifs stimulerait la demande et, par conséquent, entraînerait un accroissement des recettes. La plupart d'entre eux ont préféré viser les couches aisées de la population, en particulier les expatriés, les grands hôtels internationaux et les ambassades, les agents de l'Etat et les entreprises à vocation exportatrice. Le point commun des membres de ce groupe cible est qu'ils établissent un grand nombre de communications téléphoniques internationales. En revanche, pour le reste de la population, les tarifs demeurent trop élevés, comme en témoignent les problèmes liés au non paiement des factures et à l'augmentation du nombre de déconnexions qui ont été évoquées plus haut.

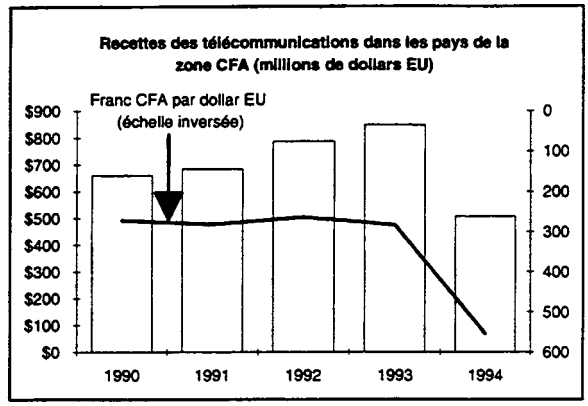
Le problème est que, à la différence des produits alimentaires ou des logements, l'infrastructure des télécommunications n'est pas produite sur place, de sorte qu'elle doit être importée et payée en devises. Etant donné que les monnaies sont faibles, les tarifs doivent être fixés à un niveau élevé pour couvrir les coûts afférents à l'acquisition et à l'installation de cette infrastructure. En revanche, les tarifs des communications internationales appliqués dans les pays développés ont accusé une baisse, de sorte que les règlements pour le trafic entrant en provenance de l'extérieur se sont accrus en Afrique. Ces règlements sont généralement libellés en devises fortes, mais les responsables des PTO constatent souvent que les fonds en question sont absorbés par d'autres organismes publics. Le pire est que, du fait de l'application de tarifs internationaux élevés, les réseaux des PTO vont sans doute être de plus en plus supplantés par des réseaux "parallèles". En conséquence, les règlements des soldes des comptes ne peuvent être considérés comme une source de revenus durable.

La capacité d'expansion des réseaux pour desservir de plus larges couches de la population dépendra en grande partie du succès des politiques macroéconomiques. Si l'on parvenait à stabiliser les monnaies, un accroissement des recettes nationales n'influerait pas sur la capacité d'importation d'équipements de télécommunication, ce qui attirerait davantage d'investisseurs étrangers dans la région.

Figure 4: Une baisse temporaire?

Recettes des télécommunications obtenues par les 15 principaux marchés d'Afrique subsaharienne et par les pays de la zone CFA





Note: Le graphique de gauche représente un indice des recettes des télécommunications et le PIB à prix constants (1990 = 100).
Source: Base de données des indicateurs des télécommunications mondiales de l'UIT.

Encadré 2: le problème des tarifs

L'un des paradoxes de l'Afrique est que les tarifs des télécommunications y sont relativement élevés, alors que les revenus par habitant dans certains pays du continent figurent parmi les plus faibles du monde. Du fait de ces redevances tarifaires élevées, le niveau des recettes par ligne est plus élevé que celui d'autres pays en développement. Or, si l'on veut développer les services de télécommunication dans la région, il faut que leur prix soit abordable.

Les tarifs comprennent des redevances fixes (installation et abonnement) et des redevances variables (utilisation). Une gestion efficace des diverses options tarifaires pourrait se traduire par un élargissement de l'accès, mais malheureusement, bon nombre d'opérateurs des télécommunications africaines n'exploitent pas suffisamment les différentes stratégies qui s'offrent à eux. De plus, on ne tient pas toujours compte d'options simples comme l'application de taxes différentes pour les entreprises et les particuliers ou le recours à un éventail de taxes différentes pour l'installation, l'abonnement et les communications.

Le prix moyen perçu par les opérateurs de la région pour l'installation d'une ligne est inférieur à 50 dollars EU, même pour les entreprises. De ce fait, les PTO locaux ne peuvent espérer être en mesure de couvrir leurs coûts, qui sont nettement supérieurs à ceux d'autres régions en raison du coût unitaire plus élevé des investissements. Par contre, les redevances d'abonnement acquittées par les particuliers peuvent être très élevées, ce qui est tout aussi préjudiciable pour les perspectives à long terme dans le secteur. Il est grand temps de faire appel, dans plusieurs pays, à des systèmes de rééquilibrage tarifaire comprenant les différentes mesures ci après:

- Augmentation des redevances d'installation pour les aligner davantage sur le coût d'installation d'une nouvelle ligne (voir l'encadré 3). On peut difficilement justifier la pratique qui consiste à subventionner les redevances d'installation dans les pays où les listes d'attente demeurent importantes et où la capacité existante du réseau est faible. Une augmentation des redevances d'installation fournirait aux opérateurs une source de recettes directe qu'ils pourraient réinvestir[2]. En revanche, les pays disposant d'une capacité inutilisée importante souhaiteraient peut-être envisager d'abaisser leurs redevances d'installation pour attirer davantage d'abonnés.
- Etablissement des redevances d'abonnement applicables aux particuliers en fonction du niveau moyen des revenus des ménages. Ce chiffre pourrait atteindre, pour la région, environ 3 à 5 pour cent du PIB par habitant. Etant donné que le PIB moyen par habitant en Afrique s'élevait à quelque 600 dollars EU par an en 1994, cela correspondrait à une redevance d'abonnement moyenne de 1,50 à 2,50 dollars EU par mois pour les particuliers, qui pourrait être majorée proportionnellement à l'augmentation des revenus.
- Etablissement de redevances d'installation et d'abonnement distinctes pour les abonnés d'affaires. Cette mesure tiendrait compte non seulement de la capacité de paiement plus importante des entreprises, mais aussi des contraintes accrues qu'elles font peser sur le réseau et le personnel chargé de la maintenance. Une majoration d'au moins 3 à 4 fois la redevance d'abonnement applicable aux particuliers semblerait judicieuse, mais en contrepartie, les PTO devraient s'efforcer d'accroître la fiabilité et la qualité de service.
- Application de réductions en faveur des chefs d'entreprise exploitant des centres téléphoniques publics (voir l'Encadré 5) et d'autres revendeurs.

[2] Voir Paltridge, S. 1994. A survey of the Tariff Structures in Africa. Communication présentée à Africa Telecom 94.

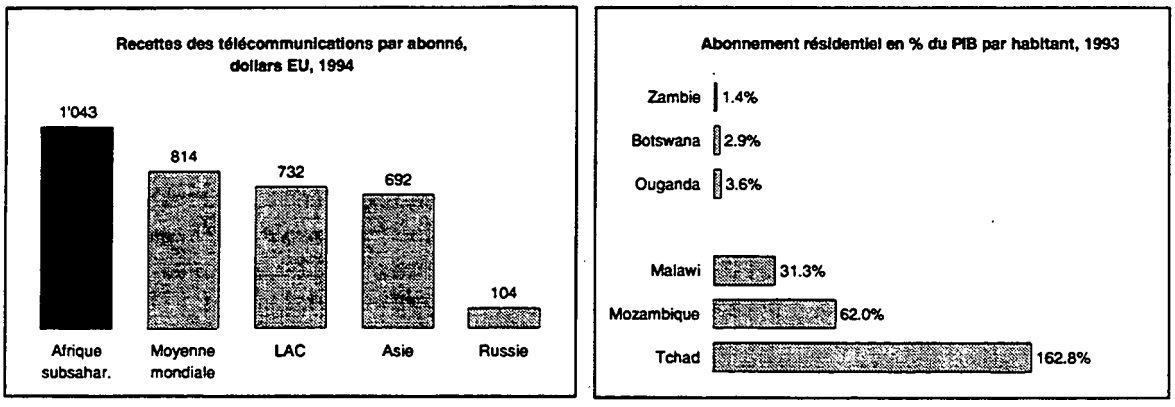
Encadré 2: le problème des tarifs (suite)

Ces mesures permettraient de dégager des recettes et, partant, de disposer d'une plus large gamme d'options tarifaires. Bon nombre de pays de la région n'appliquent toujours pas des tarifs réduits aux heures creuses pour encourager les particuliers à établir des communications le soir ou le week-end. En outre, nombreux sont ceux qui continuent d'appliquer des redevances tarifaires fondées sur la distance pour les communications interurbaines, en forte augmentation, alors que cette pratique ne repose pourtant plus sur les coûts.

Enfin, les tarifs doivent couvrir les coûts pour que les télécommunications soient financièrement viables et pour éviter les pertes. A cet égard, l'un des meilleurs moyens d'abaisser les tarifs et de rendre le service téléphonique plus abordable dans la région consiste à faire en sorte que le coût unitaire des investissements soit moins élevé.

Figure de l'encadré 2: Les prix sont-ils équitables?

Recettes par ligne d'abonné, dollars EU, 1994, et redevances d'abonnement acquittées par les particuliers en pourcentage du PIB par habitant, 1993



Note: LAC = Amérique latine et Caraïbes. Les redevances d'abonnement acquittées par les particuliers s'entendent de la taxe d'abonnement annuelle, à laquelle s'ajoutent 700 communications téléphoniques locales. Elles sont exprimées en pourcentage du produit intérieur brut par habitant.

Source: Base de données des indicateurs des télécommunications mondiales de l'UIT.

4. Investissements en télécommunications

Les investissements consacrés aux télécommunications en Afrique se sont accrus entre 1990 et 1993. Toutefois, à l'instar des recettes, ils ont accusé une baisse en 1994 (19 pour cent). Près de 60 pour cent des investissements ont été autofinancés par les recettes obtenues par les opérateurs. Ce pourcentage d'autofinancement est relativement élevé par rapport à d'autres pays en développement, ce qui donne à penser qu'il y a pénurie de capitaux en provenance d'autres sources. L'assistance multilatérale a représenté encore 20 pour cent des investissements destinés aux télécommunications, le reste ayant été financé par des organismes bilatéraux et par d'autres sources (dons, tirages sur réserve, prêts commerciaux). Les prêts bilatéraux ont atteint un niveau record de 431 millions de dollars EU en 1989, mais ils sont retombés à 97 millions de dollars EU à peine en 1994. Les principaux donateurs bilatéraux sont, d'assez loin, le Japon et la France.

Des organismes de crédit multilatéraux tels que la Banque européenne d'investissement (BEI), la Banque africaine de développement et la Banque mondiale ont consenti des prêts d'environ 750 millions de dollars EU à l'Afrique subsaharienne pour des projets de télécommunication au cours de la période 1986-1994, ce qui représente à peine 0,3 pour cent du montant total des prêts accordés par ces organismes pour l'ensemble des projets d'infrastructure réalisés dans le monde. En revanche, la Banque européenne pour la reconstruction et le développement, qui a été créée pour offrir une assistance aux pays d'Europe centrale et orientale, a octroyé depuis 1990 un prêt de plus de 900 millions de dollars EU aux pays de cette région pour la réalisation de projets de télécommunication. Il convient de noter que, comme l'Afrique, l'Europe centrale et orientale est une région où le secteur privé n'occupe pas une place importante. Les crédits accordés par des institutions multilatérales *ont* influé sensiblement sur le développement des télécommunications en Afrique subsaharienne. Ainsi, les pays ayant bénéficié de prêts ont enregistré un accroissement notable de leur télédensité: au Bénin et au Togo, par exemple, qui ont reçu des prêts multilatéraux à la fin des années 80, la télédensité a augmenté respectivement de 46 et 88 pour cent. Les prêts sont néanmoins en baisse et, en 1994, seule la BEI avait accordé des crédits à la région pour la réalisation de projets de télécommunication. En effet, les prêts multilatéraux sont de plus en plus liés aux réformes sectorielles.

On affirme souvent que l'Afrique subsaharienne doit avoir pour objectif de porter la télédensité à une ligne pour 100 habitants d'ici à l'an 2000. Le problème, pour chiffrer la réalisation de cet objectif, est que les dépenses d'investissement varient considérablement d'un pays à l'autre de la région. Dans la plupart des pays d'Afrique subsaharienne, les investissements par ligne sont nettement supérieurs à la norme en vigueur dans le secteur, à savoir 1 500 dollars EU par ligne. Si l'on appliquait cette norme, il faudrait à peine 8 milliards de dollars EU d'ici au siècle prochain pour que la région atteigne une télédensité de un. D'après les estimations, l'autofinancement permettrait de dégager près de 5 milliards de dollars EU, de sorte que l'insuffisance de l'investissement se situerait aux alentours de 3 milliards de dollars EU. Cependant, il faudra réunir beaucoup plus de crédits si l'on tient compte des investissements réalisés actuellement pour chaque ligne dans la région. En conséquence, il sera tout aussi important de réduire les coûts unitaires des investissements, par exemple dans le cadre d'appels d'offres ou d'achats massifs, que de rechercher de nouvelles sources de financement.

Tableau 2: Choix d'un scénario

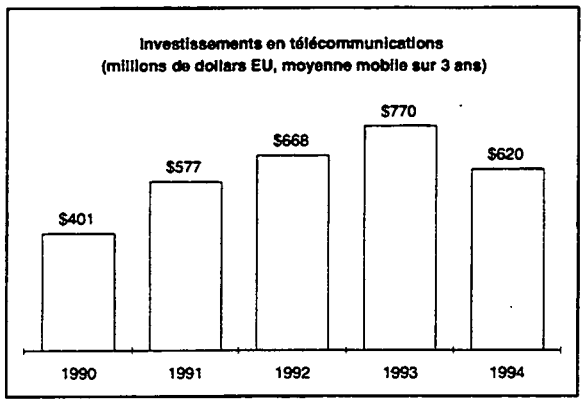
Investissements destinés aux télécommunications en Afrique subsaharienne, 1995-2000: scénarios possibles

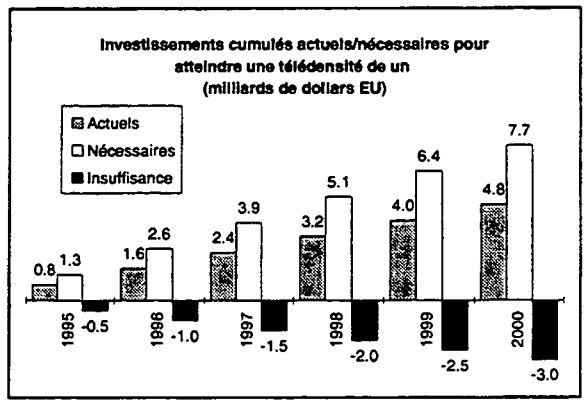
Scénario	Lignes principales à ajouter (milliers) (1995-2000)	Investissements estimés (1995-2000) million de dollars EU		Lignes principales pour 100 habitants 2000
		Faible coût a)	Coût élevé b)	
Evolution actuelle	1'519	2'279	8'357	0.62
Pour atteindre une ligne principale pour 100 habitants	5'144	7'715	28'306	1

Note: a) A supposer que le coût de chaque ligne s'élève à 1 500 dollars EU.
b) A supposer que le coût de chaque ligne s'élève à 5 500 dollars EU, à savoir la moyenne pour la période 1990-94.
Source: Projections de l'UIT fondées sur des données provenant de la base de données des indicateurs des télécommunications mondiales..

Figure 5: Evolution des investissements

Investissements destinés aux télécommunications sur les 15 principaux marchés d'Afrique subsaharienne et prévisions en matière d'investissements en Afrique subsaharienne





Note: Les chiffres indiqués dans le diagramme de droite sont fondés sur un coût estimatif de 1 500 dollars EU par nouvelle ligne installée. Les prévisions concernant les investissements reposent sur la croissance des investissements observée au cours de période 1990-93 et ne tiennent pas compte du recul de ces investissements observé en 1994 (par suite de la dévaluation du franc CFA).

Source: Base de données des indicateurs des télécommunications mondiales de l'UIT.

La conclusion selon laquelle on peut quadrupler le rendement des investissements en améliorant les procédures d'appel d'offres (voir l'encadré 3) est encourageante pour les pays de la région. Trois autres faits nouveaux sont riches de promesses, à savoir:

- En Afrique du Sud, pays qui s'efforce d'accroître la télédensité dans les anciens homelands et townships noirs pour l'aligner sur celle des banlieues, où la population est principalement blanche, le PTO en place, Telkom SA, envisage de lancer un appel d'offres en vue de la construction de cinq millions de nouvelles lignes d'ici à l'an 2001. L'appel d'offres initial précise que les marchés ne doivent pas alourdir la dette de Telkom, ce qui signifie probablement que la réalisation de ce projet s'effectuera dans le cadre d'un montage construction exploitation-transfert (CET). Telkom avait acheté antérieurement des équipements au titre d'accords d'approvisionnement à long terme (quinze ans) avec des constructeurs nationaux. Le recours à un appel d'offres et l'importance de la commande devraient fortement réduire les coûts unitaires des investissements.
- En Afrique de l'Est, WorldTel a soumis une proposition visant à regrouper les investissements nécessaires, dans le cadre d'une même commande d'un million de lignes, dont le montant est estimé à 1,3 milliard de dollars. Cette mise en commun des ressources permet de créer des économies d'échelle et favorise la concurrence entre fournisseurs potentiels.
- A l'échelle internationale, un certain nombre de plans d'investissement sont mis en oeuvre actuellement pour accroître les recettes provenant du trafic international, l'objectif étant de promouvoir des projets d'infrastructure financés par le secteur privé. Ces projets sont examinés de manière plus approfondie dans le paragraphe 6.

Encadré 3: Coût d'une ligne

L'une des tâches les plus ardues qui attend les opérateurs africains des télécommunications consiste à réduire les coûts unitaires des investissements. Les frais d'installation de lignes en Afrique subsaharienne sont quatre fois supérieurs à la moyenne des pays en développement[3]. Si les coûts encourus en Afrique subsaharienne se rapprochaient de la moyenne mondiale, à savoir 1 500 dollars EU par ligne, on pourrait installer quatre fois plus de lignes par an dans la région avec les mêmes investissements.

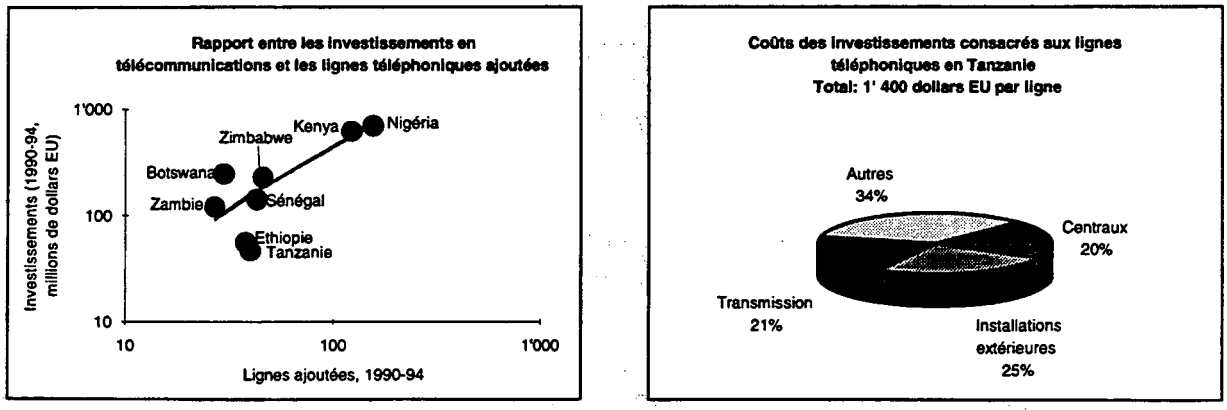
Les progrès techniques font baisser les coûts des équipements de télécommunication. A cet égard, le recours aux techniques hertziennes ouvre des perspectives extrêmement encourageantes pour la réduction des coûts. A l'heure actuelle, les coûts des réseaux de radiocommunications cellulaires mobiles sont compétitifs par rapport à ceux des réseaux câblés et leur installation est généralement plus rapide. D'après un fournisseur, il faut deux mois pour installer un système cellulaire contre trois ans pour un système de liaisons fixes[4]. Au Malawi, une coentreprise de radiocommunications cellulaires, à laquelle participe l'opérateur national des télécommunications, aura installé un réseau de 10 000 abonnés en moins d'un an, pour un montant de 1 000 dollars EU par abonné. Les radiocommunications cellulaires fixes constituent elles aussi une solution attrayante par rapport aux fils de cuivre. Il ressort d'une étude que les coûts afférents aux radiocommunications de ce type sont tombés de 5 000 dollars EU par abonné en 1985 à 500 dollars EU aujourd'hui[5].

Si les coûts unitaires des investissements sont élevés dans la région, c'est parce qu'il existe des zones rurales étendues dont la desserte est en général plus coûteuse. Toutefois, les coûts des équipements de télécommunication sont également en baisse dans cette région[6]. 7Les coûts des investissements varient sensiblement d'un pays à l'autre en Afrique subsaharienne. Il ressort d'une analyse des investissements réalisés par huit pays dans le domaine des télécommunications au cours de la période 1990-1994 que les coûts oscillent entre 1 000 et 8 000 dollars EU par ligne d'abonné, la moyenne se situant aux alentours de 4 250 dollars EU. La méthode de régression a permis d'établir une relation étroite entre les investissements et le nombre de nouvelles lignes ajoutées, la plupart des pays se situant sur la ligne de régression ou à proximité de cette ligne. Deux pays, l'Ethiopie et la Tanzanie, sont situés nettement au dessous de la ligne de régression, ce qui donne à penser que les coûts des investissements y sont nettement moins élevés. Ces pays ont tous deux bénéficié de prêts multilatéraux importants pour le financement de leurs projets de télécommunication. Ces prêts prévoient habituellement que les achats d'équipements doivent être transparents et faire l'objet d'appels d'offres internationaux. Les appels d'offres réduisent généralement les coûts unitaires des investissements. Les résultats de cette étude sont confirmés par des données provenant de la Tanzanie, qui montrent que le coût unitaire des investissements dans ce pays s'élève à 1 400 dollars EU par ligne, chiffre légèrement inférieur à la moyenne du secteur et nettement plus faible que la moyenne régionale.

Il ressort de ce qui précède que si l'Ethiopie et la Tanzanie parviennent à abaisser les coûts de leurs investissements par rapport à la moyenne du secteur, les autres pays d'Afrique subsaharienne pourraient en faire autant. De plus, ces deux pays disposent de vastes étendues de territoire, de sorte que les coûts devraient même être plus faibles dans les pays plus petits ou plus urbanisés. La réduction du coût des investissements constitue pour l'Afrique subsaharienne un moyen relativement facile d'encourager les investissements, puisque pour un niveau d'investissement égal, un pays peut acquérir davantage de lignes.

Figure de l'encadré 3: Combien coûte une ligne téléphonique?

Rapport entre les investissements et les lignes ajoutées et coût des investissements destinés aux lignes en Tanzanie



Note: On a utilisé une échelle logarithmique dans le diagramme de gauche.

Source: Base de données des indicateurs des télécommunications mondiales de l'UIT, Banque mondiale.

[3] Voir UIT, 1994, Rapport sur le développement mondial des télécommunications, UIT, Genève.

[4] Voir Lawton, G. "Out of Africa". Global Telephony, février 1996.

[5] Voir Herschel Shosteck Associates Ltd., 1995. World Demand for Wireless Local Loop Systems. Herschel Shosteck, Wheaton, MD (Etats-Unis d'Amérique).

[6] Voir "Mapping a route to Africa's remotest regions". Telecommunications in Africa. Janvier/février 1996.

5. Trafic international

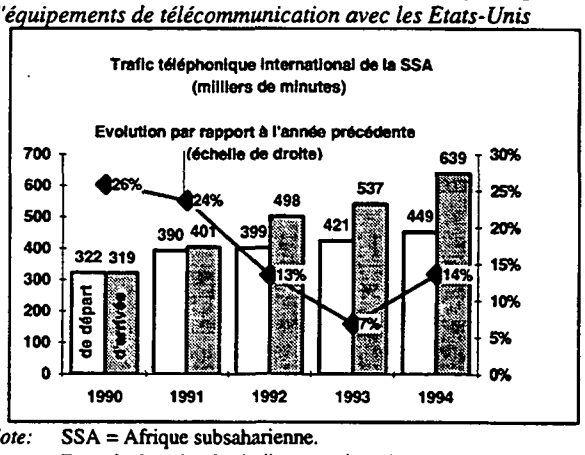
Le secteur des télécommunications africaines est fortement tributaire des communications téléphoniques internationales, puisque celles ci représentent plus de 50 pour cent des recettes de la région[7]. Bien que le volume du trafic international ait augmenté, le taux de croissance s'est néanmoins ralenti en Afrique subsaharienne depuis le début des années 90 (voir la Figure 6, graphique de gauche). Ces résultats vont dans le sens de l'évolution mondiale et reflètent la morosité générale de l'économie africaine. En 1994, le taux de croissance s'est accru, sous l'effet d'une reprise de l'activité économique. A l'intérieur de la région, les pays d'Afrique du Nord, l'Afrique du Sud et les pays d'Afrique subsaharienne représentent respectivement 36 pour cent, 26 pour cent et 38 pour cent du trafic. Au cours de la dernière décennie, la part de l'Afrique du Nord a reculé, celle de l'Afrique du Sud a augmenté, tandis que celle de l'Afrique subsaharienne est restée inchangée. Plus de 60 pour cent du trafic est acheminé à l'extérieur de la région. L'essentiel du trafic régional est échangé entre l'Afrique du Sud et ses voisins.

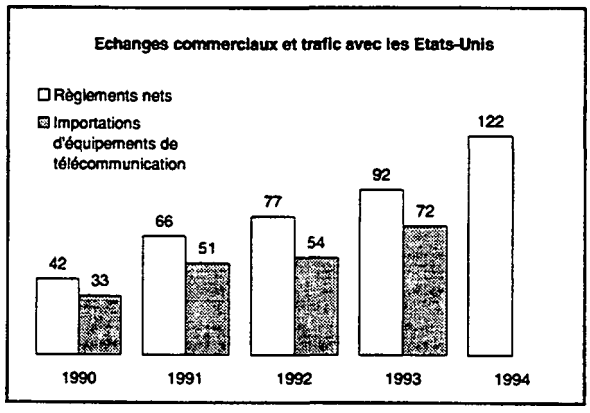
Depuis 1991, le trafic d'arrivée dépasse le trafic de départ. Ce déséquilibre du trafic permet aux opérateurs de télécommunications d'Afrique subsaharienne de se procurer des devises qui font cruellement défaut. Le trafic entre l'Afrique et les Etats-Unis illustre bien l'accroissement du trafic téléphonique d'arrivée: ainsi, les appels entrants en provenance des Etats-Unis sont passés de 75 millions de minutes en 1990 à 173 millions de minutes en 1994. En conséquence, les Etats-Unis sont aujourd'hui le principal fournisseur d'appels entrants à destination du continent. Cette progression du trafic d'arrivée va sans doute se poursuivre tant que les tarifs seront plus élevés en Afrique qu'aux Etats Unis. A cet égard, les disparités tarifaires ont favorisé le recours accru à des entreprises fournissant des services de rappel depuis les Etats-Unis. Les opérateurs de services de rappel exploitent en effet ces différences en inversant la facturation. Il y a de fortes chances pour qu'une partie du trafic considéré comme du trafic d'arrivée en provenance des Etats-Unis soit en fait du trafic de *rappel sortant à destination* des Etats-Unis ou d'autres pays via les Etats Unis. Bien que les services de rappel aient été jugés illégaux dans plusieurs pays africains, il est techniquement difficile d'y mettre fin. Tant que le trafic de rappel est acheminé pour l'essentiel sur le réseau public avec commutation, il devrait avoir des effets positifs sur les recettes en devises.

Les avantages nets que la région retire du trafic téléphonique sont pourtant neutralisés par ses achats d'équipements de télécommunication. Ainsi, les achats de ces équipements effectués par l'Afrique subsaharienne aux Etats-Unis ont augmenté parallèlement aux règlements nets (voir la Figure 6, graphique de droite). Les exportations américaines d'équipements de télécommunication vers l'Afrique subsaharienne ont quant à elles doublé depuis 1990 et progressent actuellement de 30 pour cent par an. Dans l'ensemble, le commerce d'équipements de télécommunication est profondément déséquilibré sur le continent africain, puisque l'Afrique importe vingt fois plus d'équipements qu'elle n'en exporte. Ainsi, en 1992, les importations d'équipements pour centraux téléphoniques effectuées par l'Afrique subsaharienne se sont élevées à 200 millions de dollars EU environ, alors que les exportations ont atteint moins de 5 millions de dollars EU.

Figure 6: Télécommunications et commerce

Afrique subsaharienne: évolution du trafic téléphonique international en 1990-94, règlements nets et échanges commerciaux d'équipements de télécommunication avec les Etats-Unis





Note: SSA = Afrique subsaharienne.

Source: Base de données des indicateurs des télécommunications mondiales de l'UIT, FCC, Department of Commerce, Etats-Unis d'Amérique.

[7] Pour une analyse approfondie du trafic téléphonique international en Afrique, voir la publication de M. Minges, 1996, intitulée "Africa Calling", dans Communications Technology Handbook, 1996 (à paraître). BMI-TechKnowledge, Afrique du Sud.

6. Infrastructures internationales

Diverses mesures sont prises actuellement pour accroître la connectivité des télécommunications internationales en Afrique. S'agissant des télécommunications par satellite, on citera la création de l'organisation RASCOM (Système régional africain de communications par satellite), dont le siège se trouve à Abidjan (Côte d'Ivoire). RASCOM a notamment pour objectif de mettre sur pied un système à satellites panafricain. Parallèlement, elle assure la coordination des besoins de l'Afrique avec INTELSAT, le système à satellites mondial que la plupart des pays du continent utilisent. En 1994, un accord de coopération a été signé avec cet organisme, en vertu duquel INTELSAT lancera en 1997 deux satellites qui assureront une large couverture du continent. En regroupant leurs besoins en matière de satellites dans le cadre de RASCOM, les pays africains ont pu négocier des tarifs moins élevés. Outre les systèmes à satellites existants, plusieurs consortiums internationaux proposent actuellement des systèmes sur orbite basse (LEO) destinés à des abonnés mobiles. Etant donné qu'ils assurent une couverture mondiale, les systèmes LEO desserviront aussi l'Afrique et devraient entrer en service d'ici à la fin du siècle.

Un certain nombre d'initiatives visant à intégrer l'Afrique dans le réseau mondial de l'information grâce à des câbles sous-marins en fibres optiques voient le jour actuellement. Les seules liaisons par fibres optiques qui relient aujourd'hui l'Afrique au reste du monde sont établies à partir de l'Afrique du Sud, de plusieurs pays du Maghreb et de Djibouti. Alcatel, le constructeur français d'équipements de télécommunication, collabore actuellement avec plusieurs pays pour mettre au point un câble sous-marin en fibres optiques qui doit relier l'Afrique de l'Ouest à l'Europe. La société AT&T (Etats-Unis) projette de mettre en oeuvre le projet Africa ONE, câble en fibres optiques qui encerclera le continent africain. Siemens, le constructeur d'équipements allemand, a proposé d'installer 6 000 kilomètres de liaisons par fibres optiques le long de la côte ouest de l'Afrique. La société Telkom (Afrique du Sud) propose quant à elle une solution différente: utiliser son système de câbles SAFE (South Africa Far East) pour faire transiter par satellite via l'Afrique du Sud le trafic africain avec l'extérieur, puis l'acheminer sur le câble en fibres optiques SAT-2.

Les propositions de systèmes à fibres optiques visent à réduire la nécessité de faire passer le trafic international par des pays tiers situés à l'extérieur de la région et, par conséquent, à limiter les frais de transit et à promouvoir la croissance du trafic. Cependant, l'essentiel du trafic entre l'Afrique subsaharienne et l'étranger est acheminé par satellite lorsqu'il existe une capacité suffisante pour écouler les volumes de trafic actuels et prévus à court terme. Compte tenu de l'utilisation de satellites et, parallèlement, du volume et de la croissance relativement limités du trafic téléphonique africain par rapport à d'autres régions, il n'est peut-être pas viable d'opter pour quatre systèmes à fibres optiques différents. Une proposition soumise antérieurement par le consortium FLAG (Fiberoptic Link Across the Globe), en vue d'installer une section en câble en Afrique, a même été retirée en juin 1994, au motif que l'accroissement du trafic prévu ne justifiait pas l'investissement. Les faits nouveaux survenus récemment semblent indiquer qu'il a été procédé à une rationalisation des différents projets, puisqu'Alcatel et AT&T ont décidé de faire équipe.

Eu égard au nombre de pays enclavés que compte le continent, il est évident que l'instauration de la connectivité internationale passe par l'utilisation combinée de divers systèmes, qu'il s'agisse des satellites, des fibres optiques ou des systèmes de Terre existants comme les faisceaux hertziens. La difficulté consistera à étudier les avantages et la complémentarité des différentes solutions possibles, l'ampleur de la coopération régionale nécessaire et l'adoption de structures efficaces en matière de participation au capital et de gestion.[8]

Tableau 3: Des anneaux autour de l'Afrique

Projets de câbles sous-marins en fibres optiques en Afrique

Nom	Société responsable	Investissments (millions de dollars EU)	Remarque
Africa One	AT&T	2'650	Avec répéteurs. Vise à encercler le continent africain. Longueur totale: 32'000 km.
Afrilink	Siemens	500	Sans répéteurs. Sera mis en place par étape en fonction de la demande. La longueur totale doit atteindre approximativement 6'000 km.
Projet panafricain	Alcatel	1'000	Avec répéteurs. Vise à relier un certain nombre de pays d'Afrique de l'Ouest. Construction éventuelle d'une deuxième artère le long de l'océan Indien.
SAFE	Telkom SA	Pas d'investissements supplémentaires	Utilisation commune du câble en fibres optiques SAT-2 de l'Afrique du Sud, en acheminant conjointement par satellite le trafic provenant d'autres pays.

Source: UIT, rapports de sociétés, TFA.

[8] Voir Telecommunications Foundation of Africa (TFA), 1995, Pan-African Connectivity: Responses to Increasing Traffic. TFA: Nairobi, Kenya.

7. Evolution des radiocommunications cellulaires

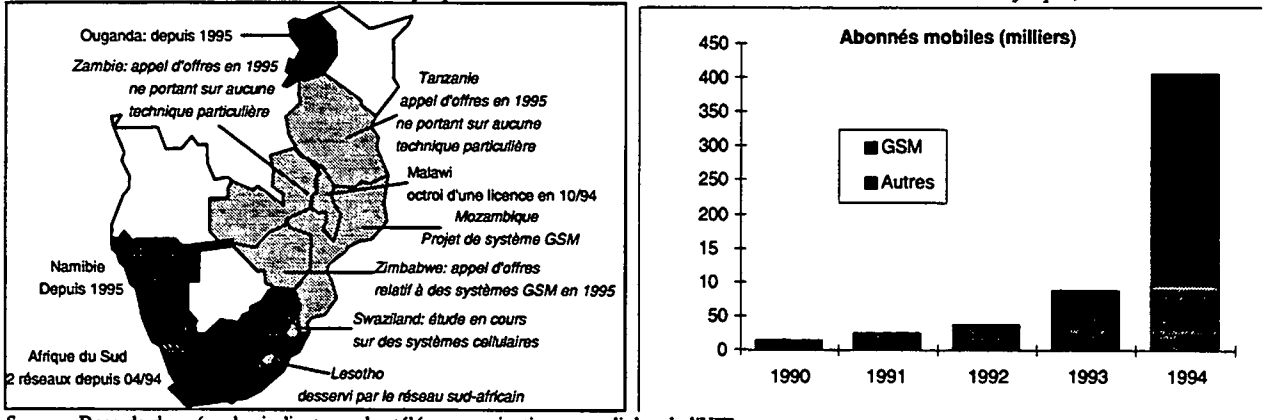
Bien qu'elles aient mis du temps à "décoller", les communications mobiles sont aujourd'hui plus largement acceptées en Afrique. A la fin de 1995, 23 pays africains environ exploitaient des systèmes cellulaires. Toutefois, c'est l'Afrique du Sud qui compte le plus grand nombre d'abonnés à ces systèmes, les radiocommunications cellulaires ayant connu un essor spectaculaire dans ce pays depuis le lancement d'un système GSM numérique par deux concurrents en 1994. Le développement des systèmes cellulaires dans le reste de l'Afrique a cependant été limité par rapport à l'Afrique du Sud et eu égard à la croissance rapide observée dans le reste du monde. La croissance a été freinée pour des raisons liées à la sécurité en Afrique du Nord (sauf au Maroc, où le nombre d'abonnés a doublé depuis la mise en oeuvre d'un système GSM numérique) et par les prix élevés appliqués en Afrique subsaharienne. A cet égard, il est intéressant de noter que les radiocommunications cellulaires constituent l'un des rares segments du marché des télécommunications africaines qui ont été ouverts aux investissements privés et à la concurrence. Parmi les vingt six réseaux en service, onze font l'objet de coentreprises avec des investisseurs étrangers, tandis que trois pays - le Ghana, la Guinée et l'Afrique du Sud - autorisent actuellement une concurrence dans le secteur.

L'Afrique subsaharienne offre des conditions qui conviennent parfaitement aux techniques cellulaires. En effet, le mauvais état du réseau de liaisons fixes fait des systèmes cellulaires - qui sont plus rapides à installer et pour lesquels les coûts des investissements sont compétitifs - une solution de remplacement idéale. Un certain nombre d'éléments nouveaux pourraient transformer le paysage des radiocommunications cellulaires en Afrique et contribuer à une meilleure utilisation du potentiel qu'offrent les techniques hertziennes:

- **Extension de la zone GSM.** La croissance spectaculaire des systèmes GSM en Afrique du Sud, qui développe des échanges commerciaux et multiplie ses liaisons de communication dans la partie sud du continent, laisse prévoir la possibilité d'un élargissement de la zone GSM, qui s'étendrait de l'Afrique du Sud à la Namibie au Nord Est et à l'Ouganda au Nord Est. Cette zone pourrait fournir des services de mobilité à environ une douzaine de pays. La Namibie et l'Ouganda ont commencé à exploiter des systèmes GSM en 1995. Au Malawi, une coentreprise réunissant l'exploitant national et Telekom Malaysia envisage de mettre en service un réseau GSM, tandis que la Tanzanie, la Zambie et le Zimbabwe projettent d'octroyer des licences pour l'exploitation de réseaux GSM.
- **Liaisons par satellite.** On fait de plus en plus appel aux satellites pour raccorder des cellules isolées et pour assurer une couverture nationale et internationale. Au Zaïre, Telecel utilise INTELSAT pour relier entre eux ses systèmes cellulaires dans six villes et pour offrir des services interurbains et internationaux[9]. Au Ghana, la Société Millicom a loué des lignes à INTELSAT pour raccorder ses réseaux cellulaires d'Accra et de Kamasi et envisage d'en faire autant dans d'autres villes.
- **Systèmes cellulaires fixes.** Les techniques de lignes d'abonnés hertziennes (WLL) utilisent les radiocommunications cellulaires en mode stationnaire comme une ligne fixe, à ceci près que la technologie cellulaire remplace le câble métallique classique qui reliait l'abonné au central téléphonique. Le prix des techniques WLL ne cessant de baisser, on peut penser que celles ci sont à présent aussi bon marché que les câbles métalliques. Au Ghana, Capital Telecom installe actuellement des systèmes WLL, dans le cadre d'un projet de construction exploitation-transfert (CET), qui devraient desservir jusqu'à 50 000 abonnés dans des zones rurales d'ici à 1998.

Figure 7: Extension de la zone GSM?

Evolution du GSM dans le Cône sud de l'Afrique et nombre d'abonnés aux communications mobiles en Afrique, 1990-1994



Source: Base de données des indicateurs des télécommunications mondiales de l'UIT.

[9] "Satellite Cellular Links Move Zaire Ahead. "Via INTELSAT. Avril 1993 et "Ghana Goes Global Using Cellular Solution." Via INTELSAT, octobre 1995.

Tableau 4: Abonnés à des services de radiocommunications cellulaires en Afrique

Nombre d'abonnés à des services de radiocommunications cellulaires mobiles en Afrique, 1990 1995

Economie	Exploitant/Système/Propriétaires	1990	1991	1992	1993	1994	1995
Angola	Angola Telecom [AMPS]	0	0	0	1'100	*1'500*	1'994
Benin	OPT [AMPS]	0	0	0	0	0	1'050
Burundi	Telecel Burundi [AMPS] - ONATEL (30%), Telecel Zaïre (40%), Gouvernement du Burundi (30%)	0	0	0	320	343	480
Cameroun	Dirtel [GSM]	0	0	0	*1'000*	1'700	2'485
République centrafricaine	CARATEL [AMPS] - Telecel International et investisseurs centrafricains.	0	0	0	0	0	79
Gabon	OPT [AMPS]	0	0	280	1'200	2'581	*3'000*
Gambie [a]	Gamtel [TACS]	0	0	204	379	810	*1'000*
Ghana	Mobitel [TACS] - Millicom (80%), autres(20%)	0	0	400	1'742	3'336	3'637
	Celltel [AMPS] - Ghana (95%), AT&T (5%)	0	0	0	0	0	2'563
Guinée	Telecel Guinée [AMPS] - Telecel International (60%), partenaires guinéens (40%)	0	0	0	0	312	480
	Spacetel-Guinée [AMPS] - Investisseurs guinéens et américains. Pas d'interconnexion avec le réseau téléphonique public	0	0	0	0	0	...
Kenya [b]	KPTC [TACS]	0	0	1'100	1'162	1'990	2'279
Malawi	Telekom Networks Ltd. [GSM] (fin 1995) -Telekom Malaysia, PTC	0	0	0	0	0	...
Maurice	Emtel [TACS] - Millicom (46%), autres (54%)	2'200	2'556	2'912	4'037	5'706	11'735
Namibie [c]	Mobile Telecom. Ltd. [GSM] - Namibia Telecom (51%), Telia, Swedfund (49%)	0	0	0	0	0	3'500
Nigéria	MTS [TACS] - Nitel, Digital Telecom	0	0	0	9'049	12'800	*15'000*
Sénégal	Sonatel [AMPS]	0	0	0	0	98	122
Tanzanie	MIC Tanzania Limited [TACS] - TTCL (25%), Millicom (46%), autres (29%)	0	0	0	0	371	2'303
Ouganda [b]	Clovergem Celtel Ltd. [GSM] (juin 1995) - Vodafone (R.U.) (35%), Clovergem (20%), MSI (20%), IFC (10%), CDC (10%), autres (5%)	0	0	0	0	0	1'747
Zaïre	Telecel [AMPS] - Investisseurs zaïrois, américains et belges	0	*2'000*	*4'000*	*6'000*	*7'000*	*10'000*
	Afrique subsaharienne	**2'200**	**4'556**	**8'896**	**24'989**	**38'547**	***63'554***
Algérie	PTT [NMT]	470	4'780	4'781	4'781	1'348	*1'500*
Egypte [b]	Arento [TACS]	4'000	5'240	6'944	7'550	7'371	*7'500*
Maroc	ONPT [NMT, GSM]	904	1'500	3'228	6'725	13'794	*20'000*
Tunisie	DGT [NMT]	953	1'239	1'889	2'269	2'709	*7'000*
	Afrique du Nord	**6'327**	**12'759**	**16'842**	**21'325**	**25'222**	***36'000***
Afrique du Sud [a]	Réseaux téléphoniques mobiles [GSM] - Multichoice (25%); Cable & Wireless (25%); Transtel, Naftel, FABCOS, Cosatu (50%)	0	0	0	0	120'000	190'000
	Vodacom Group [GSM] - Telkom South Africa (50%); Vodafone (UK) (35%); Rembrandt Group (15%)	5'680	7'100	12'510	40'000	220'000	330'000
	Afrique du Sud	**5'680**	**7'100**	**12'510**	**40'000**	**340'000**	***520'000***
	AFRIQUE	**14'207**	**24'415**	**38'248**	**86'314**	**403'769**	***619'554***
	- TCAC		**72%**	**57%**	**126%**	**368%**	**53%**
	Nombre de pays dotés de systèmes cellulaires	**6**	**7**	**10**	**15**	**18**	**23**
	Nombre de pays dépourvus de systèmes cell.	**46**	**45**	**43**	**38**	**35**	**30**

Note: Les chiffres en italiques sont des estimations. Le nombre de pays en Afrique a augmenté en 1992 compte tenu de l'avènement à l'indépendance de l'Erythrée. a) année commençant au 1er avril. b) année finissant au 30 juin. c) année finissant au 30 septembre. Toutes les autres années se terminent au 31 décembre.

Source: Base de données des PTO de l'UIT.

8. Restructuration

Depuis 1990, le rythme de la restructuration s'accélère dans le secteur des télécommunications africaines. Les télécommunications sont actuellement dissociées des Postes, les exploitations sont transformées en sociétés par actions, des organismes de réglementation sont créés et le secteur privé participe de plus en plus aux activités liées aux radiocommunications cellulaires. Dans le cadre d'une enquête menée récemment par l'UIT, à laquelle 28 pays africains ont répondu, quatre de ces pays ont fait savoir qu'ils avaient séparé les Postes des télécommunications au cours des deux dernières années, tandis que cinq autres ont annoncé leur intention de le faire dans les deux années à venir. De plus, 14 pays sur 21 ont indiqué qu'ils envisageaient de créer des organismes de réglementation au cours des deux à trois prochaines années.

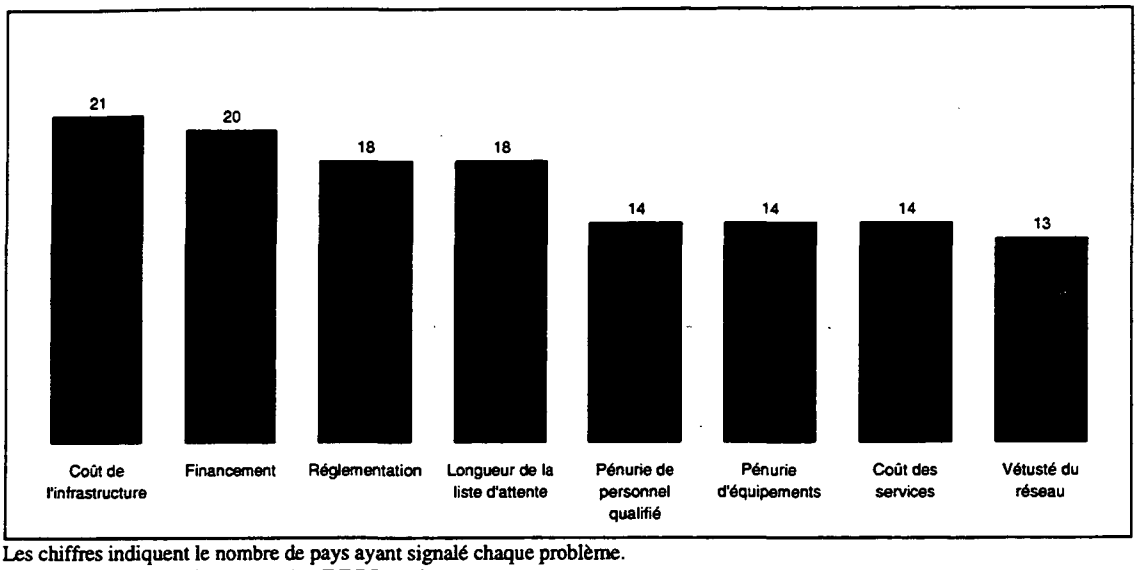
La privatisation des exploitations de télécommunications publiques et l'ouverture à la concurrence de certains marchés commencent également à gagner du terrain. L'exploitant national des télécommunications de la Guinée a été en partie privatisé au début de 1996. Au Cap-Vert, le gouvernement a lancé un appel d'offres pour la vente de 40% du capital de l'exploitant national en 1995. Au Ghana, deux entreprises concurrentes - qui seront prochainement au nombre de trois - assurent déjà des radiocommunications cellulaires, tandis que la Tanzanie a lancé des appels d'offres à l'intention d'autres exploitants de systèmes cellulaires. Un fait nouveau important, qui a été annoncé au début de 1996, est le projet de privatisation partielle des exploitations en place et l'arrivée d'un deuxième exploitant de liaisons fixes au Ghana et en Ouganda.

Avec le développement de la privatisation et de la libéralisation dans l'ensemble de la région, un grand nombre de problèmes complexes devront être résolus. Il ressort des réponses à l'étude sur le secteur effectuée par l'UIT/BDT en 1995 que la réglementation, suivie de près par le coût des infrastructures et le financement du réseau, figurent parmi les principaux problèmes auxquels la région est confrontée (voir la Figure 8). Il convient également d'aborder des questions telles que la définition des conditions d'octroi de licences, les procédures et les redevances, les accords d'interconnexion, le service universel et les politiques tarifaires. Des difficultés sont apparues dans le domaine des ressources humaines. Ainsi, au Mozambique, un organisme de réglementation a été créé et l'exploitation des télécommunications a été privatisée en 1993. La question de savoir quels fonctionnaires resteraient avec le Ministère et quels seraient ceux qui collaboreraient avec l'organisme de réglementation et l'exploitant n'a pas été chose facile. Dans d'autres pays, les craintes que suscitent les possibilités de mutation résultant de la restructuration parmi le personnel des télécommunications retardent actuellement les réformes.

Une autre difficulté tient au fait qu'il faut assurer le financement de l'organisme chargé de la réglementation, tout en garantissant sa neutralité et son indépendance. En général, les nouveaux organismes de réglementation d'Afrique subsaharienne rendent compte de leurs activités au Ministère compétent et sont financés par les redevances de licences. A Maurice, l'organisme de réglementation fait rapport au Premier Ministre et ses activités sont financées par l'Etat. L'organisme chargé de la réglementation s'acquitte de la plupart des tâches, à l'exception de la fixation des redevances de licences, qui incombe au Ministère. En Côte d'ivoire, l'organisme chargé de la réglementation fait rapport à un Conseil. Au Nigéria, cet organisme assume la plupart des fonctions, à l'exclusion de l'attribution des fréquences, qui relève du Ministère.

Figure 8: Quel est le problème?

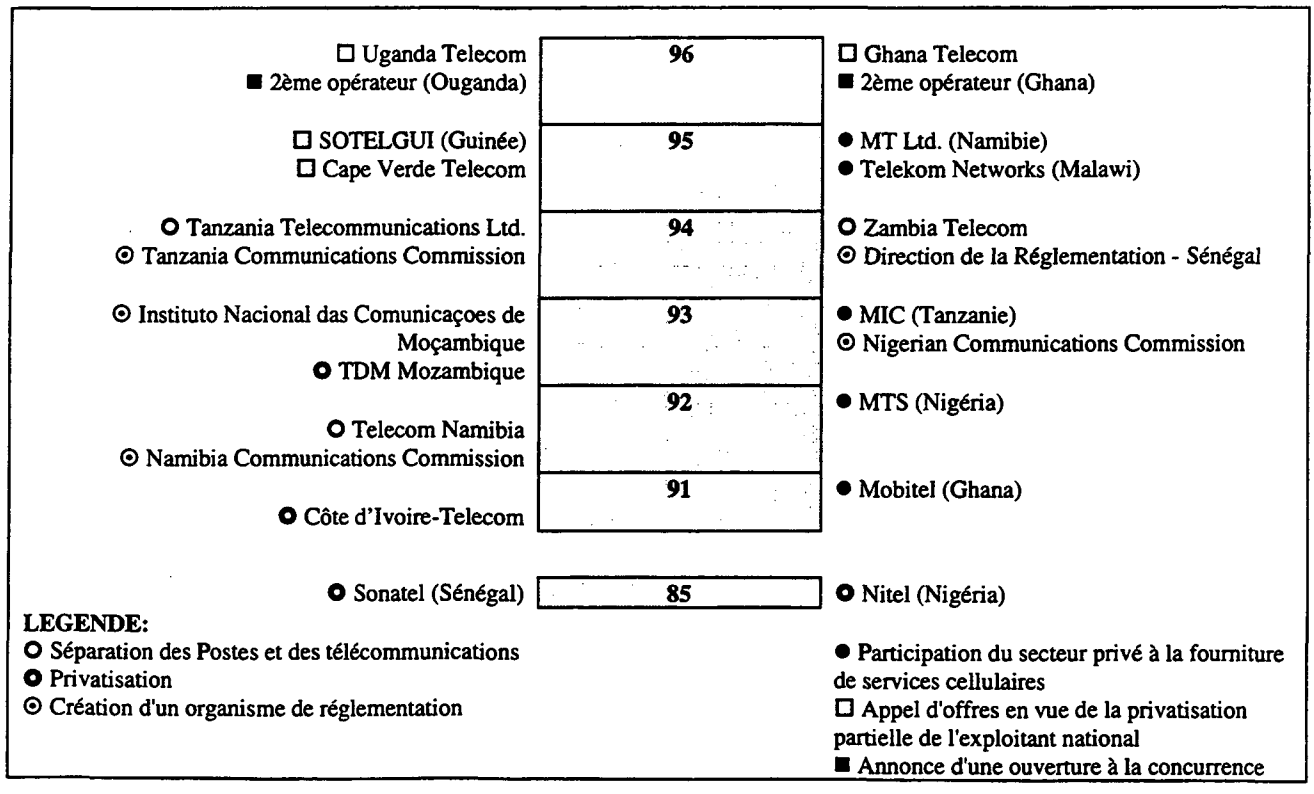
Ordre d'importance des problèmes signalés par les Administrations des télécommunications africaines, 1995



Note: Les chiffres indiquent le nombre de pays ayant signalé chaque problème.
Source: Etude sur le secteur effectuée par l'UIT/BDT, 1995.

Figure 9: Restructuration du secteur

Evolution du secteur des télécommunications en Afrique subsaharienne, 1985-1996



Source: UIT/BDT.

Encadré 4: Le Livre vert africain

Au cours de la Conférence régionale africaine de développement des télécommunications tenue en 1990, il a été décidé de créer un Groupe d'études permanent africain de la politique de l'information et des télécommunications (GEPAIT). Le GEPAIT avait pour tâche principale d'élaborer *le Livre vert africain: Politiques des télécommunications pour l'Afrique*, qui servirait de guide pour la région.

La dénomination du Livre vert s'inspire de l'exemple du Livre vert de la Commission des communautés européennes, élaboré en 1987, intitulé "Développement d'un marché commun pour les services et équipements de télécommunication". Etant donné que la situation en Afrique est très différente des conditions qui prévalent dans les pays Membres de l'Union européenne, il convient de considérer le Livre vert africain comme un outil de réflexion, proposant des démarches et des options possibles pour la restructuration du secteur des télécommunications en Afrique.

Le Livre vert a été rédigé par un groupe d'experts africains et comprend huit chapitres. Il traite de la situation mondiale et régionale, des considérations juridiques intervenant dans le processus de restructuration, des cadres réglementaires appropriés, des possibilités de réaménagement des réseaux et des services, de questions économiques, financières et tarifaires et du développement du réseau.

On trouvera ci-après un aperçu des principales recommandations figurant dans le Livre vert:

- Séparation des fonctions de réglementation et d'exploitation:
- Séparation des Postes et des télécommunications;
- Création d'un organisme national distinct pour la réglementation des télécommunications;
- Octroi d'une autonomie aux exploitants de télécommunication en matière de financement et de gestion;
- Ouverture à une concurrence "réglementée" des secteurs du marché où la demande reste insatisfaite;
- Investissements dans le domaine du développement et de la gestion des ressources humaines;
- Mise en place d'un mécanisme consultatif permettant aux utilisateurs et aux autres parties concernées de contribuer à l'amélioration de l'efficacité du secteur.

Le Livre vert africain sera présenté pour adoption à la deuxième Conférence régionale africaine de développement des télécommunications, qui se tiendra à Abidjan en mai 1996.

9. Résultats

Quelle a été l'évolution des résultats obtenus sur le marché des télécommunications africaines depuis 1990? Une analyse des 15 principaux marchés des télécommunications d'Afrique subsaharienne fait apparaître des résultats contrastés. Les résultats sont examinés sous l'angle du développement du réseau ainsi que de la productivité et du financement.

S'agissant de la qualité de fonctionnement du réseau, les 15 principaux exploitants de télécommunication ont accru la **télédensité** de 32 pour cent en moyenne, de 1990 à 1994, pour la porter à plus de un. Le Botswana, le Gabon et le Sénégal ont enregistré l'augmentation la plus forte, tandis qu'au Ghana et au Zimbabwe, la télédensité a fléchi du fait que le nombre de lignes ajoutées n'a pas augmenté au même rythme que la croissance démographique.

Le nombre de **dérangements téléphoniques** a augmenté dans plusieurs pays entre 1990 et 1994. Cette baisse de la qualité de service est préoccupante. Le taux global de dérangements pour 100 lignes principales reste nettement supérieur aux moyennes mondiales. C'est le Sénégal qui obtient les meilleurs résultats à cet égard, en raison notamment de la numérisation très poussée du réseau de Sonatel (76 pour cent des lignes principales sont en effet raccordées à des centraux numériques).

La productivité, mesurée d'après le **nombre de lignes téléphoniques principales par employé des télécommunications**, s'est accrue de 37 pour cent entre 1990 et 1994 dans les 15 pays considérés dans leur ensemble. Toutefois, conformément à l'évolution observée dans le reste du monde, cette progression est surtout imputable à des réductions de personnel plutôt qu'à un accroissement spectaculaire du nombre de lignes. Le Botswana a cependant fait exception à cette règle, puisque sa productivité a augmenté d'un tiers malgré un accroissement de ses effectifs d'environ 500 employés.

D'une manière générale, il semble que les pays francophones aient obtenu de meilleurs résultats au cours de la première moitié des années 90. Ce sont le Sénégal, la Côte d'Ivoire, le Cameroun et le Gabon qui ont accompli le plus de progrès, alors que le Botswana et le Sénégal affichent actuellement les résultats les plus positifs pour les trois indicateurs.

Tableau 5: Indicateurs de qualité de fonctionnement du réseau et de productivité

15 principaux marchés des télécommunications d'Afrique subsaharienne, 1994

	Télédensité		Lignes principales par employé		Dérangements pour 100 lignes principales		Classement	
Pays	1994	Evolution 1990-94	1994	Evolution 1990-94	1994	Evolution 1990-94	1994 a)	Evolution 1994 b)
1 Botswana	3.50	69.3%	31	34%	55	-4%	1 =	6
2 Cameroun	0.46	33.1%	30	54%	74	3%	5	3
3 Congo	0.82	17.3%	22	41%	61	55%	6 =	5
4 Côte d'Ivoire	0.79	29.5%	30	61%	80	34%	6 =	2
5 Ethiopie	0.26	5.2%	26	25%	74	57%	11	9
6 Gabon	3.03	65.9%	40	52%	74	-21%	3	4
7 Ghana	0.30	-0.8%	13	35%	176	-32%	14 =	13 =
8 Kenya	0.88	11.9%	22	53%			12	8
9 Mozambique	0.37	22.0%	24	37%	60	-83%	9	11
10 Namibie	4.65	26.3%	34	3%	78		4	12
11 Nigéria	0.34	13.1%	25	45%	327	7%	13	7
12 Sénégal	0.89	48.5%	38	65%	39	7%	1 =	1
13 Tanzanie	0.31	2.6%	19	24%	201		14 =	15
14 Zambie	0.87	3.6%	27	56%	124	-44%	6 =	10
15 Zimbabwe	1.23	-3.4%	25	2%	190	18%	10	13 =
MOYENNE c)	**1.25**	**32%**	**27**	**37%**	**115**	**-18%**		
MONDE d)	**19.95**	**32%**	**127**	**52%**	**55**	**7%**		

Note: a) Classement en additionnant les rangs pour chacun des trois indicateurs en 1994. b) Classement des pays ayant enregistré des progrès pour chacun des trois indicateurs (1990 1994). c) Moyennes simples (non pondérées) de 15 exploitants d'Afrique subsaharienne. d) Moyennes simples de 24 grands pays émergents autres qu'africains.

Source: Base de données des indicateurs des télécommunications mondiales de l'UIT.

Les indicateurs financiers sont plus difficiles à interpréter, en partie parce qu'ils sont influencés par les taux de change. Ainsi, les données relatives aux pays de la zone CFA feront apparaître des valeurs plus faibles en 1994 en raison de la dévaluation du franc CFA. De plus, les indicateurs des investissements tendent à varier avec le temps, d'où la difficulté de procéder à des comparaisons. Enfin, s'il est vrai que de bons résultats financiers peuvent être intéressants pour une entreprise, il se peut aussi que ces résultats ne soient pas toujours aussi bons d'un point de vue économique général. Lorsque les recettes par ligne principale sont

supérieures à la moyenne, cela peut signifier que les tarifs sont simplement trop élevés pour les abonnés potentiels, décourageant ainsi la demande. Par ailleurs, les services de télécommunication doivent être financièrement viables si l'on veut dégager des fonds en vue de les réinvestir dans le réseau.

Les recettes par ligne principale constituent un indicateur important de la viabilité, dans la mesure où ils illustrent la capacité de l'exploitant de mobiliser suffisamment de ressources pour assurer la maintenance et l'expansion du réseau. Ces recettes vont de 388 dollars EU (Ethiopie) à 2 000 dollars EU (Congo). L'objectif institué pour les recettes par ligne correspond à 750 dollars EU par an, soit environ la moitié de la moyenne du secteur pour les coûts afférents à l'installation des lignes. Les coûts étant généralement beaucoup plus élevés en Afrique, il faudrait près de douze ans pour payer une ligne principale (étant entendu que 40 pour cent des recettes seraient conservées au titre des bénéfices d'exploitation), compte tenu des coûts d'installation en vigueur sur le continent. Toutefois, ces coûts varient en général considérablement à l'intérieur de la région, de sorte que même si l'Ethiopie obtient les recettes les plus faibles, elle figure aussi au nombre des pays où les coûts d'installation des lignes sont les plus bas. La plupart des pays ont atteint cet objectif, voire l'ont dépassé. . .

Les recettes en pourcentage du produit intérieur brut (PIB) mettent en évidence le rôle du secteur des télécommunications dans l'économie en général. Cet indicateur est influencé, dans une certaine mesure, par la taille du secteur des services dans chaque pays, ce secteur étant généralement un "gros" utilisateur de télécommunications. Ainsi, au Mozambique le secteur des services représente 55 pour cent du PIB, ce qui est nettement supérieur à la moyenne de l'Afrique subsaharienne. En conséquence, la part du secteur des télécommunications dans ce pays est aussi la plus élevée de la région.

Les investissements dans les télécommunications en pourcentage des recettes indiquent le pourcentage des recettes qui sont réinjectées dans le développement du réseau. Une proportion élevée est synonyme d'efficacité, puisque cela signifie que les coûts d'exploitation sont faibles et qu'en conséquence, on peut réinvestir davantage. Toutefois, cet indicateur peut lui aussi être influencé par la disparité des politiques en matière d'amortissement, d'imposition ou de crédits budgétaires publics. On a retenu un objectif de 40 pour cent, car il est apparu que cette proportion correspondait au minimum nécessaire pour assurer la croissance du réseau. Toutefois, pour atteindre des niveaux de croissance très élevés, il faut que la part des réinvestissements augmente en conséquence. On a choisi le total sur cinq ans (1990-94), afin de tenir compte des variations des structures des investissements. Il ressort des résultats que la plupart des pays n'ont toujours pas atteint le niveau de réinvestissement qui leur permettrait d'assurer une croissance durable de leurs réseaux. Si l'Afrique a obtenu des résultats décevants dans le secteur des télécommunications par rapport à d'autres pays en développement, c'est sans doute essentiellement parce qu'elle n'accorde pas l'importance voulue aux investissements destinés aux infrastructures.

Tableau 6: Indicateurs financiers

15 principaux marchés des télécommunications d'Afrique subsaharienne, 1994

	Recettes par ligne, dollars EU	Recettes en % du PIB	Investissements en % des recettes	
Pays	1994	1994	1990-1994	Classement
1 Botswana	1'366	1.8%	74%	2
2 Cameroun	708	0.7%	70%	14
3 Congo	2'005	2.6%	...	6
4 Côte d'Ivoire	1'089	1.8%	38%	10
5 Ethiopie	388	1.1%	17%	15
6 Gabon	2'631	2.1%	19%	4
7 Ghana	1'231	1.1%	21%	11
8 Kenya	1'131	3.7%	52%	1
9 Mozambique	1'124	4.5%	12%	6
10 Namibie	886	2.1%	29%	12
11 Nigéria	1'247	1.1%	34%	8
12 Sénégal	1'438	2.7%	18%	3
13 Tanzanie	794	3.2%	13%	13
14 Zambie	1'007	2.6%	20%	8
15 Zimbabwe	908	2.3%	42%	5
MOYENNE a)	**1'197**	**2.2%**	**31%**	
OBJECTIF	**750**	**1.5%**	**40%**	
MONDE b)	**643**	**1.9% c)**	**46%**	

Note: a) Moyennes simples (non pondérées) de 15 exploitants d'Afrique subsaharienne. b) Moyenne simple de 24 grands pays émergents autres qu'africains. c) 1993.

Source: Base de données des indicateurs des télécommunications mondiales de l'UIT.

10. Radiodiffusion

Il y a trois fois plus de téléviseurs que de lignes téléphoniques en Afrique. Si le marché de la télévision est intéressant sur le continent, c'est parce que de plus en plus de téléspectateurs sont disposés à payer pour recevoir la télévision à péage, même si les redevances sont bien supérieures à celles perçues pour le service téléphonique de base. Des sociétés de radiodiffusion étrangères et des entreprises locales prennent actuellement des dispositions pour satisfaire cette demande.

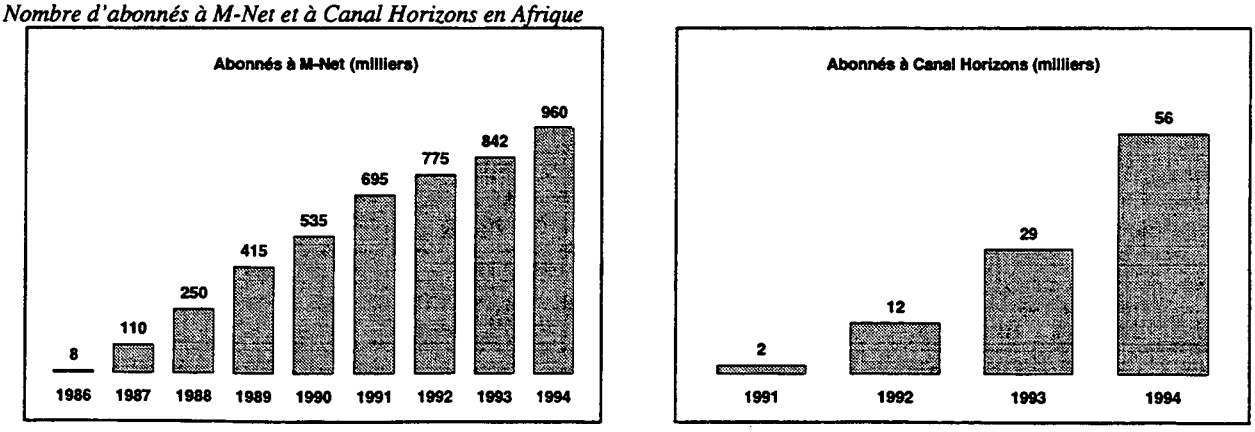
En octobre 1986, le réseau M-Net d'Afrique du Sud est devenu le premier réseau de télévision à péage de l'hémisphère Sud. En mars 1995, ce réseau comptait 930 000 abonnés en Afrique du Sud, au Botswana, en Egypte, au Ghana, au Lesotho, en Namibie, au Nigéria et en Ouganda. Les émissions M Net sont également retransmises dans 35 pays du continent et peuvent être reçues à l'aide d'antennes de satellites de réception directe pour particuliers. La société Multichoice, qui est rattachée à M Net, collabore avec des partenaires nationaux en vue de développer les services de télévision à péage. En 1995, elle a mis en oeuvre un service numérique de réception directe pour particuliers qui est assuré par l'intermédiaire du satellite PanAmSat 4 et qui peut être reçu sur tout le continent.

La société française Canal+, premier groupe télévisuel mondial (pour ce qui est du chiffre d'affaires), exerce ses activités en Afrique francophone par l'intermédiaire de sa filiale Canal Horizons. Elle compte des abonnés en Côte d'Ivoire, au Gabon, au Sénégal et en Tunisie et peut être reçue dans d'autres pays à l'aide de paraboles de satellites de réception directe pour particuliers (moyennant l'utilisation d'un décodeur, comme pour M-Net). La station francophone TV5 a commencé à diffuser ses émissions en 1993 par l'intermédiaire de systèmes de distribution par voie hertzienne (MDS) financés en partie par l'Etat canadien. Les programmes peuvent être reçus au Bénin, au Burkina Faso, en Côte d'Ivoire, au Gabon, au Mali, au Niger et au Sénégal. Si les systèmes MDS sont répandus en Afrique, c'est parce que les antennes de réception directe pour particuliers sont onéreuses et que les systèmes MDS peuvent être installés relativement rapidement. L'un des marchés les plus dynamiques pour les systèmes MDS est le Nigéria, où l'on recense environ 15 exploitants et une audience potentielle comprise entre 100 000 et un million de téléspectateurs.[10].

Le développement d'un réseau de communication homogène, assurant à la fois des services téléphoniques et de télévision à péage, permettrait de réaliser des économies (en évitant les infrastructures faisant double emploi) et de dégager davantage de recettes, ce qui libérerait des crédits supplémentaires pour l'expansion du réseau et justifierait la mise en place d'une infrastructure de communication large bande qui pourrait également être utilisée pour la transmission de textes, de données et d'images. Dans d'autres régions du monde, les PTO prennent une part active à l'établissement de réseaux de télévision par câble, alors que jusqu'à présent, les PTO africains ont tardé à saisir l'occasion qui s'offrait à eux. Outre qu'elle permettrait d'obtenir davantage de recettes et qu'elle justifierait l'établissement de réseaux large bande, la participation des PTO africains à la mise en place de réseaux de télévision présenterait plusieurs autres avantages. L'offre conjointe de services téléphoniques et de télévision attirerait sans doute plus de capitaux que la fourniture individuelle de chaque service. Les coûts seraient moindres en raison des économies d'échelle qu'un réseau de PTO opérant au niveau national permettrait de réaliser par rapport à un grand nombre d'opérateurs de télévision par câble isolés. De plus, les pouvoirs publics seraient sans doute plus favorables à cette option, étant donné que la transmission de programmes de télévision sur une infrastructure câblée permet d'assurer un certain contrôle du contenu, ce qui n'est pas le cas avec la réception directe par satellite.

Figure 10: La télévision à péage en Afrique

Nombre d'abonnés à M-Net et à Canal Horizons en Afrique



Note: M-Net compte des abonnés en Afrique du Sud, au Botswana, en Egypte, au Ghana, au Lesotho, en Namibie, au Nigéria et en Ouganda. Canal Horizons compte des abonnés en Côte d'Ivoire, au Gabon, au Sénégal et en Tunisie.

Source: Multichoice Limited, Canal+.

[10] Wittering, S. "MMDS, I presume." INTERNATIONAL CABLE, août 1994.

11. Internet

L'accès de l'Afrique au réseau mondial Internet se fait progressivement. Les premiers pays d'Afrique subsaharienne ont été raccordés à ce réseau en 1994 et 16 pays africains disposaient d'une connectivité directe avec Internet en décembre 1995. Environ 50 000 serveurs sont reliés au réseau mondial Internet, mais ils se trouvent pour la plupart (99 pour cent) en Afrique du Sud, laquelle figure parmi les 20 premiers pays classés d'après le nombre de noeuds Internet.

Bon nombre des initiatives de mise en réseau actuelles sont prises au niveau local, avec l'appui de la communauté internationale, et sont destinées aux milieux universitaires et scientifiques, encore que le secteur privé soit de plus en plus actif dans ce domaine. En règle générale, ces initiatives consistent à mettre des systèmes de courrier électronique à la disposition des chercheurs, l'objectif étant d'assurer, à terme, la connectivité avec Internet. On estime à environ 5 000 le nombre de comptes de courrier électronique en Afrique (compte non tenu de l'Afrique du Sud).

Les coûts élevés de l'infrastructure et des lignes louées figurent au nombre des facteurs qui freinent la connectivité avec Internet. Une réglementation contraignante et des droits de douane élevés sur les équipements importés, auxquels s'ajoute la pénurie de personnel qualifié, contribuent également à retarder l'établissement de l'accès à ce réseau. Le recours à des microstations pour assurer la connectivité avec Internet constitue à cet égard un progrès décisif, ces systèmes ayant besoin d'une largeur de bande raisonnable, moyennant un coût nettement inférieur à celui des lignes louées internationales.

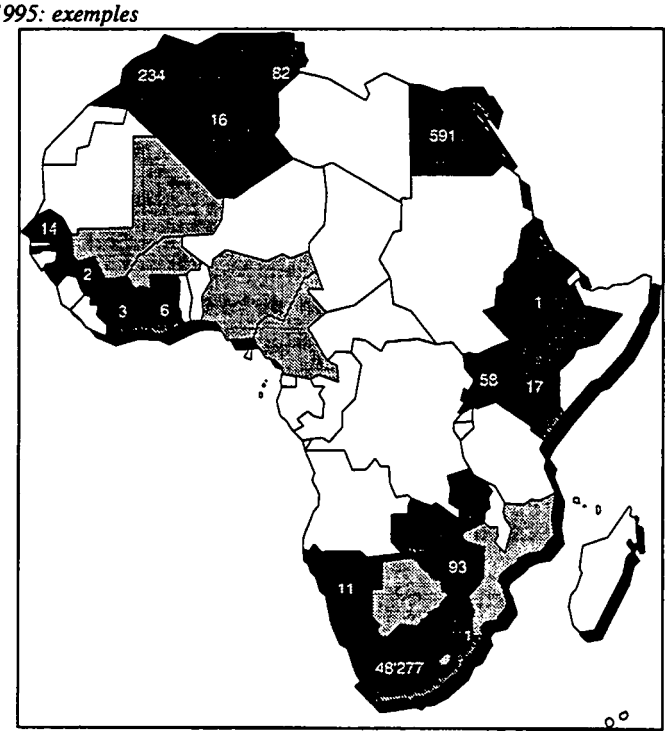
Le Colloque sur la télématique au service du développement, qui s'est tenu à Addis-Abeba en avril 1995, constitue une manifestation du plus haut intérêt pour accélérer la connectivité avec Internet. Cette réunion d'experts africains en informatique et en télécommunications, la plus importante qui ait jamais été organisée sur le continent, a permis de rassembler 31 administrations des télécommunications et un grand nombre de spécialistes de renom dans le domaine de la mise en réseau informatique. Conformément aux recommandations formulées au cours de ce Colloque, un Groupe de travail a été chargé de conseiller des décideurs sur la meilleure manière de relier l'Afrique à la nouvelle infrastructure mondiale de l'information. Un Livre blanc, intitulé *Building Africa's Information Highway* (Mise en place de l'autoroute de l'information en Afrique), doit être présenté aux Ministres africains de la planification en vue d'être mis en oeuvre.

Figure 11: Le réseau Internet en Afrique

Serveurs Internet et pays ayant accès à Internet, décembre 1995: exemples

Serveurs Internet en Afrique: exemples

Egypte	http: //ristec_www.com.eg Regional Information Technology and Software Engineering Centre
Kenya	http://www.arcc.or.ke African Regional Centre for Computing
Sénégal	http://senet.net Serveur www de Sonatel
Afrique du Sud	http: //www.telkom.co.za Serveur www de Telkom SA
Tunisie	URL: gopher://alyssa.rsnet.tn Serveur du logiciel de navigation de la Tunisie
Zambie	URL: gopher://gopher.unza.zm ZAMNET Zambian National Gopher



Note: Les parties hachurées foncées indiquent les pays disposant d'un raccordement direct avec le réseau mondial Internet, ainsi que le nombre de serveurs. Les parties hachurées claires indiquent les pays ayant accès indirectement à Internet.

Source: Adapté de Network Wizards (http://www.nw.com).

12. Solutions exogènes, solutions endogènes

L'Afrique a de tout temps constitué un centre d'intérêt pour *l'extérieur*, en partie en raison des relations qui remontent à l'époque coloniale, puis à cause de sa position géopolitique stratégique au moment des rivalités entre les grandes puissances et, plus récemment, par suite de l'attention que lui porte la communauté chargée du développement économique. Cette attention dont l'Afrique fait l'objet est illustrée par le fait que son réseau de télécommunication est dans l'ensemble nettement plus développé pour les communications internationales que pour les communications nationales ou régionales. Le nombre de minutes de trafic international par abonné en Afrique figure parmi les plus élevés du monde, alors qu'il y a peu d'abonnés au téléphone, que l'état des installations extérieures demeure médiocre et que le trafic local et national n'est pas fiable.

L'intérêt que le reste du monde porte à l'Afrique va s'amenuisant. La participation de l'extérieur en Afrique est en pleine évolution. Ainsi, dans le domaine des télécommunications, le niveau de l'assistance multilatérale a diminué par suite de la nouvelle ligne d'action suivie par les organismes de développement, en vertu de laquelle les investissements privés doivent contribuer davantage au développement des infrastructures[11]. Compte tenu du peu de ressources dont elle dispose l'Afrique se trouve confrontée à un dilemme: accepter une réduction des crédits destinés aux investissements ou ouvrir ses marchés de télécommunication à des investisseurs étrangers, même si elle n'est pas encore tout à fait prête à agir dans ce sens. Rares sont les pays africains qui ont mené à bonne fin tous les travaux préparatoires nécessaires, dans le domaine de la réglementation, pour libéraliser leur secteur des télécommunications, par exemple en créant un organe de réglementation indépendant. En outre, il est à peu près certain que les nouveaux investisseurs intéressés par la région privilégieront avant tout les segments lucratifs du marché, tels que les communications internationales et mobiles, au lieu de développer les réseaux nationaux ou d'assurer la desserte des zones rurales. En conséquence, le moment est peut-être venu pour l'Afrique de rechercher des solutions *endogènes*, afin que ses habitants aient plus largement accès aux télécommunications.

Un certain nombre de facteurs communs sont à l'origine des bons résultats qui ont été obtenus dans le domaine des télécommunications dans d'autres régions du monde, à savoir:

- la **demande** intérieure est stimulée par la hausse des revenus. S'il est vrai que les niveaux moyens de revenu ont à peine augmenté en Afrique, il n'en reste pas moins que la demande est suffisamment importante pour justifier la construction de réseaux bien plus vastes que ceux qui existent actuellement. En conséquence, on ne peut faire valoir que la croissance est lente en Afrique en raison de l'insuffisance de la demande;
- il existe une **volonté politique** de procéder à des investissements dans les infrastructures et d'entreprendre une réforme sectorielle. Or, récemment encore, cette volonté était pour ainsi dire inexistante sur le continent. Les Ministères des postes et télécommunications jouissent rarement d'un statut important au sein des gouvernements et il arrive qu'on ne les consulte pas pour de grandes décisions telles que les programmes de privatisation. Certains signes donnent cependant à penser que cette situation est en train d'évoluer. Quelques pays ont engagé une restructuration du secteur et la liste ne fait qu'augmenter;
- **il existe un véritable esprit d'entreprise au niveau local.** En Asie et en Amérique latine, le regain de dynamisme que connaît le secteur des télécommunications est dû en grande partie aux entreprises locales ou aux réseaux familiaux qui ont créé des groupements, afin de réunir des capitaux nationaux et étrangers. En Afrique, cet esprit d'entreprise a presque toujours fait défaut. Le monopole tout-puissant qu'exerce l'Etat pour la fourniture de services de télécommunication n'a favorisé ni les initiatives locales, ni l'entraide collective. On pensait que si l'Etat n'assurait pas le service, personne ne le ferait. Cette confiance dans la toute puissance de l'Etat commence aujourd'hui à s'estomper en Afrique, en partie à cause des progrès de la démocratie, mais aussi parce que, dans la plupart des pays africains, les pouvoirs publics n'ont pas tenu leurs promesses. En conséquence, il leur faut encourager les chefs d'entreprise à participer aux télécommunications, en faisant en sorte que les règles soient plus transparentes et plus

11 "A greater role for the private sector is being promoted explicitly as the Bank moves to suport and catalyze private sector activities." Voir la Banque mondiale, 1994, *Rapport annuel 1994*, Banque mondiale, Washington D.C.

stables et qu'elles soient moins soumises au bon vouloir des individus et aux changements de gouvernement.

Le premier des trois "mécanismes de déclenchement" évoqués plus haut est déjà présent dans la région, le deuxième peut être mis en place sous l'effet de pressions extérieures et grâce à la création de modèles au niveau local, mais le troisième doit émaner de l'Afrique elle-même. Le présent rapport a exposé un certain nombre d'initiatives, qui montrent que l'esprit d'entreprise commence enfin à se développer dans le secteur des télécommunications africaines:

- un exemple d'initiative prise récemment pour améliorer l'accès aux télécommunications nous est offert par la **libéralisation du marché des publiphones** (voir l'encadré 5). Il existe depuis longtemps un marché parallèle pour la revente des services téléphoniques, qui s'est développé dans le secteur informel de l'économie. La libéralisation des publiphones ne fait qu'encourager cette activité et légitime les chefs d'entreprise qui en tirent leurs revenus. Les téléboutiques au Maroc, les télécentres au Sénégal et les publiphones privés en Tanzanie constituent autant d'exemples d'initiatives locales et de créations d'emplois. De telles initiatives contribuent à une meilleure utilisation de la capacité existante en vue de raccorder davantage d'abonnés et à la baisse des tarifs pour rendre les télécommunications plus abordables;

- le développement d'**Internet** en Afrique est un bon exemple d'initiative locale et illustre bien l'enthousiasme et la participation active qui prévalent envers et contre tout. Lorsque les réseaux de communication de données officiels sont pratiquement inexistants, il faut agir par ses propres moyens. S'il est vrai que certaines initiatives ont été prises par des organisations internationales, les milieux universitaires et différents chefs d'entreprise au niveau local ont eux aussi joué un rôle très actif à cet égard. La notion d'initiative personnelle propre à Internet est un aspect qui a trop longtemps été méconnu dans les télécommunications africaines;

- dans le domaine de la **radiodiffusion**, des initiatives locales à petite échelle permettent de répondre à la demande de divertissements et d'informations. Il est relativement bon marché d'établir un système de distribution à hyperfréquences pour la radiodiffusion télévisuelle locale, ou d'installer une parabole pour capter des programmes de réception directe pour particuliers, ou encore de mettre en place un câble pour raccorder des foyers voisins moyennant une redevance d'abonnement modeste. Il existe une forte demande pour la télévision dans la région et cette demande peut aisément être rentabilisée;

- au niveau officiel, la création de consortiums pour la fourniture de **services de communications mobiles** aide également les entreprises locales à s'adapter à la situation. Celles-ci participent à des consortiums au Ghana, en Guinée, en Afrique du Sud et en Ouganda notamment.

Ces initiatives prises individuellement peuvent paraître insignifiantes, mais elles contribuent dans l'ensemble à imposer une nouvelle manière de conduire les affaires. Au lieu de toujours s'en remettre à autrui ou à l'Etat pour obtenir de l'aide, les chefs d'entreprise en viennent peu à peu à compter avant tout sur eux-mêmes. Il se peut que des projets de grande envergure comme l'installation de câbles en fibres optiques ou la privatisation d'un exploitant public continuent de retenir l'attention, mais à long terme, ce sont les initiatives locales qui apporteront les avantages les plus durables.

Sous l'angle de la politique générale, cette évolution pose un problème. Le secteur informel est plus prospère lorsqu'on le laisse faire que lorsqu'on le soumet à de grandes orientations politiques. Les décideurs voudront peut-être fermer les yeux sur certains systèmes semi légaux en vigueur actuellement. Ainsi, la plupart des fournisseurs d'accès à Internet de la région exercent sans doute leurs activités de manière illégale, parce qu'ils ne respectent peut être pas les restrictions d'utilisation applicables à la revente de capacité de lignes louées et à l'interconnexion de ces lignes avec le réseau public. De même, les opérateurs de services de rappel agissent dans une "zone grise", qui se situe entre ce qui est permis et ce qui ne l'est pas.

Les décideurs et les donateurs internationaux peuvent apporter une assistance dans ce domaine en accordant des crédits à des taux d'intérêt peu élevés. Ils peuvent également obliger les investisseurs étrangers désireux d'exercer des activités dans la région à s'associer avec des entreprises locales. En outre, les décideurs peuvent favoriser indirectement l'esprit d'entreprise, en encourageant le principal opérateur public à acquérir, auprès d'entreprises locales, une plus grande partie des services que celui ci fournit lui même, par exemple l'installation de lignes, la maintenance et l'entretien ou le recouvrement de créances.

La tâche qui attend les gouvernements africains, à savoir passer de la fourniture à la réglementation des services de télécommunication, est considérable. Il n'existe guère de tradition en matière de réglementation dans la région et les compétences en la matière sont limitées. Les donateurs internationaux, qui se sont empressés de promouvoir la privatisation et la libéralisation du marché, devraient étayer leurs principes d'une assistance concrète, en vue de dispenser une formation aux responsables de la réglementation et de garantir la transparence et la stabilité de l'environnement des télécommunications africaines. Pour toute réforme des télécommunications, l'*enchaînement* des opérations revêt une importance capitale. En principe, il faut d'abord séparer les Postes des télécommunications et privatiser l'exploitant en place. Il convient ensuite de créer un organisme indépendant pour la réglementation. La libéralisation du marché en vue de créer un marché d'équipements de télécommunication compétitif et de promouvoir le développement de services à valeur ajoutée constitue généralement l'étape suivante. Ce n'est que si ces différentes étapes ont été menées à bonne fin que la privatisation et l'ouverture à la concurrence des infrastructures porteront pleinement les fruits que les décideurs espèrent recueillir. Or, on attend des gouvernements africains qu'ils réalisent en quelques années ce que d'autres pays ont mis des décennies à accomplir.

Un système réglementaire approprié peut encourager les investissements nationaux et étrangers, tout en favorisant le développement intérieur. En conséquence, il s'agira de structurer des dispositions réglementaires adaptées au marché africain. Elles ne devront pas être trop restrictives au risque de décourager les initiatives locales décrites plus haut. Parallèlement, elles devront dissuader de nouveaux concurrents du marché de ne desservir que les zones rentables, en veillant à ce qu'il soient également tenus de répondre aux besoins des zones mal desservies. La tâche qui consiste à mettre fin au cycle d'une croissance lente et d'investissements peu élevés est loin d'être facile, mais les responsables africains doivent miser de plus en plus sur leurs concitoyens pour favoriser un nouveau départ.

Encadré 5: Evolution des publiphones en Afrique

On recense à peine plus de 100 000 publiphones (à pièces, à cartes et publics) en Afrique, soit environ un pour cent de l'ensemble des lignes téléphoniques principales, dont près de 60 pour cent se trouvent en Afrique du Sud, 25 pour cent en Afrique du Nord et le reste en Afrique subsaharienne. Si la croissance des publiphones a été forte dans certains pays, c'est parce que l'on a admis qu'ils contribuaient à améliorer l'accès dans une région où les télécommunications sont insuffisantes et où les lignes individuelles sont rares. Les publiphones à cartes sont de plus en plus répandus, car ils permettent de limiter les actes de vandalisme et l'utilisation de fausses pièces. En outre, le marché africain des publiphones est l'un des rares qui ait été ouvert à la libéralisation.

Divers projet ambitieux d'installation de publiphones sont en cours d'exécution. Ainsi, la Côte d'Ivoire installe actuellement 1 300 publiphones à cartes dans tout le pays. Le Swaziland projette, quant à lui, d'en mettre en place 2 000 d'ici à la fin de la décennie. En Afrique du Sud, où les opérateurs de systèmes cellulaires sont tenus de fournir des publiphones en vertu d'accords de licence, il est prévu d'atteindre une densité d'un publiphone pour 1 000 habitants dans les zones rurales, et de 2 publiphones pour 1 000 dans les zones urbaines.

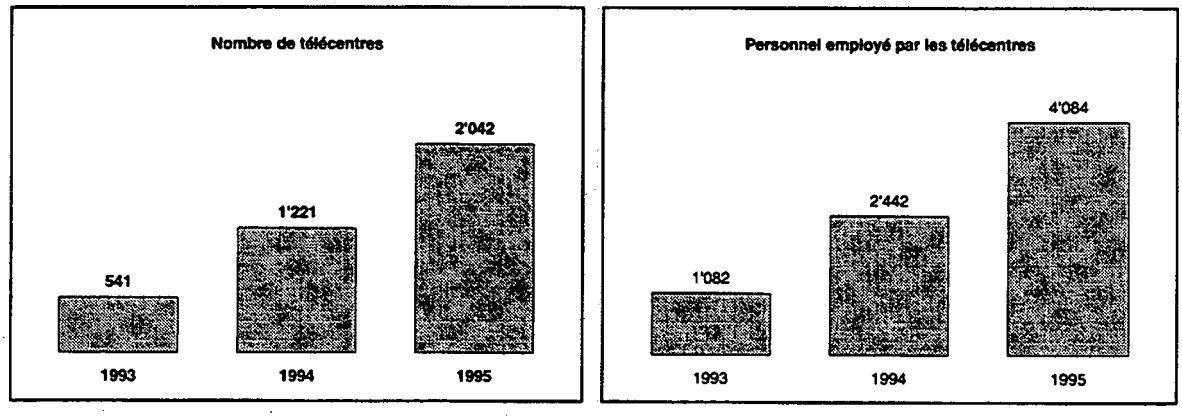
Le marché des publiphones fait l'objet actuellement d'une libéralisation dans plusieurs pays de la région. Cette libéralisation consiste notamment à autoriser des sociétés privées à installer et à exploiter des publiphones et à permettre à des chefs d'entreprise d'offrir des services de télécommunication depuis des kiosques téléphoniques. Cinq opérateurs de publiphones ont été agréés au Nigeria, tandis qu'en Tanzanie, une entreprise privée projette d'installer 500 publiphones à cartes. Le gouvernement danois finance actuellement au Mozambique un programme visant à installer 500 publiphones dans des commerces, pour un montant de 7 000 dollars EU l'unité. Les commerçants seront autorisés à conserver 15 pour cent des recettes ainsi obtenues.

La pénurie de postes téléphoniques sur le continent a encouragé la revente de services sur des lignes privées. Ainsi, au Ghana, on estime que plus d'une centaine d'hôtels et de petits détaillants revendent des services téléphoniques. Un certain nombre de pays cautionnent actuellement ce type d'activité en octroyant des licences pour l'exploitation de kiosques publics. Ces centres gérés par des chefs d'entreprise offrent toute une gamme de services de télécommunication, comme le téléphone, la télécopie et le télex. Au Sénégal, on dénombre plus de 3 200 télécentres comptant plus de 4 000 employés (effectifs supérieurs à ceux de l'exploitant national du téléphone)[12].

Les télécentres font cependant l'objet d'une controverse. Au Cameroun, les publiphones existants ne sont guère utilisés, même si les tarifs appliqués dans les télécentres sont censés être 50 fois plus élevés. La multiplication de télécentres "pirates" a fait *baisser* les tarifs par rapport à ceux qui sont appliqués par l'entreprise téléphonique nationale. La conversion d'une ligne louée en plusieurs lignes (par exemple en installant un autocommutateur privé et en procédant au multiplexage du trafic) permet à un chef d'entreprise de percevoir des taxes auprès de plusieurs clients, en ne payant que pour une seule ligne. Les activités de ces télécentres non agréés entraînent parfois un encombrement du trafic et peuvent aboutir au non paiement des factures relatives aux communications internationales. Le fait est qu'il existe une très forte demande pour le service téléphonique, demande que le PTO ne parvient pas à satisfaire dans le cadre de son service normal.

Figure de l'encadré 5: Télécentres privés au Sénégal

Nombre de télécentres privés et d'employés estimés, Sénégal, 1993-1995



Source: African Telecommunication Observatory.

[12] Pour les PTO, les avantages financiers sont eux aussi importants. Au Sénégal, les télécentres représentent environ 5,5 pour cent des recettes des PTO nationaux. Les télécentres apportent également des avantages socio-économiques, dans la mesure, notamment, où ils démocratisent le téléphone, où ils apportent une aide aux petites entreprises et où ils fournissent des services à valeur ajoutée (télécopie, accès à Internet). Voir Zongo, G. 1996. *Social-economic and financial impact of private telecentres: The case of Senegal.* Communication présentée au cours de l'atelier ICTP/UIT sur l'évaluation économique de l'incidence des télécommunications sur le développement (Trieste, Italie, 26 février - 1er mars 1996).

AFRICAN TELECOMMUNICATION INDICATORS

INDICATEURS DES TELECOMMUNICATIONS AFRICAINES

II. TELECOMMUNICATION INDICATORS

Introduction ..... II-v
List of countries ..... II-vi
1. Basic indicators II-1
2. Main telephone lines II-2
3. Waiting list II-3
4. Local telephone network II-4
5. Tele-accessibility II-5
6. Urban main lines II-6
7. Telephone tariffs II-7
8. Cellular indicators II-8
9. International telephone traffic II-9
10. African call charges II-10
11. African telephone traffic II-12
12. Text communications II-14
13. Telecommunication staff II-15
14. Telecommunications revenue II-16
15. Telecommunications investment II-17
16. Multimedia II-18
17. Projections II-19
18. Africa's top telecommunication operators ... II-20

Country tables II-21
Technical notes II-77
Data Sources II-88

II. INDICATEURS DES TELECOMMUNICATIONS

Introduction ..... II-v
Liste des pays ..... II-vi
1. Indicateurs de base II-1
2. Lignes téléphoniques principales II-2
3. Liste d'attente II-3
4. Réseau téléphonique local II-4
5. Accès au téléphone II-5
6. Lignes principales urbaines II-6
7. Tarifs téléphoniques II-7
8. Indicateurs cellulaires II-8
9. Trafic téléphonique international II-9
10. Coûts des appels africains. II-10
11. Trafic téléphonique africain. II-12
12. Transmission de texte II-14
13. Personnel des télécommunications II-15
14. Recettes des télécommunications. II-16
15. Investissements en télécommunication II-17
16. Multimédia II-18
17. Prévisions II-19
18. Premiers exploitants des télécommunications en Afrique II-20

Tableaux par pays II-21
Notes techniques II-82
Sources des données II-88

Introduction

This document provides data for 55 African countries and territories classified by the United Nations as being in the African region. Regional totals and averages are provided for *Sub-Saharan Africa* and *North Africa* (see *List of Economies*).

Substantial effort has been made to collect and harmonise the data. The origins of the data are explained in *Sources*. Because of differences in national statistical practices, strict comparability is not always possible. Additional explanations and definitions are provided in the *Technical Notes*.

Data generally refer to the end of the calendar year indicated. For exceptions see the individual country pages where the fiscal year period is shown.

The following signs and symbols are used in the document:

italic	Estimate
k	Thousands (e.g., 1'000)
M	Millions (e.g., 1'000'000)
B	Billions (e.g., 1'000'000'000)
US$	United States dollars. See the *Technical notes* for how US$ figures are obtained.
%	Per cent
-	Zero or a quantity less than half the unit shown. Also used for data items that are not applicable.
...	Data not available
CAGR	Compound Annual Growth Rate. See the *Technical notes* for how this is computed.

The absence of any sign or symbol indicates that data are in units.

Please address comments to:

Information Systems Unit
Telecommunication Development Bureau (BDT)
International Telecommunication Union
CH-1211 Geneva 20, Switzerland
Fax: + 41 22 / 730 6449

Introduction

Ce document contient des données pour 55 pays africains et territoires faisant partie de l'Afrique, selon le classement établi par l'Organisation des Nations Unies. Des chiffres globaux et des moyennes sont donnés pour deux régions: *l'Afrique subsaharienne* et *l'Afrique du Nord* (Voir la *Liste de pays*).

Des efforts importants ont été accomplis en vue d'obtenir et d'harmoniser ces données. La rubrique *Source* fournit des explications sur la provenance des données. Les différences qui existent dans les pratiques statistiques nationales ne permettent pas toujours une comparabilité rigoureuse. De plus, on trouvera des explications ainsi que des définitions supplémentaires dans les *Notes techniques*.

Les données se réfèrent en général à la fin de l'année civile indiquée. Pour les exceptions, on se reportera aux *tableaux par pays* où l'année budgétaire est mentionnée.

Les signes et symboles suivants sont utilisés dans le document:

italiques	Estimations
k	Milliers (par exemple, 1'000)
M	Millions (par exemple, 1'000'000)
B	Milliards (par exemple, 1'000'000'000)
US$	Dollars des Etats-Unis. Pour l'obtention des chiffres exprimés en US$, on se reportera aux *Notes techniques*.
%	Pourcentage
-	Zéro ou grandeur inférieure à la moitié de l'unité indiquée. S'applique aussi aux données sans objet.
...	Données non disponibles
TCAC	Taux de croissance annuelle composé. Pour le calcul, on se reportera aux *Notes techniques*.

Prière d'envoyer les remarques éventuelles à l'adresse suivante:

Unité des Systèmes d'Information
Bureau de développement des télécommunications (BDT)
Union internationale des télécommunications
CH-1211 Genève 20, Suisse
Fax.: + 41 22 / 730 6449

List of countries / Liste des pays

English designation / Dénomination anglaise	*French designation / Dénomination française*	*Designation in document / Dénomination dans le document*
Algeria (People's Democratic Republic of)	Algérie (République algérienne démocratique et populaire)	Algeria / Algérie
Egypt (Arab Republic of)	Egypte (République arabe d')	Egypt / Egypte
Libya (Socialist People's Libyan Arab Jamahiriya)	Libye (Jamahiriya arabe libyenne populaire et socialiste)	Libya / Libye
Morocco (Kingdom of)	Maroc (Royaume du)	Morocco / Maroc
Tunisia	Tunisie	Tunisia / Tunisie
North Africa	**Afrique du Nord**	**North / Nord**
South Africa (Republic of)	Sudafricaine (République)	South Africa / Sudafricaine (Rép.)
South Africa	**Afrique du Sud**	**South Africa / Afrique du Sud**
Angola (People's Republic of)	Angola (République populaire d')	Angola
Benin (Republic of)	Bénin (République du)	Benin / Bénin
Botswana (Republic of)	Botswana (République du)	Botswana
Burkina Faso	Burkina Faso	Burkina Faso
Burundi (Republic of)	Burundi (République du)	Burundi
Cameroon (Republic of)	Cameroun (République du)	Cameroon / Cameroun
Cape Verde (Republic of)	Cap-Vert (République du)	Cape Verde / Cap-Vert
Central African Republic	Centrafricaine (République)	Central African Rep. / Rép. Centrafricaine
Chad (Republic of)	Tchad (République du)	Chad / Tchad
Comoros (Islamic Federal Republic of the)	Comores (République fédérale islamique des)	Comoros / Comores
Congo (Republic of the)	Congo (République du)	Congo
Côte d'Ivoire (Republic of)	Côte d'Ivoire (République de)	Côte d'Ivoire
Djibouti (Republic of)	Djibouti (République de)	Djibouti
Equatorial Guinea (Republic of)	Guinée équatoriale (République de)	Equatorial Guinea / Guinée équatoriale
Eritrea	Erythrée	Eritrea / Erythrée
Ethiopia	Ethiopie	Ethiopia / Ethiopie
Gabonese Republic	Gabonaise (République)	Gabon
Gambia (Republic of the)	Gambie (République de)	Gambia / Gambie
Ghana	Ghana	Ghana
Guinea (Republic of)	Guinée (République de)	Guinea / Guinée
Guinea-Bissau (Republic of)	Guinée-Bissau (République de)	Guinea-Bissau / Guinée-Bissau
Kenya (Republic of)	Kenya (République du)	Kenya
Lesotho (Kingdom of)	Lesotho (Royaume du)	Lesotho
Liberia (Republic of)	Libéria (République du)	Liberia / Libéria
Madagascar (Democratic Republic of)	Madagascar (République démocratique de)	Madagascar
Malawi	Malawi	Malawi
Mali (Republic of)	Mali (République du)	Mali
Mauritania (Islamic Republic of)	Mauritanie (République islamique de)	Mauritania / Mauritanie
Mauritius (Republic of)	Maurice (République de)	Mauritius / Maurice
Mayotte	Mayotte	Mayotte
Mozambique (Republic of)	Mozambique (République du)	Mozambique
Namibia (Republic of)	Namibie (République de)	Namibia / Namibie
Niger (Republic of the)	Niger (République du)	Niger
Nigeria (Federal Republic of)	Nigéria (République fédérale du)	Nigeria / Nigéria
Reunion (French Department of)	Réunion (Département français de la)	Réunion
Rwandese Republic	Rwandaise (République)	Rwanda
Sao Tome & Principe (Democratic Republic of)	Sao Tomé-et-Principe (République démocratique de)	S. Tome & Principe / Sao Tomé-et-Principe
Senegal (Republic of)	Sénégal (République du)	Senegal / Sénégal
Seychelles (Republic of)	Seychelles (République des)	Seychelles
Sierra Leone	Sierra Leone	Sierra Leone
Somali Democratic Republic	Somalie (République démocratique)	Somalia / Somalie
Sudan (Republic of the)	Soudan (République du)	Sudan / Soudan
Swaziland (Kingdom of)	Swaziland (Royaume du)	Swaziland
Tanzania (United Republic of)	Tanzanie (République-Unie de)	Tanzania / Tanzanie
Togolese Republic	Togolaise (République)	Togo
Uganda (Republic of)	Ouganda (République de l')	Uganda / Ouganda
Zaire (Republic of)	Zaïre (République du)	Zaire / Zaïre
Zambia (Republic of)	Zambie (République de)	Zambia / Zambie
Zimbabwe (Republic of)	Zimbabwe (République du)	Zimbabwe
Sub-Saharan Africa	**Afrique subsaharienne**	**Sub-Saharan / Subsaharienne**

1. Basic indicators / Indicateurs de base

	Population		GDP / PIB		Main telephone lines / Lignes téléphoniques principales	
	Total (M) 1994	Density / Densité (per/par km²) 1994	Total (B US$) 1994	per capita / par habitant (US$) 1994	Total (k) 1994	per 100 inhabitants / pour 100 habitants 1994
1 Algeria/Algérie	27.33	11	42.3	1'548	1'122.4	4.11
2 Egypt/Egypte	57.56	58	39.2	682	2'456.2	4.27
3 Libya/Libye	5.22	3	21.9 [89]	4'990	264.0	5.06
4 Morocco/Maroc	26.49	40	31.5	1'189	992.8	3.75
5 Tunisia/Tunisie	8.82	54	13.7	1'550	474.3	5.38
North / Nord	**125.41**	**21**	**148.6**	**1'193**	**5'309.6**	**4.23**
6 South Africa/Sudafricaine (Rép.)	41.59	35	121.9	2'931	3'844.5	9.24
South Africa / Afrique du Sud	**41.59**	**35**	**121.9**	**2'931**	**3'844.5**	**9.24**
7 Angola	10.67	9	9.2 [90]	997	53.3 [93]	0.52
8 Benin/Bénin	5.25	47	1.5	290	23.9	0.46
9 Botswana	1.44	3	3.8	2'666	50.4	3.50
10 Burkina Faso	10.05	37	2.8 [93]	288	26.3	0.26
11 Burundi	6.21	223	0.9	142	15.8	0.25
12 Cameroon/Cameroun	12.87	27	5.8	454	58.2	0.45
13 Cape Verde/Cap-Vert	0.38	94	0.3	876	18.6	4.87
14 Central African Rep./Centrafricaine (Rép.)	3.24	5	1.0	303	7.4	0.23
15 Chad/Tchad	6.18	5	0.9	147	4.7	0.08
16 Comoros/Comores	0.49	260	0.2	435	4.3	0.88
17 Congo	2.52	7	1.6	627	20.6	0.82
18 Côte d'Ivoire	13.78	43	6.7	487	108.4	0.79
19 Djibouti	0.57	26	0.5 [93]	835	7.5	1.33
20 Equatorial Guinea/Guinée équatoriale	0.39	14	0.1	318	2.5	0.65
21 Eritrea/Erythrée	3.44	37	0.5 [93]	150	15.2	0.44
22 Ethiopia/Ethiopie	53.44	44	5.0	94	137.7	0.26
23 Gabon	1.04	4	3.9	3'812	31.4	3.03
24 Gambia/Gambie	1.08	101	0.4	347	18.3	1.69
25 Ghana	16.94	71	5.4	320	50.0	0.30
26 Guinea/Guinée	6.50	26	3.6	547	9.3	0.14
27 Guinea-Bissau/Guinée-Bissau	1.05	29	0.2	231	9.0	0.86
28 Kenya	26.02	45	7.0	267	228.5	0.88
29 Lesotho	2.00	66	0.9	444	12.2 [93]	0.63
30 Liberia/Libéria	2.94	26	1.2 [89]	479	4.5 [93]	0.16
31 Madagascar	13.10	22	2.8	215	33.7	0.26
32 Malawi	10.84	115	2.0 [93]	193	33.1	0.31
33 Mali	9.52	8	1.9	196	15.2	0.16
34 Mauritania/Mauritanie	2.22	2	1.0	463	8.4	0.38
35 Mauritius/Maurice	1.10	592	3.5	3'134	129.4	11.72
36 Mayotte	0.10	278	...	...	4.0 [93]	3.98
37 Mozambique	16.61	21	1.4	87	57.2	0.34
38 Namibia/Namibie	1.50	2	2.9	1'923	69.8	4.65
39 Niger	8.85	7	1.5	174	12.5	0.14
40 Nigeria/Nigéria	107.90	117	44.5	412	368.7	0.34
41 Réunion	0.64	256	...	...	198.5 [93]	31.37
42 Rwanda	7.75	294	1.5 [93]	198	15.0	0.19
43 S. Tomé & Principe/Sao Tomé-et-Principe	0.13	130	-	231	2.5	1.97
44 Senegal/Sénégal	8.10	41	3.9	479	72.1	0.89
45 Seychelles	0.07	181	0.5	6'229	12.5	17.08
46 Sierra Leone	4.59	63	0.8	178	15.8	0.34
47 Somalia/Somalie	9.08	14	0.9 [90]	101	15.0	0.17
48 Sudan/Soudan	27.36	11	4.3 [92]	165	64.0	0.23
49 Swaziland	0.91	52	1.1	1'216	18.6	2.05
50 Tanzania/Tanzanie	28.85	31	2.4 [93]	85	88.3	0.31
51 Togo	4.01	71	1.0	243	21.4	0.53
52 Uganda/Ouganda	18.59	79	4.5	244	34.9	0.19
53 Zaire/Zaïre	42.55	18	7.5 [90]	201	36.0	0.08
54 Zambia/Zambie	9.20	12	3.0	330	79.8	0.87
55 Zimbabwe	11.00	28	4.9 [93]	459	134.8	1.23
Sub-Saharan / Subsaharienne	**533.04**	**23**	**161.4**	**309**	**2'459.3**	**0.46**
AFRICA / AFRIQUE	**700.03**	**23**	**431.8**	**628**	**11'613.4**	**1.66**

Note: For data comparability and coverage, see the technical notes /
Pour la comparabilité et le champ de définition des données, voir les notes techniques.

Source: ITU, UN, IMF, World Bank / UIT, ONU, FMI, Banque mondiale.

2. Main telephone lines / Lignes téléphoniques principales

	Main telephone lines / Lignes téléphoniques principales (k)			*Main telephone lines per 100 inhabitants / Lignes principales pour 100 habitants*		
	1990	*1994*	*CAGR / TCAC (%) 1990-94*	*1990*	*1994*	*CAGR / TCAC (%) 1990-94*
1 Algeria/Algérie	794.3	1'122.4	9.0	3.19	4.11	6.6
2 Egypt/Egypte	1'602.1	2'456.2	11.3	3.01	4.27	9.1
3 Libya/Libye	220.0	264.0	4.7	4.84	5.06	1.1
4 Morocco/Maroc	402.4	992.8	25.3	1.65	3.75	22.7
5 Tunisia/Tunisie	301.3	474.3	12.0	3.73	5.38	9.6
North / Nord	**3'320.1**	**5'309.6**	**12.5**	**2.88**	**4.23**	**10.1**
6 South Africa/Sudafricaine (Rép.)	3'315.0	3'844.5	3.8	8.73	9.24	1.4
South Africa / Afrique du Sud	**3'315.0**	**3'844.5**	**3.8**	**8.73**	**9.24**	**1.4**
7 Angola	70.0	53.3 [93]	-8.7	0.76	0.52 [93]	-12.0
8 Benin/Bénin	14.8	23.9	12.8	0.32	0.46	9.4
9 Botswana	26.4	50.4	17.6	2.07	3.50	14.0
10 Burkina Faso	16.2	26.3	12.9	0.18	0.26	9.8
11 Burundi	8.0	15.8	18.7	0.14	0.25	15.2
12 Cameroon/Cameroun	40.2	58.2	9.7	0.35	0.45	6.7
13 Cape Verde/Cap-Vert	8.2	18.6	22.5	2.42	4.87	19.1
14 Central African Rep./Centrafricaine (Rép.)	5.0	7.4	10.2	0.17	0.23	7.4
15 Chad/Tchad	4.0	4.7	4.1	0.07	0.08	1.4
16 Comoros/Comores	3.3	4.3	7.0	0.75	0.88	4.0
17 Congo	15.9	20.6	6.7	0.71	0.82	3.6
18 Côte d'Ivoire	72.8	108.4	10.5	0.61	0.79	6.7
19 Djibouti	5.7	7.5	7.1	1.10	1.33	4.7
20 Equatorial Guinea/Guinée équatoriale	1.3	2.5	17.9	0.37	0.65	15.0
21 Eritrea/Erythrée	...	15.2	...	...	0.44	...
22 Ethiopia/Ethiopie	125.4	137.7	2.4	0.26	0.26	-0.6
23 Gabon	20.8	31.4	10.9	2.17	3.03	8.7
24 Gambia/Gambie	6.2	18.3	31.3	0.67	1.69	26.2
25 Ghana	44.2	50.0	3.1	0.29	0.30	-
26 Guinea/Guinée	11.3	9.3	-4.7	0.20	0.14	-7.6
27 Guinea-Bissau/Guinée-Bissau	6.0	9.0	10.8	0.62	0.86	8.5
28 Kenya	175.1	228.5	6.9	0.75	0.88	4.0
29 Lesotho	12.4	12.2 [93]	-0.4	0.69	0.63 [93]	-3.1
30 Liberia/Libéria	...	4.5 [93]	...	...	0.16 [93]	...
31 Madagascar	31.5	33.7	1.6	0.27	0.26	-1.2
32 Malawi	26.6	33.1	5.6	0.28	0.31	1.8
33 Mali	11.2	15.2	8.0	0.13	0.16	4.9
34 Mauritania/Mauritanie	5.9	8.4	9.5	0.29	0.38	6.7
35 Mauritius/Maurice	55.6	129.4	23.5	5.26	11.72	22.2
36 Mayotte	2.8	4.0 [93]	12.8	3.14	3.98 [93]	8.2
37 Mozambique	47.4	57.2	4.8	0.34	0.34	0.7
38 Namibia/Namibie	53.0	69.8	7.1	3.93	4.65	4.3
39 Niger	9.3	12.5	7.7	0.12	0.14	4.1
40 Nigeria/Nigéria	289.2	368.7	6.3	0.30	0.34	3.2
41 Réunion	162.4	198.5 [93]	6.9	26.88	31.37 [93]	5.3
42 Rwanda	10.4	15.0	9.6	0.15	0.19	6.8
43 S. Tomé & Principe/Sao Tomé-et-Principe	2.2	2.5	2.8	1.92	1.97	0.7
44 Senegal/Sénégal	44.3	72.1	12.9	0.60	0.89	10.1
45 Seychelles	8.7	12.5	9.5	12.40	17.08	8.3
46 Sierra Leone	13.3	15.8	4.4	0.32	0.34	1.8
47 Somalia/Somalie	15.0	15.0	-	0.17	0.17	-1.1
48 Sudan/Soudan	62.0	64.0	0.8	0.25	0.23	-1.9
49 Swaziland	13.7	18.6	8.0	1.73	2.05	4.4
50 Tanzania/Tanzanie	73.0	88.3	4.9	0.29	0.31	1.8
51 Togo	10.5	21.4	19.4	0.30	0.53	15.7
52 Uganda/Ouganda	27.9	34.9	5.8	0.17	0.19	3.1
53 Zaire/Zaïre	34.0	36.0	1.4	0.09	0.08	-1.8
54 Zambia/Zambie	65.1	79.8	5.2	0.80	0.87	2.1
55 Zimbabwe	123.7	134.8	2.2	1.25	1.23	-0.5
Sub-Saharan / Subsaharienne	**1'891.5**	**2'459.3**	**6.6**	**0.40**	**0.46**	**3.4**
AFRICA / AFRIQUE	**8'526.6**	**11'613.4**	**8.0**	**1.37**	**1.66**	**4.9**

Note: For data comparability and coverage, see the technical notes /
Pour la comparabilité et le champ de définition des données, voir les notes techniques.

Source: ITU / UIT.

3. Waiting list / Liste d'attente

	Waiting list for telephone lines / Liste d'attente pour une ligne téléphonique (k) 1990	(k) 1994	CAGR / TCAC (%) 1990-94	Total demand / Demande totale (k) 1994	Satisfied demand / Demande satisfaite (%) 1994	Waiting list / Temps d'attente (years/années) 1994
1 Algeria/Algérie	668.1	646.7	-0.8	1'769.1	63.4	8.1
2 Egypt/Egypte	1'191.6	1'310.2	2.4	3'766.3	65.2	6.1
3 Libya/Libye	244.9	231.7 [92]	-2.7	495.7	53.3	>10
4 Morocco/Maroc	192.8	103.6	-14.4	1'096.4	90.5	0.6
5 Tunisia/Tunisie	122.6	126.0	0.7	600.2	79.0	2.7
North / Nord	**2'419.9**	**2'418.2**	**-**	**7'727.8**	**68.7**	**4.7**
6 South Africa/Sudafricaine (Rép.)	125.4	133.2	1.5	3'977.7	96.7	1.0
South Africa / Afrique du Sud	**125.4**	**133.2**	**1.5**	**3'977.7**	**96.7**	**1.0**
7 Angola	...	...	...	...	...	...
8 Benin/Bénin	...	7.2	...	31.1	76.9	2.4
9 Botswana	7.4	24.8	35.4	75.2	67.1	4.2
10 Burkina Faso	...	...	...	...	...	...
11 Burundi	1.0	5.0 [92]	121.7	20.8	76.0	2.7
12 Cameroon/Cameroun	...	30.0	...	88.2	66.0	5.5
13 Cape Verde/Cap-Vert	...	9.5	...	28.1	66.0	3.0
14 Central African Rep./Centrafricaine (Rép.)	...	0.6	...	8.0	92.6	0.9
15 Chad/Tchad	0.2	2.3	84.6	7.1	67.1	>10
16 Comoros/Comores	0.6	1.2 [92]	34.4	5.4	78.7	5.5
17 Congo	1.6	0.8	-16.8	21.3	96.5	0.6
18 Côte d'Ivoire	9.0	36.2 [92]	100.7	144.6	74.9	3.7
19 Djibouti	0.1	-	-20.2	7.6	99.4	0.1
20 Equatorial Guinea/Guinée équatoriale	...	...	...	...	...	...
21 Eritrea/Erythrée	...	36.4	...	51.6	29.4	...
22 Ethiopia/Ethiopie	108.9	160.9	10.3	298.7	46.1	>10
23 Gabon	2.5	2.4 [92]	-1.6	33.8	92.9	1.4
24 Gambia/Gambie	...	19.5	...	37.8	48.4	7.1
25 Ghana	11.9	12.8	1.9	62.8	79.6	>10
26 Guinea/Guinée	...	...	...	...	...	...
27 Guinea-Bissau/Guinée-Bissau	...	0.7	...	9.7	92.8	0.8
28 Kenya	82.3	70.1	-3.9	298.6	76.5	7.4
29 Lesotho	8.7	8.3 [93]	-1.3	20.5	59.4	...
30 Liberia/Libéria	...	...	...	...	...	...
31 Madagascar	...	7.6 [93]	...	41.3	81.6	...
32 Malawi	11.0	21.7	18.5	54.8	60.4	>10
33 Mali	...	...	...	...	...	...
34 Mauritania/Mauritanie	0.8	3.0 [92]	89.3	11.4	73.8	4.4
35 Mauritius/Maurice	55.2	43.8	-5.6	173.3	74.7	2.0
36 Mayotte	0.9	...	...	...	...	...
37 Mozambique	32.9	3.8	-41.9	61.0	93.8	2.6
38 Namibia/Namibie	...	3.5	...	73.3	95.2	0.8
39 Niger	0.5	1.3 [93]	34.9	13.8	90.3	1.6
40 Nigeria/Nigéria	247.3	194.8	-5.8	563.5	65.4	7.8
41 Réunion	2.0	...	...	...	...	...
42 Rwanda	2.2	5.0 [92]	51.0	20.0	75.0	4.1
43 S. Tomé & Principe/Sao Tomé-et-Principe	1.1	0.9	-4.9	3.4	73.2	>10
44 Senegal/Sénégal	...	9.6	...	81.7	88.2	1.2
45 Seychelles	2.2	3.2	9.5	15.7	79.6	3.1
46 Sierra Leone	14.8	5.0	-23.7	20.8	75.9	6.8
47 Somalia/Somalie	...	...	...	...	...	...
48 Sudan/Soudan	...	15.0	...	79.0	81.0	>10
49 Swaziland	7.9	15.4	18.2	34.0	54.7	>10
50 Tanzania/Tanzanie	112.2	145.0	6.6	233.3	37.9	>10
51 Togo	1.9	7.1	39.3	28.5	75.0	2.0
52 Uganda/Ouganda	15.7	4.0	-29.1	38.9	89.8	1.8
53 Zaire/Zaïre	...	...	...	...	...	...
54 Zambia/Zambie	52.5	72.0	8.2	151.8	52.6	>10
55 Zimbabwe	64.2	107.6	13.8	242.4	55.6	>10
Sub-Saharan / Subsaharienne	**859.4**	**1'098.1**	**2.9**	**3'557.4**	**69.1**	**8.2**
AFRICA / AFRIQUE	**3'404.8**	**3'649.5**	**0.8**	**15'262.9**	**76.1**	**4.6**

Note: For data comparability and coverage, see the technical notes /
Pour la comparabilité et le champ de définition des données, voir les notes techniques.

Source: ITU / UIT.

4. Local telephone network / Réseau téléphonique local

	Main telephone lines / Lignes téléphoniques principales				*Faults per 100 main lines per year / Dérangements pour 100 LP par an*
	Capacity used / Capacité utilisée (%) 1994	*Automatic / Automatiques (%) 1994*	*Digital / Numériques (%) 1994*	*Residential / Résidentielles (%) 1994*	*1994*
1 Algeria/Algérie	81.4	97.3	29.4	86.0 [92]	74.0
2 Egypt/Egypte	77.9	91.9	56.3	71.6	...
3 Libya/Libye	69.7 [92]	100.0	12.0 [91]	...	230.0 [92]
4 Morocco/Maroc	87.5	99.4	91.8	77.0	63.0
5 Tunisia/Tunisie	64.3	100.0	77.8	70.0	92.0
North / Nord	**78.4**	**95.6**	**57.2**	**75.4**	**86.2**
6 South Africa/Sudafricaine (Rép.)	81.9	98.8	66.2	64.0	8.0
South Africa / Afrique du Sud	**81.9**	**98.8**	**66.2**	**64.0**	**8.0**
7 Angola	58.3 [92]	92.0 [92]	- [93]	70.0 [92]	150.0 [92]
8 Benin/Bénin	67.0	100.0	70.0	65.0	90.0
9 Botswana	77.0	99.0	100.0	59.0	55.4 [92]
10 Burkina Faso	77.7	98.9	84.8	...	88.8
11 Burundi	81.3 [93]	94.3 [93]	88.1	56.0 [93]	64.2 [93]
12 Cameroon/Cameroun	43.2	100.0	67.5 [92]	86.0 [92]	74.0 [92]
13 Cape Verde/Cap-Vert	84.5	100.0	49.0	85.0	36.0
14 Central African Rep./Centrafricaine (Rép.)	80.4	100.0	97.3	57.0	...
15 Chad/Tchad	77.6	82.9	17.1	32.1	97.2
16 Comoros/Comores	45.4 [92]	100.0	5.7	87.0 [92]	68.0 [93]
17 Congo	70.9	99.0	83.0	61.0 [92]	60.6 [93]
18 Côte d'Ivoire	66.2 [93]	100.0	84.0	...	80.0 [92]
19 Djibouti	75.2	100.0	100.0	60.0	11.0 [92]
20 Equatorial Guinea/Guinée équatoriale	100.0	...	-	70.0	50.0
21 Eritrea/Erythrée	54.6	97.3	53.0	74.0	...
22 Ethiopia/Ethiopie	79.7	90.9	39.6	63.4	74.0 [92]
23 Gabon	74.0	100.0	87.0	55.4 [92]	74.0 [92]
24 Gambia/Gambie	79.7	100.0	100.0	64.0	45.1
25 Ghana	89.2	89.3	58.0	41.4 [92]	176.0
26 Guinea/Guinée	49.0	100.0	2.4	...	150.0
27 Guinea-Bissau/Guinée-Bissau	40.7	100.0	40.0	68.0	...
28 Kenya	62.7	93.8	54.0	45.9	...
29 Lesotho	59.3 [93]	99.4 [93]	81.0 [93]	56.0 [92]	...
30 Liberia/Libéria	...	...	...	...	283.0 [92]
31 Madagascar	78.9	90.0 [93]	- [93]	40.4	78.0 [92]
32 Malawi	50.3	98.0	51.8	44.3	...
33 Mali	80.7	95.1	78.0	26.0 [92]	...
34 Mauritania/Mauritanie	64.4	93.8	90.4	40.0	206.0
35 Mauritius/Maurice	83.5	100.0	100.0	68.0	104.8
36 Mayotte	...	100.0	...	...	...
37 Mozambique	60.0	98.0	72.0	58.0	43.6
38 Namibia/Namibie	85.1	90.0	71.0	55.0	77.8 [92]
39 Niger	76.8	87.7	70.6	...	78.9 [92]
40 Nigeria/Nigéria	63.5	100.0	36.2	54.3	327.0 [92]
41 Réunion	...	100.0	...	...	...
42 Rwanda	66.6 [92]	100.0	100.0	68.0 [91]	38.1 [91]
43 S. Tomé & Principe/Sao Tomé-et-Principe	74.5	100.0	95.0	70.0	27.0
44 Senegal/Sénégal	68.5	100.0	76.0	66.0	39.4
45 Seychelles	73.5	100.0	100.0	65.0	45.0
46 Sierra Leone	69.8	98.0	83.5	63.5	10.8
47 Somalia/Somalie	83.3 [91]	...	...	...	...
48 Sudan/Soudan	76.2	94.6	5.4	40.0	20.0
49 Swaziland	58.3	99.0	94.8	48.0	206.0
50 Tanzania/Tanzanie	67.9	87.0	39.2	51.0	201.0
51 Togo	90.6	99.0	98.0	75.0	24.0
52 Uganda/Ouganda	58.3	92.0	68.0	30.0 [92]	100.0
53 Zaire/Zaïre	...	80.0 [93]	48.9 [93]	...	...
54 Zambia/Zambie	72.1	100.0	62.0	54.0	123.8
55 Zimbabwe	66.6	99.0	32.0	66.0	190.0
Sub-Saharan / Subsaharienne	**67.6**	**96.4**	**56.2**	**56.9**	**141.6**
AFRICA / AFRIQUE	**77.1**	**96.8**	**60.1**	**67.8**	**62.1**

Note: For data comparability and coverage, see the technical notes /
Pour la comparabilité et le champ de définition des données, voir les notes techniques.

Source: ITU / UIT.

5. Tele-accessibility / Accès au téléphone

	Households / Ménages (k) 1994	Residential main lines / Lignes principales résidentielles Total (k) 1994	p. 100 households/ p. 100 ménages 1994	Payphones / Publiphones Total (k) 1994	p. 1'000 inhabitants / p. 1'000 habitants 1994
1 Algeria/Algérie	3'890	827.5 [92]	22.1	6.72	0.25
2 Egypt/Egypte	11'500	1'758.6	15.3	4.13	0.07
3 Libya/Libye	705	...	...	...	...
4 Morocco/Maroc	4'444	764.4	17.2	7.49	0.28
5 Tunisia/Tunisie	1'704	332.0	19.5	5.67	0.64
North / Nord	**22'243**	**3'682.5**	**17.2**	**24.02**	**0.20**
6 South Africa/Sudafricaine (Rép.)	4'946	2'459.7	49.7	59.65	1.43
South Africa / Afrique du Sud	**4'946**	**2'459.7**	**49.7**	**59.65**	**1.43**
7 Angola	2'020	34.2 [92]	1.8	0.02 [92]	-
8 Benin/Bénin	882	15.6	1.8	0.17	0.03
9 Botswana	266	29.8	11.2	0.46	0.32
10 Burkina Faso	1'700	...	...	0.14	0.01
11 Burundi	1'290	8.7 [93]	0.7	0.11 [93]	0.02
12 Cameroon/Cameroun	2'358	47.0 [92]	2.1	0.26	0.02
13 Cape Verde/Cap-Vert	67	15.8	23.6	0.18	0.46
14 Central African Rep./Centrafricaine (Rép.)	551	4.2	0.8	0.06	0.02
15 Chad/Tchad	1'450	1.5	0.1	0.06	0.01
16 Comoros/Comores	99	3.4 [92]	3.6	0.01 [92]	0.02
17 Congo	503	10.9 [92]	2.3	0.07	0.03
18 Côte d'Ivoire	1'495	...	...	0.23 [93]	0.02
19 Djibouti	109	4.5	4.1	0.05	0.08
20 Equatorial Guinea/Guinée équatoriale	...	1.8	...	-	0.01
21 Eritrea/Erythrée	...	11.2	...	0.12	0.04
22 Ethiopia/Ethiopie	13'350	87.3	0.7	1.48	0.03
23 Gabon	195	15.3 [92]	8.2	0.13	0.13
24 Gambia/Gambie	113	11.7	10.4	0.20	0.19
25 Ghana	3'350	19.8 [92]	0.6	0.03	-
26 Guinea/Guinée	1'144	...	...	0.02	-
27 Guinea-Bissau/Guinée-Bissau	150	6.1	4.1	...	...
28 Kenya	6'500	104.9	1.6	5.79	0.22
29 Lesotho	377	6.4 [92]	1.8	0.20 [93]	0.10
30 Liberia/Libéria	...	...	...	...	...
31 Madagascar	2'557	13.6	0.5	0.12 [93]	0.01
32 Malawi	1'188	14.7	1.2	0.45	0.04
33 Mali	1'536	3.3 [92]	0.2	0.28	0.03
34 Mauritania/Mauritanie	407	3.4	0.8	0.26	0.12
35 Mauritius/Maurice	230	88.0	38.3	0.43	0.39
36 Mayotte	23	...	...	...	...
37 Mozambique	3'860	33.2	0.9	0.12	0.01
38 Namibia/Namibie	255 [93]	38.4	15.1	1.08	0.72
39 Niger	1'450	...	...	0.17 [93]	0.02
40 Nigeria/Nigéria	19'980	200.1	1.0	0.35	-
41 Réunion	168	...	...	0.61 [91]	0.99
42 Rwanda	1'550	7.7 [91]	0.5	...	...
43 S. Tomé & Principe/Sao Tomé-et-Principe	31	1.7	5.5	0.04	0.34
44 Senegal/Sénégal	934	47.6	5.1	2.35	0.29
45 Seychelles	17	8.1	47.7	0.20	2.74
46 Sierra Leone	709	10.0	1.4	0.09	0.02
47 Somalia/Somalie	...	...	...	...	...
48 Sudan/Soudan	4'413	25.6	0.6	0.56 [91]	0.02
49 Swaziland	176	8.9	5.1	0.40	0.44
50 Tanzania/Tanzanie	5'255	45.0	0.9	0.62	0.02
51 Togo	668	16.1	2.4	0.07	0.02
52 Uganda/Ouganda	3'900	9.0 [92]	0.2	0.29	0.02
53 Zaire/Zaïre	5'428	...	...	...	...
54 Zambia/Zambie	1'688	43.1	2.6	0.55	0.06
55 Zimbabwe	2'264	89.0	3.9	1.41	0.13
Sub-Saharan / Subsaharienne	**96'654**	**1'146.5**	**1.3**	**20.22**	**0.04**
AFRICA / AFRIQUE	**123'843**	**7'288.7**	**6.6**	**103.88**	**0.17**

Note: For data comparability and coverage, see the technical notes / Pour la comparabilité et le champ de définition des données, voir les notes techniques.

Source: ITU / UIT.

6. Urban main lines / Lignes principales urbaines

	Largest city / Plus grande ville				Rest of country teledensity / Télédensité dans le reste du pays	Overall country teledensity / Télédensité nationale
	Population as % of total / Population en % du total	Main lines / Lignes princ. (k)	as % of total / en % du total	Teledensity / Télédensité		
	1994	1994	1994	1994	1994	1994
1 Algeria/Algérie	12.0	200.6	17.9	6.12	3.83	4.11
2 Egypt/Egypte	15.0	823.1	33.5	9.53	3.34	4.27
3 Libya/Libye	49.7	84.3	31.9	3.25	6.84	5.06
4 Morocco/Maroc	12.8	306.4	30.9	9.01	2.97	3.75
5 Tunisia/Tunisie	20.8	127.8	26.9	6.98	4.96	5.38
North / Nord	**15.7**	**1'542.2**	**29.0**	**7.81**	**3.57**	**4.23**
6 South Africa/Sudafricaine (Rép.)	5.5	1'196.2	31.1	52.08	6.74	9.24
South Africa / Afrique du Sud	**5.5**	**1'196.2**	**31.1**	**52.08**	**6.74**	**9.24**
7 Angola	15.4	35.3 [93]	66.2	2.29	0.21	0.52
8 Benin/Bénin	11.0	16.4	68.6	2.84	0.16	0.46
9 Botswana	10.5	24.0	47.5	15.88	2.05	3.50
10 Burkina Faso	7.7	16.9	64.0	2.18	0.10	0.26
11 Burundi	4.0	13.6 [93]	87.8	5.66	0.03	0.26
12 Cameroon/Cameroun	7.0	25.1 [92]	45.9	2.94	0.26	0.45
13 Cape Verde/Cap-Vert	21.7	6.2	33.4	7.50	4.14	4.87
14 Central African Rep./Centrafricaine (Rép.)	17.2	6.7	91.4	1.21	0.02	0.23
15 Chad/Tchad	12.3	3.9	82.4	0.51	0.02	0.08
16 Comoros/Comores	4.9	2.2 [92]	56.7	9.10	0.38	0.84
17 Congo	54.8	10.8 [92]	60.3	0.83	0.66	0.76
18 Côte d'Ivoire	15.7	70.3 [93]	74.9	2.92	0.22	0.71
19 Djibouti	73.1	6.5 [92]	95.2	1.64	0.22	1.26
20 Equatorial Guinea/Guinée équatoriale	18.3	1.5	59.6	2.11	0.32	0.65
21 Eritrea/Erythrée	25.0	14.8	97.3	1.72	0.02	0.44
22 Ethiopia/Ethiopie	5.7	91.7	66.6	3.01	0.09	0.26
23 Gabon	27.9	26.1	83.3	9.05	0.70	3.03
24 Gambia/Gambie	18.0	6.9	37.7	3.54	1.29	1.69
25 Ghana	13.4	25.0	50.0	1.10	0.17	0.30
26 Guinea/Guinée	16.9	4.7	50.5	0.43	0.09	0.14
27 Guinea-Bissau/Guinée-Bissau	6.8	8.2 [93]	96.2	11.60	0.03	0.83
28 Kenya	6.7	185.5	81.2	10.60	0.18	0.88
29 Lesotho	8.5	7.8 [93]	64.1	4.71	0.25	0.63
30 Liberia/Libéria	22.7	...	...	...	...	...
31 Madagascar	31.6	19.1	56.7	0.46	0.16	0.26
32 Malawi	4.1	18.9	57.2	4.23	0.14	0.31
33 Mali	7.7	8.5 [92]	66.3	1.22	0.05	0.14
34 Mauritania/Mauritanie	23.5	6.4	75.6	1.22	0.12	0.38
35 Mauritius/Maurice	14.3	28.6	22.1	18.08	10.66	11.72
36 Mayotte	...	...	...	...	...	...
37 Mozambique	9.4	35.6	62.2	2.28	0.14	0.34
38 Namibia/Namibie	9.7	32.9	47.2	22.56	2.72	4.65
39 Niger	6.6	8.1	65.1	1.40	0.05	0.14
40 Nigeria/Nigéria	7.2	127.6	34.6	1.65	0.24	0.34
41 Réunion	19.1	...	...	...	...	...
42 Rwanda	2.8	7.7 [92]	65.5	3.71	0.06	0.16
43 S. Tomé & Principe/Sao Tomé-et-Principe	33.9	2.1	83.9	4.88	0.48	1.97
44 Senegal/Sénégal	23.1	50.5	70.0	2.70	0.35	0.89
45 Seychelles	57.5	4.2	33.7	10.02	26.65	17.08
46 Sierra Leone	15.9	13.8	87.7	1.89	0.05	0.34
47 Somalia/Somalie	8.6	12.5 [91]	83.3	1.71	0.03	0.17
48 Sudan/Soudan	9.3	12.0	18.8	0.47	0.21	0.23
49 Swaziland	7.1	12.2	65.6	19.08	0.76	2.05
50 Tanzania/Tanzanie	6.3	36.8	41.7	2.04	0.19	0.31
51 Togo	12.8	16.3	76.2	3.18	0.15	0.53
52 Uganda/Ouganda	4.4	23.9	68.3	2.89	0.06	0.19
53 Zaire/Zaïre	8.1	16.0 [93]	44.4	0.48	0.05	0.09
54 Zambia/Zambie	12.0	30.4	38.1	2.76	0.61	0.87
55 Zimbabwe	11.5	71.7	53.2	5.69	0.65	1.23
Sub-Saharan / Subsaharienne	**9.7**	**1'206.0**	**54.2**	**2.39**	**0.21**	**0.42**
AFRICA / AFRIQUE	**10.5**	**3'944.4**	**34.7**	**5.43**	**1.20**	**1.64**

Note: For data comparability and coverage, see the technical notes /
Pour la comparabilité et le champ de définition des données, voir les notes techniques.

Source: ITU / UIT.

7. Telephone tariffs / Tarifs téléphoniques

		Residential / Résidentiels		Business / Commerciaux		Local call / Communication locale	Subs. as % of GDP per capita / Abon. mensuel en % du PIB par habitant
		Installation (US$) 1994	Monthly subs. Abon. mensuel (US$) 1994	Installation (US$) 1994	Monthly subs. Abon. mensuel (US$) 1994	(US$) 1994	1994
1 Algeria/Algérie		62.8	2.6	62.8	2.6	0.04	1.7
2 Egypt/Egypte		118.1	1.1	265.8	1.8	0.01	2.2
3 Libya/Libye	[92]	158.1	5.9	...	...	0.04	...
4 Morocco/Maroc		36.9	3.3	36.9	3.3	0.09	3.9
5 Tunisia/Tunisie		118.6	2.6	118.6	2.6	0.07	2.2
North / Nord							
6 South Africa/Sudafricaine (Rép.)		74.8	10.5	74.8	10.9	0.06	4.5
South Africa / Afrique du Sud							
7 Angola	[92]	90.9	72.7	90.9	109.1	0.09	...
8 Benin/Bénin		158.0	4.1	287.7	4.1	0.11	12.0
9 Botswana		74.5	5.7	74.5	6.0	0.10	2.8
10 Burkina Faso		38.9	3.8	38.9	3.8	0.11	25.6 [93]
11 Burundi		18.0	1.9	18.0	1.9	0.05	14.1 [93]
12 Cameroon/Cameroun		54.0	7.2	54.0	7.2	0.07	...
13 Cape Verde/Cap-Vert		36.6	3.1	36.6	3.1	0.05	4.5
14 Central African Rep./Centrafricaine (Rép.)		91.7	5.1	163.7	5.1	0.18	16.0
15 Chad/Tchad		108.1	13.5	108.1	13.5	0.18	83.7
16 Comoros/Comores	[93]	124.5	6.6	124.5	6.6	0.26	14.9 [93]
17 Congo		126.1	12.9	126.1	12.9	0.13	15.6
18 Côte d'Ivoire	[93]	148.3	12.3	148.3	12.3	0.20	21.1 [93]
19 Djibouti		140.7	19.7	140.7	19.7	0.20	28.3 [93]
20 Equatorial Guinea/Guinée équatoriale		42.5	5.8	49.7	...	2.70	17.2
21 Eritrea/Erythrée		183.0	4.0	183.0	4.0	0.04	35.3 [93]
22 Ethiopia/Ethiopie		55.8	1.5	55.8	3.1	0.04	18.0
23 Gabon	[92]	206.3	24.6	206.3	24.6	0.25	5.2 [92]
24 Gambia/Gambie		83.5	3.1	83.5	3.7	0.09	11.3
25 Ghana		52.3	1.0	52.3	1.0	0.10	3.5
26 Guinea/Guinée		104.0	4.2	104.0	4.2	0.11	10.2
27 Guinea-Bissau/Guinée-Bissau	[93]	84.3	3.0	84.3	3.0	0.17	15.2 [93]
28 Kenya		37.5	4.5	37.5	...	0.06	25.7
29 Lesotho	[93]	105.7	6.1	133.3	6.1	0.05	18.8 [93]
30 Liberia/Libéria		...	...	...	...	...	...
31 Madagascar	[93]	36.1	3.7	...	25.9	0.06	16.6 [93]
32 Malawi	[93]	68.1	5.7	90.9	5.7	0.05	35.3 [93]
33 Mali		91.9	3.4	91.9	3.4	0.15	14.6
34 Mauritania/Mauritanie		356.1	10.9	582.6	10.9	0.13	30.5
35 Mauritius/Maurice		111.4	3.3	167.0	5.6	0.06	1.4
36 Mayotte		...	...	...	...	...	...
37 Mozambique		88.6	5.0	88.6	5.0	0.04	68.4
38 Namibia/Namibie	[92]	67.4	10.1	67.4	10.1	0.06	6.2 [92]
39 Niger		108.1	5.1	108.1	5.1	0.14	24.2
40 Nigeria/Nigéria		133.7	2.3	201.9	4.5	0.26	9.3
41 Réunion	[92]	42.8	5.7	...	...	...	...
42 Rwanda		...	...	...	...	...	...
43 S. Tomé & Principe/Sao Tomé-et-Principe		42.2	2.0	42.2	3.2	0.02	7.8
44 Senegal/Sénégal		100.9	4.2	100.9	4.2	0.10	7.2
45 Seychelles		83.3	14.6	83.3	14.6	0.16	2.9
46 Sierra Leone		167.0	1.7	167.0	3.4	0.10	12.8
47 Somalia/Somalie		...	...	...	...	...	...
48 Sudan/Soudan		207.2	20.7	207.2	0.3	0.01	13.8 [91]
49 Swaziland		23.7	2.3	23.7	2.3	0.14	2.4
50 Tanzania/Tanzanie		51.9	3.9	51.9	3.9	0.02	69.4 [93]
51 Togo		192.7	2.6	192.7	2.6	0.09	9.4
52 Uganda/Ouganda		127.6	1.5	127.6	1.5	0.05	10.3
53 Zaire/Zaïre	[92]	2.6	0.2	2.6	0.2	0.19	...
54 Zambia/Zambie		3.2	0.3	3.2	0.3	0.08	0.8
55 Zimbabwe		17.2	1.9	17.2	1.9	0.04	4.8 [92]
Sub-Saharan / Subsaharienne							
AFRICA / AFRIQUE							

Note: For data comparability and coverage, see the technical notes /
Pour la comparabilité et le champ de définition des données, voir les notes techniques.

Source: ITU / UIT.

8. Cellular indicators / Indicateurs cellulaires

		Mobile subscribers / Abonnés au mobile			*Cellular tariffs / Tarifs du cellulaire*		
		Total (k) 1995	*p. 100 inhabitants/ habitants 1995*	*As % of total subs. / En % du total des abonnés 1995*	*Connection / Connexion (US$) 1995*	*Monthly subs./ Abon. mensuel (US$) 1995*	*Local call / Appel local (US$) 1995*
1 Algeria/Algérie	[94]	1.3	-	0.1	285.27	14.26	0.45
2 Egypt/Egypte		7.4	...	0.3	...	...	...
3 Libya/Libye	[94]	-	-	-	-	-	-
4 Morocco/Maroc		29.5	...	2.5	152.13	43.47	1.74
5 Tunisia/Tunisie		3.2	...	0.6	...	...	...
North / Nord		**41.4**	-	**0.7**			
6 South Africa/Sudafricaine (Rép.)	[94]	340.0	0.82	8.1	0.39	...	...
South Africa / Afrique du Sud		**340.0**	**0.82**	**8.1**			
7 Angola		2.0	...	3.2	...	...	...
8 Benin/Bénin		1.1	...	3.6	-	-	-
9 Botswana	[94]	-	-	-	-	-	-
10 Burkina Faso	[94]	-	-	-	-	-	-
11 Burundi	[94]	0.3	0.01	2.1	...	50.00	0.99
12 Cameroon/Cameroun		2.5	...	4.0	...	...	...
13 Cape Verde/Cap-Vert	[94]	-	-	-	-	-	-
14 Central African Rep./Centrafricaine (Rép.)		0.1	...	1.0	-	-	-
15 Chad/Tchad		-	...	-	-	-	-
16 Comoros/Comores	[94]	-	-	-	-	-	-
17 Congo	[94]	-	-	-	-	-	...
18 Côte d'Ivoire	[94]	-	-	-	-	-	-
19 Djibouti	[94]	-	-	-	-	-	-
20 Equatorial Guinea/Guinée équatoriale	[94]	-	-	-	-	-	-
21 Eritrea/Erythrée		-	...	-	-	-	-
22 Ethiopia/Ethiopie	[94]	-	-	-	-	-	-
23 Gabon	[94]	2.6	0.25	7.6	...	...	...
24 Gambia/Gambie	[94]	0.8	0.07	4.2	11.49	10.44	0.47
25 Ghana		6.2	...	9.4	...	...	...
26 Guinea/Guinée		0.5	...	4.2	...	...	...
27 Guinea-Bissau/Guinée-Bissau		-	...	-	-	-	-
28 Kenya		2.3	...	0.9	6.39	7.40	1.87
29 Lesotho	[94]	-	-	-	-	-	-
30 Liberia/Libéria	[94]	-	-	-	-	-	-
31 Madagascar	[94]	-	-	-	-	-	-
32 Malawi	[94]	-	-	-	-	-	-
33 Mali		-	...	-	-	-	-
34 Mauritania/Mauritanie	[94]	-	-	-	-	-	-
35 Mauritius/Maurice		11.7	...	7.3	...	...	...
36 Mayotte	[94]	-	-	-	-	-	-
37 Mozambique		-	...	-	-	-	-
38 Namibia/Namibie		3.5	...	4.3	-	-	-
39 Niger		-	...	-	-	-	-
40 Nigeria/Nigéria		13.0	...	3.1	2'273.14	54.56	1.05
41 Réunion		...	...	...	...	...	...
42 Rwanda	[94]	-	-	-	-	-	-
43 S. Tomé & Principe/Sao Tomé-et-Principe	[94]	-	-	-	-	-	-
44 Senegal/Sénégal		0.1	...	0.1	190.92	36.02	0.90
45 Seychelles		0.3	...	2.4	-	-	-
46 Sierra Leone	[94]	-	-	-	-	-	-
47 Somalia/Somalie	[94]	-	-	-	...	...	...
48 Sudan/Soudan	[94]	-	-	-	-	-	-
49 Swaziland	[94]	-	-	-	-	-	-
50 Tanzania/Tanzanie	[94]	0.4	-	0.4	-	-	-
51 Togo		-	...	-	-	-	-
52 Uganda/Ouganda		1.7	...	3.9	-	-	-
53 Zaire/Zaïre		10.0	...	21.7	...	...	...
54 Zambia/Zambie		0.8	...	...	-	-	-
55 Zimbabwe		-	...	-	-	-	-
Sub-Saharan / Subsaharienne		**59.9**	-	**2.5**			
AFRICA / AFRIQUE		**441.4**	**0.13**	**3.6**			

Note: For data comparability and coverage, see the technical notes /
Pour la comparabilité et le champ de définition des données, voir les notes techniques.

Source: ITU / UIT.

9. International telephone traffic / Trafic téléphonique international

	Outgoing telephone traffic / Trafic téléphonique sortant					International tel. circuits / Circuits tél. internation. (k)
	Minutes		CAGR / TCAC (%)	Minutes per inhabitant / par habitant	Minutes per subscriber / par abonné	
	1990	1994	1990-94	1994	1994	1994
1 Algeria/Algérie	92.1	118.0 [92]	13.2	4.5	122.6	3.0
2 Egypt/Egypte	48.4	92.8	17.7	1.6	37.8	3.4
3 Libya/Libye	29.2	42.4	9.8	8.1	160.7	1.1 [91]
4 Morocco/Maroc	84.9	129.8	11.2	4.9	130.7	4.6
5 Tunisia/Tunisie	64.5	64.0	-0.2	7.3	134.9	2.4
North / Nord	**319.2**	**447.0**	**8.8**	**3.6**	**86.8**	**14.5**
6 South Africa/Sudafricaine (Rép.)	156.0	262.6	13.9	6.3	68.3	7.0 [93]
South Africa / Afrique du Sud	**156.0**	**262.6**	**13.9**	**6.3**	**68.3**	**7.0**
7 Angola	7.3	17.8	25.1	1.7	...	0.2 [92]
8 Benin/Bénin	3.4	5.4	12.9	1.0	227.1	0.3
9 Botswana	21.8	28.4	6.8	19.7	563.0	0.6
10 Burkina Faso	...	5.6	...	0.6	213.8	0.3
11 Burundi	1.2	2.3	16.4	0.4	144.3	- [93]
12 Cameroon/Cameroun	14.5	22.7	11.8	1.8	389.7	...
13 Cape Verde/Cap-Vert	...	3.2	...	8.5	174.9	0.2
14 Central African Rep./Centrafricaine (Rép.)	1.4	2.4	15.4	0.7	327.4	0.1
15 Chad/Tchad	1.2	1.6	8.0	0.3	332.5	0.1
16 Comoros/Comores	0.3	1.3	46.0	2.7	304.3	- [92]
17 Congo	6.6	3.9	-12.2	1.6	189.8	0.2
18 Côte d'Ivoire	23.2	27.1	3.9	2.0	249.7	0.8 [93]
19 Djibouti	4.1	4.5	2.4	8.0	599.1	0.2
20 Equatorial Guinea/Guinée équatoriale	...	0.6	...	1.4	222.1	-
21 Eritrea/Erythrée	...	1.0	...	0.3	67.2	0.1
22 Ethiopia/Ethiopie	7.3	11.5	11.9	0.2	83.3	0.5
23 Gabon	15.6	15.8	0.3	15.3	503.6	0.4 [92]
24 Gambia/Gambie	2.2	4.2	18.4	3.9	231.0	0.2 [93]
25 Ghana	4.8	11.6	24.8	0.7	231.8	0.3
26 Guinea/Guinée	7.8	4.2	-14.2	0.6	452.4	0.1
27 Guinea-Bissau/Guinée-Bissau	0.7	2.0	30.3	1.9	218.7	0.1
28 Kenya	20.6	20.9	0.3	0.8	91.4	0.8
29 Lesotho	8.8	10.7 [92]	10.4	5.7	944.6	- [92]
30 Liberia/Libéria	...	2.3 [92]	...	0.8	508.9	...
31 Madagascar	3.1	4.4 [93]	12.2	0.3	126.1	0.1 [93]
32 Malawi	4.2	7.6	15.8	0.7	230.2	0.2
33 Mali	5.4	6.6	5.4	0.7	435.8	0.3
34 Mauritania/Mauritanie	2.8	4.8	14.6	2.2	571.3	0.1 [93]
35 Mauritius/Maurice	12.4	18.9	11.1	17.1	146.0	0.5
36 Mayotte	...	...	...	...	...	...
37 Mozambique	5.9	11.3	17.9	0.7	197.7	0.4
38 Namibia/Namibie	...	41.6 [93]	...	28.5	623.6	0.1 [92]
39 Niger	3.1	3.8	5.3	0.4	302.3	0.2 [92]
40 Nigeria/Nigéria	...	62.5	...	0.6	169.6	1.2
41 Réunion	...	...	...	...	...	...
42 Rwanda	1.7	1.3	-6.3	0.2	89.5	0.1 [92]
43 S. Tomé & Principe/Sao Tomé-et-Principe	0.2	0.5	16.7	3.6	184.1	-
44 Senegal/Sénégal	13.6	18.1	7.5	2.2	251.4	0.7
45 Seychelles	1.4	2.3	12.8	31.4	183.6	0.1
46 Sierra Leone	0.6	1.9	32.0	0.4	121.9	0.1
47 Somalia/Somalie	...	...	...	...	...	...
48 Sudan/Soudan	...	11.7	...	0.4	182.1	0.2 [91]
49 Swaziland	13.8	15.5 [93]	4.0	17.6	942.8	0.2
50 Tanzania/Tanzanie	2.5	4.8	18.0	0.2	54.9	0.2
51 Togo	6.5	9.0	8.6	2.2	420.7	0.3
52 Uganda/Ouganda	...	3.5	...	0.2	101.1	0.1
53 Zaire/Zaïre	...	...	...	...	...	...
54 Zambia/Zambie	10.8	10.9	0.3	1.2	137.0	0.4
55 Zimbabwe	16.3	42.5	27.2	3.9	315.6	1.1
Sub-Saharan / Subsaharienne	**256.8**	**494.7**	**9.0**	**1.0**	**222.1**	**12.0**
AFRICA / AFRIQUE	**732.0**	**1'204.3**	**10.0**	**1.9**	**106.5**	**33.5**

Note: For data comparability and coverage, see the technical notes /
Pour la comparabilité et le champ de définition des données, voir les notes techniques.

Source: ITU / UIT.

10. African call charges / Coûts des appels africains

Cost of a 3 minute direct-dialled standard rate call including taxes / Coût d'un appel direct de 3 minutes - 1994 US$

TO

FROM	DZA	EGY	LBY	MAR	TUN	North	ZAF	South	AGO	BEN	BWA	BFA	BDI	CMR	CPV	CAF	TCD	COM	COG	CIV	DJI	GNQ	ERI	ETH	GAB	GMB	GHA	GIN	GNB	KEN
Algeria (DZA)		18	1.5	1.5	1.5	5.7	...	...	...	...	...	...	...	8.1	...	...	...	...	8.1	8.1	7.2	...	...	13	8.1	...	...	...	...	14
Egypt (EGY)	4.0		2.4	4.0	2.7	3.3	8.9	8.9	8.0	8.0	8.0	8.0	8.0	6.2	8.0	6.2	8.0	8.0	6.2	8.0	4.4	8.0	...	6.2	8.0	8.0	6.6	8.0	8.0	5.1
Libya (LBY)	...	...		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Morocco (MAR)	3.2	7.1	3.2		3.2	4.2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tunisia (TUN)	1.9	6.3	1.9	1.9		3.0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6.3	...	...	...	...	...	...	...	...	...
North	**3.0**	**11**	**2.2**	**2.5**	**2.5**	**4.2**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**
South Africa (ZAF)	10	10	...	8.7	10	9.5			8.7	8.7	1.4	8.7	7.4	8.7	8.7	8.7	8.7	6.5	8.7	8.7	...	8.7	...	10	8.7	8.7	8.7	8.7	10	7.4
South	**10**	**10**	**...**	**8.7**	**10**	**9.5**			**8.7**	**8.7**	**1.4**	**8.7**	**7.4**	**8.7**	**8.7**	**8.7**	**8.7**	**6.5**	**8.7**	**8.7**	**...**	**8.7**	**...**	**10**	**8.7**	**8.7**	**8.7**	**8.7**	**10**	**7.4**
Angola (AGO)	11	11	11	11	11	11	11	11		11	11	11	11	11	7.4	11	11	11	11	11	11	11	...	11	11	11	11	11	11	11
Benin (BEN)	11	8.4	8.4	8.4	8.4	9.0	11	11	11		11	2.9	11	5.4	11	5.4	5.4	11	5.4	4.3	5.4	11	...	11	5.4	11	4.9	5.4	11	11
Botswana (BWA)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Burkina Faso (BFA)	5.9	13	9.3	5.9	5.9	8.1	13	13	10	4.2	13		13	5.9	10	4.2	4.2	5.9	4.2	4.2	5.9	10	...	4.2	4.2	13	4.2	5.9	13	13
Burundi (BDI)	16	20	11	16	16	16	11	11	20	20	20	20		16	16	20	20	11	11	16	16	16	...	16	16	20	16	20	20	7.1
Cameroon (CMR)	4.8	8.2	8.4	4.8	4.8	6.2	...	...	9.1	2.8	...	2.8	7.2		...	2.8	2.8	...	2.8	2.8	...	2.8	...	10	2.8	...	...	5.4	...	7.1
Cape Verde (CPV)	11	15	15	11	15	13	15	15	8.9	11	15	11	15	15		15	15	15	15	11	15	15	...	15	15	11	11	15	4.5	11
Central Afr. Rep. (CAF)	7.6	22	22	7.6	10	14	22	22	17	5.4	22	5.4	22	5.4	17		5.4	10	5.4	5.4	10	17	...	22	5.4	22	22	5.4	17	22
Chad (TCD)	13	19	19	13	13	15	19	19	19	7.6	19	7.6	19	7.6	19	7.6		7.6	7.6	7.6	7.6	19	...	19	7.6	19	19	19	19	19
Comoros (COM)	11	20	24	11	11	15	20	20	24	11	24	11	24	11	20	11	11		11	11	11	24	...	24	11	24	24	11	19	24
Congo (COG)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	11	26	...	26	11	26	6.1	6.1	26	26
Côte d'Ivoire (CIV)	11	11	16	8.8	8.8	11	16	16	26	6.1	26	6.1	26	6.1	26	6.1	6.1	11	6.1		11	26	...	26	11	26	6.1	6.1	26	26
Djibouti (DJI)	8.9	8.9	14	8.9	8.9	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3.5	...	...	...	...	...	...
Equatorial Guinea (GNQ)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Eritrea (ERI)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	...	15	15	15	...		15	15	15	15	15	15	15
Ethiopia (ETH)	6.5	4.6	5.5	7.0	4.3	5.6	4.3	4.3	7.7	4.3	4.3	4.3	4.3	4.3	6.5	4.3	4.3	8.1	4.3	3.8	1.8	6.6	...		4.3	4.3	4.3	4.3	8.1	2.4
Gabon (GAB)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...
Gambia (GMB)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	...	7.0	7.0		7.0	7.0	2.1	7.0
Ghana (GHA)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	3.8	7.5	3.8	7.5	7.5	7.5	7.5	7.5	11	7.5	3.8	7.5	7.5	...	7.5	7.5	7.5		7.5	7.5	4.7
Guinea (GIN)	9.2	16	14	9.2	11	12	11	11	11	9.2	21	9.2	16	9.2	9.2	11	9.2	11	11	9.2	...	16	...	11	9.2	9.2	9.2		9.2	14
Guinea-Bissau (GNB)	24	28	24	24	24	25	28	28	16	28	28	28	28	28	9.5	28	28	29	28	28	28	28	...	28	28	9.5	28	28		28
Kenya (KEN)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lesotho (LSO)	7.6	7.6	7.6	7.6	...	7.6	...	...	3.8	7.6	1.9	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	...	7.6	7.6	7.6	7.6	7.6	7.6	5.7
Liberia (LBR)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Madagascar (MDG)	...	...	...	...	...	...	...	...	28	...	24	...	16	...	...	...	...	16	...	...	18		...	19	...	...	...	...	...	13
Malawi (MWI)	9.8	9.8	9.8	9.8	9.8	10	6.5	6.5	6.5	9.8	6.5	9.8	6.5	9.8	9.8	9.8	9.8	6.5	9.8	9.8	6.5	9.8	...	6.5	9.8	9.8	9.8	9.8	9.8	6.5
Mali (MLI)	11	13	19	12	12	13	27	27	27	...	27	...	27	12	21	12	12	12	12	...	...	...	...	14	12	27	27	12	21	27
Mauritania (MRT)	4.6	14	7.0	5.2	4.6	7.1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	7.0	...	...	...	...	...	...	...	...	...
Mauritius (MUS)	...	...	...	...	...	...	5.0	5.0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mayotte (MYT)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mozambique (MOZ)	15	19	15	15	15	15	4.0	4.0	8.1	19	4.0	19	19	19	8.1	19	19	19	19	19	19	19	...	19	19	19	19	19	8.1	8.1
Namibia (NAM)	6.8	6.8	6.8	6.8	6.8	6.8	1.0	1.0	6.8	6.8	1.5	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	...	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Niger (NER)	4.1	12	7.0	6.9	7.0	7.4	11	11	10	2.9	12	2.9	10	6.9	10	2.9	2.9	6.9	2.9	2.9	...	8.1	...	8.1	2.9	11	10	6.9	10	12
Nigeria (NGA)	9.4	9.4	9.4	9.4	9.4	9.4	...	...	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	...	9.4	9.4	9.4	9.4	9.4	9.4	9.4
Réunion (REU)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Rwanda (RWA)	11	11	11	11	11	11	13	13	13	13	13	13	6.7	13	7.6	13	7.6	7.6	13	13	13	7.6	...	13	13	13	7.6	7.6	7.6	6.7
S.Tomé & Principe (STP)	17	23	17	17	23	20	23	23	12	23	23	23	23	23	12	23	23	23	23	23	23	23	...	23	23	23	23	23	12	23
Senegal (SEN)	3.6	7.9	7.9	2.2	4.8	5.3	...	...	7.9	2.2	7.9	2.2	3.6	2.2	3.6	2.2	2.2	...	2.2	2.2	...	...	...	7.9	2.2	2.2	...	2.2	2.2	7.9
Seychelles (SYC)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sierra Leone (SLE)	10	12	10	10	10	10	10	10	8.1	8.1	9.7	8.6	12	8.1	8.1	8.6	10	16	8.1	10	12	12	...	10	8.1	8.1	12	8.6	12	10
Somalia (SOM)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sudan (SDN)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Swaziland (SWZ)	8.6	16	7.4	9.0	6.7	10	1.8	1.8	9.6	6.7	2.5	9.6	10	9.2	9.2	9.6	11	9.2	7.6	9.6	...	8.6	...	8.6	9.7	8.8	8.0	11	11	4.6
Tanzania (TZA)	15	15	15	15	15	15	15	15	12	15	12	15	15	15	15	15	15	12	15	15	15	15	...	12	15	15	15	15	15	...
Togo (TGO)	5.4	11	8.1	5.4	5.4	7.0	8.6	8.6	8.7	2.7	11	2.7	8.7	5.4	6.8	2.7	2.7	5.4	2.7	2.7	5.4	5.4	...	8.1	5.4	8.6	2.7	5.4	8.6	12
Uganda (UGA)	14	14	14	14	14	14	7.0	7.0	7.0	14	7.0	14	3.5	14	14	14	14	7.0	14	14	...	14	...	7.0	14	14	14	14	14	3.5
Zaire (ZAR)	42	24	28	38	24	31	38	38	57	47	40	57	28	24	57	71	42	60	34	56	...	38	...	33	41	57	42	57	57	42
Zambia (ZMB)	5.9	7.0	5.9	5.9	5.9	6.1	2.6	2.6	2.6	5.9	2.6	6.6	2.6	5.9	7.0	5.9	5.9	2.6	6.6	6.6	2.6	5.9	...	2.6	7.0	5.9	5.9	6.6	6.6	2.6
Zimbabwe (ZWE)	8.7	8.7	8.7	8.7	8.7	8.7	2.6	2.6	6.5	8.7	2.6	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	...	8.7	8.7	8.7	6.5	8.7	8.7	6.5
Sub-Saharan	**11**	**13**	**12**	**11**	**11**	**12**	**12**	**12**	**13**	**11**	**14**	**11**	**13**	**11**	**13**	**12**	**11**	**12**	**10**	**11**	**11**	**13**	**...**	**13**	**11**	**14**	**13**	**12**	**13**	**13**
AFRICA	**10**	**13**	**11**	**10**	**10**	**11**	**12**	**12**	**13**	**11**	**13**	**11**	**13**	**11**	**12**	**12**	**11**	**12**	**10**	**11**	**11**	**13**	**...**	**13**	**11**	**14**	**13**	**12**	**13**	**12**

Source: ITU / UIT.

LSO	LBR	MDG	MWI	MLI	MRT	MUS	MYT	MOZ	NAM	NER	NGA	REU	RWA	STP	SEN	SYC	SLE	SOM	SDN	SWZ	TZA	TGO	UGA	ZAR	ZMB	ZWE	Sub-Saharan	Average	DE
...	...	8.1	...	8.1	6.0	14	...	...	...	8.1	...	9.7	...	...	8.1	14	...	10	7.2	...	...	...	...	...	...	...	...	...	(DZA) Algérie
8.0	6.2	8.0	6.6	5.1	3.9	8.0	...	8.0	8.9	8.0	5.1	8.0	8.0	8.0	8.0	8.0	6.6	8.0	2.4	8.0	5.1	8.0	5.1	8.0	6.6	8.0	7.1	6.8	(EGY) Egypte
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	(LBY) Libye
...	...	...	...	...	3.2	...	...	...	...	...	...	...	...	...	...	...	...	8.9	...	...	...	...	...	...	...	...	...	...	(MAR) Maroc
...	...	...	...	...	6.3	...	...	...	...	...	...	...	...	...	...	...	...	6.3	6.3	...	...	...	...	...	...	...	...	...	(TUN) Tunisie
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Nord
1.4	8.7	10	2.2	8.7	10	8.5	7.4	1.4	1.3	8.7	8.7	7.4	9.1	10	10	10	8.7	...	10	1.4	7.4	10	7.4	10	2.2	1.4	7.5	7.6	(ZAF) Sudafric.(Rép.)
1.4	8.7	10	2.2	8.7	10	8.5	7.4	1.4	1.3	8.7	8.7	7.4	9.1	10	10	10	8.7	...	10	1.4	7.4	10	7.4	10	2.2	1.4	7.5	7.6	Afrique du Sud
11	11	11	11	11	11	11	11	7.4	11	11	11	11	11	7.4	11	11	11	11	11	11	11	11	11	11	11	11	11	11	(AGO) Angola
11	11	5.4	11	2.9	5.4	11	...	11	11	2.9	2.9	...	8.4	11	2.9	11	11	11	11	11	11	2.9	11	11	11	11	8.7	8.8	(BEN) Bénin
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	(BWA) Botswana
13	8.0	13	12	4.2	4.2	13	...	10	13	4.2	4.2	...	4.2	13	4.2	13	13	13	13	13	13	4.2	13	13	13	13	9.1	9.1	(BFA) Burkina Faso
20	20	11	...	20	11	11	...	20	20	16	16	...	5.3	20	11	16	20	20	20	20	5.3	20	7.1	11	11	16	16	16	(BDI) Burundi
...	7.1	8.2	...	5.4	2.8	9.5	...	...	...	2.8	5.4	5.4	2.8	...	2.8	...	...	...	...	...	...	2.8	...	5.4	7.1	7.1	...	...	(CMR) Caméroun
11	11	15	15	11	11	15	15	8.9	15	11	11	15	15	8.9	3.4	15	11	15	15	15	15	11	15	15	15	15	13	13	(CPV) Cap-Vert
22	22	5.4	22	5.4	5.4	22	10	17	22	5.4	7.6	10	5.4	17	5.4	17	22	22	17	22	22	5.4	22	5.4	22	22	14	14	(CAF) Centrafric.(Rép.)
19	19	19	19	7.6	7.6	19	...	19	19	7.6	11	...	19	7.6	7.6	19	19	19	19	19	19	7.6	19	7.6	19	19	15	15	(TCD) Tchad
24	24	11	24	11	11	16	...	19	19	11	19	11	19	24	11	24	24	24	24	24	24	11	24	24	24	24	18	18	(COM) Comores
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	(COG) Congo
26	6.1	6.1	26	6.1	6.1	26	...	26	26	6.1	8.8	...	6.1	26	6.1	26	26	26	26	26	26	6.1	26	26	26	26	18	17	(CIV) Côte d'Ivoire
...	...	...	...	...	10	...	...	...	...	...	...	...	...	...	...	...	...	3.5	18	...	...	...	...	...	...	...	...	...	(DJI) Djibouti
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	(GNQ) Guinée équatoriale
15	15	15	15	15	15	15	...	15	15	15	15	...	15	...	...	15	15	15	15	...	15	15	...	15	15	15	15	15	(ERI) Erythrée
4.3	4.3	4.3	4.3	4.3	4.3	3.8	...	7.9	4.3	4.3	4.3	8.3	4.3	8.1	4.3	4.3	4.3	6.6	4.9	4.3	2.4	4.3	2.4	3.8	4.3	4.3	4.8	4.8	(ETH) Ethiopie
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	(GAB) Gabon
7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	2.1	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.8	6.9	(GMB) Gambie
7.5	7.5	7.5	7.5	7.5	7.5	7.5	11	7.5	11	7.5	3.8	11	11	11	7.5	7.5	7.5	7.5	7.5	7.5	7.5	3.8	7.5	7.5	7.5	7.5	7.5	7.5	(GHA) Ghana
21	9.2	11	14	9.2	9.2	16	...	16	16	9.2	9.2	11	11	16	9.2	16	9.2	16	16	21	16	9.2	16	14	14	14	13	12	(GIN) Guinée
28	28	28	28	28	28	29	...	16	28	28	28	...	28	16	9.5	29	28	28	28	29	28	28	28	28	28	28	26	26	(GNB) Guinée-Bissau
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	(KEN) Kenya
	7.6	7.6	3.6	7.6	7.6	7.6	7.6	2.9	1.9	7.6	7.6	7.6	9.5	7.6	7.6	7.6	7.6	7.6	...	...	...	...	...	...	...	...	7.0	...	(LSO) Lesotho
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	(LBR) Libéria
27	...		21	...	...	22	...	20	27	...	...	...	20	...	...	29	...	17	29	27	20		29	28	24	27	23	...	(MDG) Madagascar
6.5	9.8	6.5		9.8	9.8	6.5	...	6.5	6.5	9.8	9.8	9.8	6.5	9.8	9.8	6.5	9.8	6.5	9.8	6.5	6.5	9.8	6.5	6.5	6.5	6.5	8.3	8.4	(MWI) Malawi
...	16	12	27		12	12	...	27	27	...	16	...	12	21	12	27	27	27	...	27	27	12	27	27	27	27	20	20	(MLI) Mali
...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...	...	5.4	...	...	...	...	...	...	...	...	...	(MRT) Mauritanie
...	...	...	...	...	...		...	...	...	...	...	2.8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	(MUS) Maurice
...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	(MYT) Mayotte
4.0	19	19	5.7	19	19	19	19		4.0	19	19	19	19	8.1	19	19	19	19	19	4.0	5.7	19	8.1	19	8.1	4.0	15	15	(MOZ) Mozambique
1.5	6.8	6.8	1.5	6.8	6.8	6.8	6.8	1.5		6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	1.5	6.8	6.8	6.8	6.8	1.5	1.5	6.0	6.0	(NAM) Namibie
8.1	8.1	2.9	12	2.9	2.9	8.1	...	10	11		4.1	...	2.9	10	2.9	9.7	8.1	11	10	10	12	2.9	11	11	10	10	7.5	7.6	(NER) Niger
9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4		9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	...	(NGA) Nigéria
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	(REU) Réunion
13	7.6	13	11	13	7.6	13	...	13	13	13	13	...		13	13	13	13	11	13	13	6.7	13	6.7	13	11	11	11	11	(RWA) Rwanda
23	23	23	23	23	23	23	23	12	23	23	23	23	23		23	23	23	23	23	17	23	23	23	23	23	23	22	22	(STP) Sao Tomé-et-Princ.
7.9	3.6	2.2	7.9	2.2	2.2	7.9	...	7.9	7.9	2.2	3.6	...	3.6	...		7.9	3.6	7.9	7.9	...	7.9	2.2	...	3.6	7.9	7.9	4.7	...	(SEN) Sénégal
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...	(SYC) Seychelles
8.6	10	10	10	8.6	8.6	10	...	12	10	8.6	8.1	13	10	10	8.6	12		13	10	10	10	8.1	10	12	8.6	10	10	9.9	(SLE) Sierra Leone
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	(SOM) Somalie
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	(SDN) Soudan
2.2	6.4	7.4	5.4	16	11	8.8	...	1.4	2.5	9.6	8.8	6.7	9.0	9.2	10	7.6	8.8	13	9.6		6.4	9.8	4.8	6.9	6.4	2.5	8.1	8.2	(SWZ) Swaziland
12	15	12	12	15	15	12	15	12	12	15	15	15	15	15	15	12	15	12	12	12		15	...	...	12	12	14	14	(TZA) Tanzanie
8.6	6.8	11	8.6	5.4	2.7	8.6	...	8.6	11	2.7	5.4	5.4	2.7	8.6	2.7	11	11	8.6	8.6	11	8.7		8.7	8.7	11	10	6.9	7.0	(TGO) Togo
7.0	14	7.0	7.0	14	14	7.0	14	7.0	14	14	14	7.0	3.5	14	14	7.0	14	7.0	7.0	7.0	3.5	14		14	7.0	7.0	11	11	(UGA) Ouganda
40	57	57	...	42	35	42	...	57	40	40	28	14	33	57	41	42	28	49	...	40	28	28	28		29	42	43	41	(ZAR) Zaïre
2.6	5.9	2.6	2.6	6.6	7.0	2.6	5.9	2.6	2.6	5.9	5.9	6.6	6.6	5.9	6.6	2.6	5.9	2.6	5.9	2.6	2.6	6.6	2.6	6.6		2.6	4.8	4.9	(ZMB) Zambie
2.6	8.7	6.5	2.6	8.7	8.7	8.7	...	2.6	2.6	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	6.5	2.6	6.5	8.7	8.7	...	2.6		7.5	7.5	(ZWE) Zimbabwe
13	13	12	12	11	10	13	12	13	14	11	11	10	11	14	10	15	14	14	14	14	13	11	14	13	13	14	12	...	Subsaharienne
13	13	11	12	11	10	13	12	12	14	11	11	10	11	13	10	14	14	14	13	14	13	11	13	13	13	13	12	...	AFRIQUE

11. African telephone traffic / Trafic téléphonique africain

Millions minutes, 1994
TO

FROM	DZA	EGY	LBY	MAR	TUN	North	ZAF	South	AGO	BEN	BWA	BFA	BDI	CMR	CPV	CAF	TCD	COM	COG	CIV	DJI	GNQ	ERI	ETH	GAB	GMB	GHA	GIN	GNB	KEN
Algeria (DZA)	...	0.9	0.1	1.1	0.6	**2.7**	—	—	—	—	—	—	—	0.1	—	—	—	—	—	0.1	—	—	—	—	—	—	—	—	—	—
Egypt (EGY)	0.3	...	1.9	0.6	0.6	**3.4**	0.3	**0.3**	—	—	—	—	—	—	—	—	—	—	—	0.1	0.1	—	—	0.1	—	—	—	—	—	0.2
Libya (LBY)	0.5	3.7	...	0.7	2.0	**7.0**	—	—	—	—	...	...	...	—	...	...	—	...	...	...	...	...	—	...	...	—	...	...	—	...
Morocco (MAR)	3.1	1.2	0.8	...	2.2	**7.3**	—	—	—	—	...	...	...	—	...	...	—	...	...	...	—	...	—	...	...	—	...	...	—	...
Tunisia (TUN)	1.8	0.3	2.0	3.3	...	**7.5**	—	—	—	—	—	—	—	—	—	—	—	—	—	...	—	—	—	—	—	—	—	—	—	—
North	**5.7**	**6.2**	**4.8**	**5.7**	**5.5**	**27.9**	0.4	**0.4**	—	—	—	—	—	**0.1**	—	—	—	—	—	**0.1**	**0.1**	—	—	**0.1**	—	—	—	—	—	**0.2**
South Africa (ZAF)	—	0.2	—	—	—	0.3	...	...	0.4	—	14.0	—	—	—	—	—	—	—	0.1	0.2	—	—	—	—	—	0.2	—	—	1.1
South	**—**	**0.2**	**—**	**—**	**—**	**0.3**	**—**	**—**	**0.4**	**—**	**14.0**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**0.1**	**0.2**	**—**	**—**	**—**	**—**	**—**	**—**	**0.2**	**—**	**—**	**1.1**
Angola (AGO)	—	—	—	—	—	—	0.2	**0.2**	...	—	—	—	—	—	—	—	—	—	0.1	0.1	—	—	—	—	0.1	0.1	—	—	—	—
Benin (BEN)	—	—	—	—	—	—	—	—	—	...	—	0.2	—	0.1	—	—	—	—	0.1	0.5	—	—	—	—	0.1	—	—	—	—	—
Botswana (BWA)	—	—	—	—	—	—	18.9	**18.9**	—	—	...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	...	—	0.1
Burkina Faso (BFA)	—	—	—	—	—	—	—	—	—	0.2	—	...	—	—	—	—	—	—	—	1.3	—	—	—	—	—	—	—	—	—	—
Burundi (BDI)	—	—	—	—	—	—	—	—	—	—	—	—	...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.3
Cameroon (CMR)	—	—	—	0.1	—	**0.1**	—	—	—	0.2	—	—	—	...	—	0.3	0.3	—	0.2	0.5	—	0.2	—	—	0.4	—	—	...	—	—
Cape Verde (CPV)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	...	—	—	—	—	—	—	—	—	—	—	—	—	—	0.1	—
Central Afr. Rep. (CAF)	—	—	—	—	—	—	—	—	—	—	—	—	—	0.3	—	...	0.1	—	—	0.1	—	—	—	—	—	—	—	—	—	—
Chad (TCD)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	...	—	—	—	—	—	—	—	—	—	—	—	—	—
Comoros (COM)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	...	—	—	—	—	—	—	—	—	—	—	—	—
Congo (COG)	—	—	—	—	—	—	—	—	—	—	—	—	—	0.1	—	0.0	—	—	...	0.2	—	—	—	—	0.1	—	—	—	—	—
Côte d'Ivoire (CIV)	—	0.1	—	0.3	—	**0.4**	—	—	—	0.5	—	1.2	—	0.3	—	—	—	—	0.2	...	—	—	—	—	0.3	—	0.3	0.1	—	—
Djibouti (DJI)	—	0.1	—	—	—	**0.1**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	...	—	—	0.6	—	—	—	—	—	—
Equatorial Guinea (GNQ)	—	—	—	—	—	—	—	—	—	—	—	—	—	0.1	—	—	—	—	—	—	—	...	—	—	—	—	—	—	—	—
Eritrea (ERI)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	...	0.2	—	—	—	—	—	—
Ethiopia (ETH)	—	0.2	—	—	—	**0.2**	—	—	—	—	—	—	—	—	—	—	—	—	—	0.1	0.9	—	...	...	—	—	—	—	—	0.7
Gabon (GAB)	—	—	—	0.2	—	**0.3**	—	—	—	0.9	—	0.1	—	0.6	—	0.1	—	—	0.4	0.6	—	0.1	—	—	...	—	—	—	—	—
Gambia (GMB)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	...	—	—	—	—
Ghana (GHA)	—	—	—	—	—	—	0.1	**0.1**	—	—	—	—	—	—	—	—	—	—	—	0.2	—	—	—	—	...	—	...	—	—	—
Guinea (GIN)	—	—	—	0.1	—	**0.1**	—	—	...	—	...	—	—	—	—	...	—	...	—	0.2	—	—	—	—	...	—	—	...	—	—
Guinea-Bissau (GNB)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	...	—
Kenya (KEN)	...	0.1	...	...	...	**0.1**	0.7	**0.7**	—	—	—	...	...	—	...	...	—	—	...	—	...	...	—	...	—	—	...	...	—	...
Lesotho (LSO)	—	—	—	—	—	—	10.2	**10.2**	—	—	...	...	...	—	...	...	—	...	...	...	...	...	—	...	...	—	...	...	—	...
Liberia (LBR)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Madagascar (MDG)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	...	...	—	—	...	...	—	...	—	—	...	—	...	...	—	—
Malawi (MWI)	—	—	—	—	—	—	2.5	**2.5**	—	—	0.1	—	—	—	...	...	—	...	...	...	...	...	—	...	...	—	...	...	—	0.1
Mali (MLI)	0.1	—	—	—	—	**0.1**	—	—	—	0.1	—	0.3	—	—	—	—	—	—	0.1	1.6	—	—	—	—	0.1	—	—	—	—	—
Mauritania (MRT)	0.1	—	—	0.4	0.1	**0.6**	—	—	—	—	...	...	...	—	...	...	—	...	...	...	—	...	—	...	...	—	...	...	—	...
Mauritius (MUS)	—	—	—	—	—	—	1.9	**1.9**	—	—	—	...	...	—	...	...	—	...	...	—	...	...	—	...	—	—	...	...	—	0.1
Mayotte (MYT)	—	—	—	—	—	—	—	—	...	...	...	...	...	...	...	...	—	...	...	...	...	...	—	...	...	—	...	...	—	...
Mozambique (MOZ)	—	—	—	—	—	—	5.0	**5.0**	0.1	—	0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Namibia (NAM)	—	—	—	—	—	—	39.0	**39.0**	0.2	—	0.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.1
Niger (NER)	—	—	—	—	—	**0.1**	—	—	—	0.2	—	0.2	—	—	—	—	—	—	—	0.4	—	—	—	—	—	—	—	—	—	—
Nigeria (NGA)	—	0.4	—	0.1	—	**0.6**	0.4	**0.4**	0.1	0.2	—	—	—	0.2	—	—	—	—	—	0.3	—	—	—	—	0.1	—	0.2	—	—	0.1
Réunion (REU)	...	—	—	...	...	—	0.2	**0.2**	—	—	...	...	...	—	...	...	—	...	...	...	...	...	—	...	...	—	...	...	—	...
Rwanda (RWA)	—	—	—	—	—	—	—	—	—	—	...	...	...	...	...	...	—	...	...	...	...	...	—	...	...	—	...	...	—	...
S.Tomé & Principe (STP)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Senegal (SEN)	—	—	—	0.3	0.1	**0.5**	—	—	—	0.2	—	0.2	—	0.2	0.1	—	—	—	0.1	1.2	—	...	—	—	0.3	0.7	—	0.3	0.2	—
Seychelles (SYC)	—	—	—	—	—	—	0.1	**0.1**	...	...	...	...	...	...	...	...	—	...	...	...	...	...	—	...	...	—	...	...	—	...
Sierra Leone (SLE)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Somalia (SOM)	...	...	—	...	...	—	—	—	...	...	...	...	...	...	...	...	—	...	—	—	—	—	—	—	—	—	—	—	—	—
Sudan (SDN)	—	1.5	...	—	...	**1.5**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.1	—	—	—	—	—	—
Swaziland (SWZ)	—	—	—	—	—	—	10.5	**10.5**	—	—	0.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.1
Tanzania (TZA)	—	—	—	—	—	—	0.1	**0.1**	—	—	—	—	—	—	—	—	—	...	—	—	—	—	—	—	—	—	—	—	—	...
Togo (TGO)	—	—	—	—	—	—	—	—	—	1.1	—	0.4	—	0.1	—	—	—	—	0.1	0.8	—	—	—	—	0.2	—	0.3	—	—	—
Uganda (UGA)	—	—	—	—	—	—	0.1	**0.1**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	...
Zaire (ZAR)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.1
Zambia (ZMB)	—	0.1	—	—	—	—	2.4	**2.4**	—	—	0.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.2
Zimbabwe (ZWE)	—	—	—	—	—	—	24.2	**24.2**	0.1	—	2.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.4
Sub-Saharan (SSA)	**0.4**	**3.0**	**0.2**	**1.6**	**0.5**	**5.6**	**117.3**	**117.3**	**0.6**	**3.7**	**3.2**	**2.7**	**0.2**	**2.2**	**0.2**	**0.6**	**0.6**	**—**	**1.3**	**8.2**	**1.0**	**0.3**	**—**	**1.3**	**1.8**	**1.1**	**1.2**	**0.6**	**0.4**	**2.6**
AFRICA (AF)	**6.1**	**9.4**	**5.0**	**7.3**	**6.0**	**33.8**	**117.6**	**117.6**	**1.1**	**3.7**	**17.2**	**2.7**	**0.3**	**2.4**	**0.2**	**0.7**	**0.7**	**0.1**	**1.5**	**8.5**	**1.1**	**0.3**	**—**	**1.4**	**2.0**	**1.1**	**1.4**	**0.6**	**0.4**	**3.9**

Note: — = less than 50'000 minutes / moins de 50'000 minutes.

Source: ITU / UIT.

A

LSO	LBR	MDG	MWI	MLI	MRT	MUS	MYT	MOZ	NAM	NER	NGA	REU	RWA	STP	SEN	SYC	SLE	SOM	SDN	SWZ	TZA	TGO	UGA	ZAR	ZMB	ZWE	SSA	AF	DE
—	—	—	—	0.1	—	—	—	—	—	0.1	...	—	—	—	0.1	—	—	—	...	—	—	—	—	—	—	—	0.6	3.3	(DZA) Algérie
—	—	—	—	—	—	—	—	—	—	—	0.2	—	—	—	—	—	—	—	0.6	—	—	—	—	—	—	—	1.7	5.4	(EGY) Egypte
...	...	...	...	...	...	—	—	—	...	...	...	...	...	—	—	...	—	...	...	...	...	—	—	—	—	—	—	7.0	(LBY) Libye
...	...	...	...	...	0.4	—	—	—	...	...	...	...	...	—	0.3	...	—	...	—	...	...	—	—	—	—	—	0.9	8.2	(MAR) Maroc
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	...	—	—	—	—	—	—	—	—	—	—	—	—	7.6	(TUN) Tunisie
—	—	—	—	—	0.5	—	—	—	—	—	0.2	—	—	—	0.5	—	—	—	0.7	—	—	—	—	—	—	—	3.3	31.5	Nord
7.7	—	—	2.4	—	—	1.7	—	11.5	29.9	—	0.2	0.2	—	—	—	0.2	—	—	—	10.8	0.2	—	0.1	—	3.5	21.6	106.5	106.8	(ZAF) Sudafric.(Rép.)
7.7	—	—	2.4	—	—	1.7	—	11.5	29.9	—	0.2	0.2	—	—	—	0.2	—	—	—	10.8	0.2	—	0.1	—	3.5	21.6	106.5	106.8	Afrique du Sud
—	—	—	—	0.1	—	—	—	0.1	0.2	—	0.1	—	—	0.1	0.1	—	—	—	—	—	—	—	—	—	—	0.1	1.3	1.5	(AGO) Angola
...	—	—	—	0.1	—	—	—	—	—	0.2	0.2	...	—	—	0.2	—	—	—	—	—	—	0.8	—	—	—	—	2.5	2.5	(BEN) Bénin
0.2	—	—	0.1	—	—	—	—	0.1	0.1	—	—	—	—	—	—	—	—	—	...	—	0.2	0.1	—	—	—	0.3	3.1	4.4	23.3	(BWA) Botswana
—	—	—	—	0.3	—	—	—	—	—	0.2	—	...	—	—	0.2	—	—	...	—	—	—	—	0.3	—	—	—	—	2.8	2.9	(BFA) Burkina Faso
—	—	—	—	—	—	—	—	—	—	—	—	—	0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.4	0.5	(BDI) Burundi
—	—	—	—	0.1	—	—	—	—	—	—	0.1	—	—	—	0.3	—	—	—	—	—	—	0.1	—	—	—	—	—	2.7	2.8	(CMR) Caméroun
...	...	—	...	—	—	—	—	—	—	—	—	...	...	—	0.2	—	—	...	...	—	—	—	—	—	—	—	—	0.3	0.3	(CPV) Cap-Vert
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.1	—	—	—	—	—	—	—	—	—	—	—	—	0.8	0.8	(CAF) Centrafric.(Rép.)
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.2	0.3	(TCD) Tchad
—	—	—	—	—	—	—	...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.1	0.1	(COM) Comores
—	—	—	—	0.2	—	—	—	—	—	—	—	—	—	—	0.2	—	—	—	—	—	—	—	—	0.1	—	—	—	0.9	1.1	(COG) Congo
—	—	—	—	0.8	0.1	—	—	—	—	0.2	0.2	...	—	—	1.2	—	—	—	—	—	—	0.5	—	—	—	—	—	6.0	6.4	(CIV) Côte d'Ivoire
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.6	0.7	(DJI) Djibouti
...	...	...	...	...	...	—	—	—	...	...	...	...	...	—	—	...	—	...	...	—	—	—	—	—	—	—	—	0.1	0.1	(GNQ) Guinée équatoriale
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.3	0.3	(ERI) Erythrée
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.1	—	0.0	—	0.1	—	—	0.1	2.4	2.7	(ETH) Ethiopie
—	...	...	...	0.8	0.1	—	—	—	...	...	—	...	...	—	1.0	—	—	...	...	—	—	0.4	—	—	0.1	—	5.2	5.5	(GAB) Gabon
—	—	—	—	—	0.1	—	—	—	—	—	0.1	—	—	—	0.7	—	0.1	...	—	—	—	—	—	—	—	—	1.1	1.1	(GMB) Gambie
—	—	—	—	—	—	—	—	—	—	—	0.2	...	—	—	—	—	—	...	—	—	—	0.3	—	—	—	—	0.8	1.0	(GHA) Ghana
—	—	—	...	—	—	—	—	—	...	—	—	—	—	—	0.2	—	—	...	...	—	—	—	—	—	—	—	0.6	0.7	(GIN) Guinée
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.2	0.2	(GNB) Guinée-Bissau
...	...	—	...	...	...	0.1	—	—	...	...	...	...	...	—	—	...	—	...	...	—	...	—	...	...	0.2	0.2	0.8	1.6	(KEN) Kenya
...	...	...	...	...	...	—	—	—	...	...	...	...	...	—	—	...	—	...	...	...	...	—	—	...	—	0.1	0.1	10.3	(LSO) Lesotho
—	...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.1	0.1	(LBR) Libéria
—	...	...	—	...	...	0.2	—	—	—	...	...	...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.3	0.4	(MDG) Madagascar
...	...	...	...	...	...	—	—	0.2	—	—	—	—	—	—	—	—	—	...	...	—	0.1	—	—	—	0.2	0.7	1.5	4.0	(MWI) Malawi
—	—	—	—	...	—	—	—	—	—	0.1	—	—	—	—	0.8	—	—	—	—	—	—	0.1	—	—	—	—	3.2	3.4	(MLI) Mali
...	...	...	...	...	...	—	—	—	...	...	...	...	...	—	—	...	—	...	—	...	...	—	—	...	—	—	0.1	0.7	(MRT) Mauritanie
...	...	0.3	...	...	...	...	—	—	...	...	...	2.2	...	—	—	0.2	—	...	...	...	...	—	—	...	—	0.1	2.9	4.8	(MUS) Maurice
...	...	...	...	...	...	—	...	—	...	...	...	...	...	—	—	...	—	...	...	...	...	—	—	...	—	—	—	—	(MYT) Mayotte
—	—	—	0.1	—	—	—	—	...	—	—	—	—	—	—	—	—	—	—	—	0.6	0.1	—	—	—	0.1	1.0	2.2	7.2	(MOZ) Mozambique
—	—	—	—	—	—	—	—	—	...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.1	0.3	1.1	40.2	(NAM) Namibie
—	—	—	—	0.1	—	—	—	—	—	...	0.1	—	—	—	0.2	—	—	—	—	—	—	0.2	—	—	—	—	1.6	1.7	(NER) Niger
—	0.1	—	—	0.2	—	—	—	—	—	—	...	—	—	—	0.2	—	0.1	—	—	—	—	0.1	—	—	—	0.1	2.4	3.4	(NGA) Nigéria
...	...	...	...	...	...	2.6	...	—	...	...	...	...	...	—	—	...	—	...	...	...	...	—	—	...	—	—	2.6	2.8	(REU) Réunion
...	...	...	...	...	...	—	—	—	...	...	...	...	...	—	—	...	—	...	...	...	...	—	—	...	—	—	—	—	(RWA) Rwanda
—	—	—	—	—	—	—	—	—	—	—	—	—	—	...	—	—	—	—	—	—	—	—	—	—	—	—	—	0.1	(STP) Sao Tomé-et-Princ.
—	—	—	—	0.7	0.3	—	—	—	—	0.1	0.1	—	—	—	...	—	—	—	—	—	—	0.2	—	—	—	—	5.1	5.7	(SEN) Sénégal
...	...	...	...	...	...	0.2	—	—	...	...	...	...	...	—	—	...	—	...	...	...	...	—	—	...	—	...	0.2	0.3	(SYC) Seychelles
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.1	0.1	(SLE) Sierra Leone
—	...	...	...	...	...	—	—	—	...	...	...	...	...	—	—	...	...	...	...	...	...	—	—	...	—	—	—	—	(SOM) Somalie
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	...	—	—	—	—	—	—	—	0.1	1.6	(SDN) Soudan
0.1	—	—	—	—	...	—	—	0.8	—	—	—	—	—	—	—	—	—	—	—	...	—	—	—	—	0.1	0.2	1.7	12.2	(SWZ) Swaziland
—	—	—	—	—	...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	...	—	...	—	0.2	0.1	0.5	0.7	(TZA) Tanzanie
—	—	—	—	0.2	—	—	—	—	—	0.1	0.2	—	—	—	0.2	—	—	—	—	—	—	...	—	—	—	—	3.9	3.9	(TGO) Togo
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	...	—	...	—	—	—	0.3	0.4	(UGA) Ouganda
—	—	—	—	0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	...	0.1	—	0.3	0.3	(ZAR) Zaïre
—	—	—	0.2	0.1	—	—	—	—	0.1	—	—	—	—	—	0.1	—	—	—	0.1	0.2	—	0.1	—	...	0.9	2.3	4.8	(ZMB) Zambie
0.1	—	—	0.9	—	—	—	—	0.4	...	—	—	—	—	—	—	—	—	—	0.1	0.1	—	—	—	1.7	...	6.5	30.7	(ZWE) Zimbabwe
0.5	0.2	0.4	1.6	3.7	0.7	3.1	—	1.9	0.5	1.1	1.4	2.2	0.2	0.2	5.8	0.2	0.3	—	0.2	1.1	0.7	3.0	0.4	0.1	3.3	7.0	73.5	196.4	(SSA) Subsaharienne
8.2	0.2	0.5	4.0	3.8	1.1	4.8	—	13.4	30.4	1.2	1.8	2.4	0.2	0.2	6.3	0.4	0.3	—	0.9	11.9	0.9	3.1	0.5	0.1	6.8	28.6	183.2	334.6	(AF) AFRIQUE

12. Text communications / Transmission de texte

	Telex subscribers / Abonnés télex			Estimated facsimile machines / Télécopieurs estimés		
	(k)		CAGR / TCAC (%)	(k)		CAGR / TCAC (%)
	1990	1994	1990-94	1990	1994	1990-94
1 Algeria/Algérie	9.9	12.5	6.0	...	4.1	...
2 Egypt/Egypte	6.5	5.0	-6.3	7.6	21.6	29.7
3 Libya/Libye	2.3	2.7	3.8	...	...	...
4 Morocco/Maroc	8.7	6.8	-5.9	...	7.5 [93]	...
5 Tunisia/Tunisie	3.6	2.7	-6.5	2.5	20.0	68.2
North / Nord	**30.9**	**29.7**	**-1.0**	**10.1**	**53.2**	**42.4**
6 South Africa/Sudafricaine (Rép.)	13.9	8.7 [92]	-20.7	...	75.0	...
South Africa / Afrique du Sud	**13.9**	**8.7**	**-11.0**	**...**	**75.0**	**...**
7 Angola	0.8	0.6	-4.9	...	...	...
8 Benin/Bénin	0.3	0.2	-4.0	0.1	0.6	42.9
9 Botswana	0.6	0.3	-13.8	0.8	2.1	26.5
10 Burkina Faso	0.3	0.2	-8.9	...	...	...
11 Burundi	0.2	0.3 [93]	6.6	0.6	0.1 [93]	-49.3
12 Cameroon/Cameroun	1.8	0.9	-15.9	...	...	...
13 Cape Verde/Cap-Vert	...	0.1	...	...	0.3 [91]	...
14 Central African Rep./Centrafricaine (Rép.)	...	0.1	...	...	0.1	...
15 Chad/Tchad	0.1	0.1	2.3	0.1	0.1	18.1
16 Comoros/Comores	0.1	0.1 [93]	-3.4	-	0.1 [93]	53.7
17 Congo	0.5	0.4	-7.8	...	0.1 [92]	...
18 Côte d'Ivoire	1.8	1.2 [93]	-13.1	...	...	...
19 Djibouti	0.2	0.1	-12.3	0.1	0.1	-2.0
20 Equatorial Guinea/Guinée équatoriale	...	-	...	...	0.1	...
21 Eritrea/Erythrée	...	-	-	...	0.5	...
22 Ethiopia/Ethiopie	1.0	0.9	-2.8	0.2	1.1	44.1
23 Gabon	0.7	...	...	0.2	...	...
24 Gambia/Gambie	0.1	0.1	-3.9	0.2	0.7	38.5
25 Ghana	0.7	1.0	8.5	1.9	4.5	23.7
26 Guinea/Guinée	0.8	0.4	-14.6	...	-	...
27 Guinea-Bissau/Guinée-Bissau	...	0.1	...	...	0.5	...
28 Kenya	2.4	1.5	-10.2	2.0	3.0 [92]	22.5
29 Lesotho	0.2	0.2 [93]	1.0	0.3	0.4 [92]	25.7
30 Liberia/Libéria	...	...	...	...	...	...
31 Madagascar	0.5	0.5 [93]	-0.9	...	...	...
32 Malawi	0.7	0.7	0.8	0.3	0.9	28.2
33 Mali	0.3	0.2	-15.2	...	...	...
34 Mauritania/Mauritanie	0.2	0.2	-3.7	0.3	...	...
35 Mauritius/Maurice	0.7	0.4	-13.0	...	18.0	...
36 Mayotte	0.1	- [92]	-10.6	0.1	...	...
37 Mozambique	1.0	1.1	4.2	...	7.2	...
38 Namibia/Namibie	0.5	0.4 [93]	-6.4	...	...	...
39 Niger	0.3	0.2	-11.2	0.2	0.3	22.1
40 Nigeria/Nigéria	6.8	7.3	1.6	...	...	...
41 Réunion	0.8	0.6 [92]	-13.5	1.5	1.9 [91]	29.1
42 Rwanda	0.1	0.1 [92]	-0.7	0.3	0.5 [92]	26.6
43 S. Tomé & Principe/Sao Tomé-et-Principe	0.1	0.1	-5.2	...	0.1	...
44 Senegal/Sénégal	0.9	0.7	-7.3	...	...	...
45 Seychelles	0.2	0.1	-10.3	0.3	0.5	16.6
46 Sierra Leone	0.4	0.2	-21.6	-	0.8	142.9
47 Somalia/Somalie	...	...	...	...	...	...
48 Sudan/Soudan	...	1.6	...	...	5.0	...
49 Swaziland	0.3	0.2	-13.9	0.3	0.9	28.2
50 Tanzania/Tanzanie	1.8	1.8	0.4	0.6	2.0 [92]	82.6
51 Togo	0.4	0.3	-5.9	0.3	4.0	85.9
52 Uganda/Ouganda	0.9	0.3	-22.2	0.7	1.6 [92]	51.4
53 Zaire/Zaïre	...	...	...	...	...	...
54 Zambia/Zambie	2.9	2.4	-4.4	0.5	0.5	-
55 Zimbabwe	2.8	2.9	0.8	1.5	10.0	61.0
Sub-Saharan / Subsaharienne	**35.3**	**31.4**	**-4.0**	**13.5**	**68.7**	**29.9**
AFRICA / AFRIQUE	**80.1**	**69.9**	**-3.9**	**23.6**	**196.9**	**35.8**

Note: For data comparability and coverage, see the technical notes /
Pour la comparabilité et le champ de définition des données, voir les notes techniques.

Source: ITU / UIT.

13. Telecommunication staff / Personnel des télécommunications

	Telecommunication staff / Personnel des télécommunications			*Main lines per employee / Lignes principales par employé*		
	(k)		*CAGR / TCAC (%)*			*CAGR / TCAC (%)*
	1990	*1994*	*1990-94*	*1990*	*1994*	*1990-94*
1 Algeria/Algérie	18.4	18.5	0.1	43	61	8.9
2 Egypt/Egypte	58.8	52.4	-2.8	27	47	14.5
3 Libya/Libye	8.0	8.9 [92]	5.4	28	27 [92]	-1.8
4 Morocco/Maroc	8.3	13.4	12.7	48	74	11.2
5 Tunisia/Tunisie	5.5	6.4	4.0	55	74	7.7
North / Nord	**99.0**	**99.6**	**0.1**	**34**	**53**	**12.1**
6 South Africa/Sudafricaine (Rép.)	67.7	58.8	-3.5	49	65	7.5
South Africa / Afrique du Sud	**67.7**	**58.8**	**-3.5**	**49**	**65**	**7.5**
7 Angola	2.1	2.2	1.6	34	...	...
8 Benin/Bénin	1.3	1.4	3.1	12	17	9.4
9 Botswana	1.2	1.6	9.4	23	31	7.5
10 Burkina Faso	1.1	1.2	2.4	15	22	10.2
11 Burundi	0.5	0.6	6.4	16	25	11.6
12 Cameroon/Cameroun	2.1	2.0	-1.4	19	30	11.2
13 Cape Verde/Cap-Vert	0.6	0.4	-9.3	13	44	35.1
14 Central African Rep./Centrafricaine (Rép.)	0.4	0.4	1.7	14	19	8.3
15 Chad/Tchad	0.4	0.3	-6.0	10	14	10.8
16 Comoros/Comores	0.2	0.1	-14.7	14	35	25.3
17 Congo	...	0.9	...	...	22	...
18 Côte d'Ivoire	3.9	3.6	-1.9	19	30	12.7
19 Djibouti	0.5	0.5	0.4	12	16	6.7
20 Equatorial Guinea/Guinée équatoriale	...	0.3	...	...	8	...
21 Eritrea/Erythrée	...	0.6	...	...	27	...
22 Ethiopia/Ethiopie	5.9	5.2	-3.1	21	26	5.7
23 Gabon	0.8	0.8	-0.2	26	40	11.1
24 Gambia/Gambie	0.5	0.8	8.5	11	24	21.0
25 Ghana	4.5	3.7	-4.4	10	13	7.8
26 Guinea/Guinée	1.2	0.9	-7.3	10	11	2.8
27 Guinea-Bissau/Guinée-Bissau	0.2	0.3	3.1	26	35	7.5
28 Kenya	13.0	14.2	2.4	14	16	4.4
29 Lesotho	0.8	0.8 [93]	1.0	16	15 [93]	-1.4
30 Liberia/Libéria	1.0	0.5 [92]	-27.8	...	9 [92]	...
31 Madagascar	3.1	2.8	-2.1	10	12	3.9
32 Malawi	1.6	4.0	25.2	16	8	-15.7
33 Mali	1.6	1.4	-3.5	7	11	11.9
34 Mauritania/Mauritanie	0.4	0.5	3.4	15	19	5.9
35 Mauritius/Maurice	1.3	1.5	2.3	41	88	20.8
36 Mayotte	0.1	0.1 [91]	14.7	41	42 [91]	1.1
37 Mozambique	2.7	2.4	-3.1	17	24	8.1
38 Namibia/Namibie	...	2.1	...	...	34	...
39 Niger	...	1.2	...	...	11	...
40 Nigeria/Nigéria	16.4	14.5	-3.1	18	25	9.7
41 Réunion	0.8	0.8 [91]	-1.5	200	219 [91]	9.4
42 Rwanda	0.6	0.8	7.6	18	20	1.9
43 S. Tomé & Principe/Sao Tomé-et-Principe	0.2	0.2	-5.4	11	15	8.7
44 Senegal/Sénégal	1.9	1.9	-0.4	23	38	13.4
45 Seychelles	0.3	0.3	0.6	28	40	8.9
46 Sierra Leone	0.6	1.0	12.0	22	16	-6.9
47 Somalia/Somalie	...	1.5 [91]	...	...	10 [91]	...
48 Sudan/Soudan	...	2.1	...	...	30	...
49 Swaziland	0.4	0.5	3.5	34	41	4.3
50 Tanzania/Tanzanie	4.9	4.7	-1.0	15	19	5.9
51 Togo	0.6	0.9	10.3	17	24	8.3
52 Uganda/Ouganda	2.2	1.2	-13.9	13	29	22.8
53 Zaire/Zaïre	...	...	...	...	...	...
54 Zambia/Zambie	3.7	2.8	-6.7	17	28	12.8
55 Zimbabwe	5.1	5.4	1.6	24	25	0.6
Sub-Saharan / Subsaharienne	**90.5**	**97.6**	**-0.4**	**19**	**25**	**6.7**
AFRICA / AFRIQUE	**257.2**	**256.0**	**-1.0**	**33**	**45**	**8.6**

Note: For data comparability and coverage, see the technical notes /
Pour la comparabilité et le champ de définition des données, voir les notes techniques.

Source: ITU / UIT.

14. Telecommunications revenue / Recettes des télécommunications

		Telecommunications revenue / Recettes des télécommunications					As a % of GDP / En % du PIB
		Total (M US$) 1994	CAGR / TCAC (US$) 1990-94	Per inhabitant / Par habitant (US$) 1994	Per main line / Par LP (US$) 1994	Per employee / Par employé (US$) 1994	1994
1 Algeria/Algérie		231.3	-10.7	8.5	206	12'506	0.5
2 Egypt/Egypte		531.8	-0.2	9.2	217	10'152	1.4
3 Libya/Libye	[92]	280.1	5.9	57.5	1'188	31'524	...
4 Morocco/Maroc		549.9	11.9	20.8	554	41'053	1.7
5 Tunisia/Tunisie		218.3	12.2	24.8	460	33'942	1.6
North / Nord		**1'811.4**	**2.5**	**14.5**	**343**	**18'189**	**1.2**
6 South Africa/Sudafricaine (Rép.)		2'715.6	4.9	65.3	706	46'190	2.2
South Africa / Afrique du Sud		**2'715.6**	**4.9**	**65.3**	**706**	**46'190**	**2.2**
7 Angola	[93]	16.7	-38.0	1.6	313	7'904	...
8 Benin/Bénin		23.6	-0.9	4.5	988	16'607	1.6
9 Botswana		68.9	3.8	47.8	1'366	41'904	1.8
10 Burkina Faso		26.9	-6.7	2.7	1'021	22'125	1.0 [93]
11 Burundi		14.9	10.3	2.4	944	23'536	1.7
12 Cameroon/Cameroun		66.9	-7.0	5.2	1'149	34'202	1.1
13 Cape Verde/Cap-Vert		21.1	13.8	55.3	1'135	50'035	6.3
14 Central African Rep./Centrafricaine (Rép.)		12.1	5.9	3.7	1'639	31'884	1.2
15 Chad/Tchad		8.6	-14.8	1.4	1'812	26'229	0.9
16 Comoros/Comores		3.1	8.3	6.3	717	25'092	1.5
17 Congo		41.2	-9.9	16.4	2'005	44'751	2.6
18 Côte d'Ivoire		112.7	-8.6	8.2	1'039	31'056	1.7
19 Djibouti		21.0	0.3	37.2	2'798	43'807	4.5 [93]
20 Equatorial Guinea/Guinée équatoriale		...	...	...	...	...	...
21 Eritrea/Erythrée		13.3	...	3.9	872	23'832	2.6 [93]
22 Ethiopia/Ethiopie		53.4	-7.6	1.0	388	10'235	1.1
23 Gabon		82.6	0.2	79.8	2'631	104'437	2.1
24 Gambia/Gambie		19.0	13.1	17.6	1'039	25'098	5.1
25 Ghana		61.5	12.0	3.6	1'231	16'505	1.1
26 Guinea/Guinée		12.5	-17.3	1.9	1'341	14'629	0.4
27 Guinea-Bissau/Guinée-Bissau		10.0	9.6	9.5	1'109	39'220	4.1
28 Kenya		258.6	9.1	9.9	1'131	18'162	3.7
29 Lesotho	[93]	12.5	-3.9	6.4	1'026	15'721	1.6 [93]
30 Liberia/Libéria	[92]	9.5	...	3.5	2'120	18'102	...
31 Madagascar	[93]	32.9	9.0	2.6	947	13'311	1.0 [93]
32 Malawi	[93]	26.2	-6.8	2.5	800	6'549	1.3 [93]
33 Mali		30.7	-3.9	3.2	2'018	22'722	1.6
34 Mauritania/Mauritanie		22.6	7.7	10.2	2'680	49'629	2.2
35 Mauritius/Maurice		90.1	31.4	81.6	696	61'509	2.6
36 Mayotte		...	...	...	...	...	...
37 Mozambique		6.4	-38.9	0.4	112	2'658	0.4
38 Namibia/Namibie		61.8	...	41.2	886	30'150	2.1
39 Niger		16.3	...	1.8	1'310	13'885	1.1
40 Nigeria/Nigéria		459.7	13.6	4.3	1'247	31'787	1.0
41 Réunion		...	...	...	...	...	...
42 Rwanda	[93]	12.2	-17.9	1.6	1'017	18'771	0.8 [93]
43 S. Tomé & Principe/Sao Tomé-et-Principe		3.9	...	31.5	1'598	23'684	13.6
44 Senegal/Sénégal		103.5	-1.5	12.8	1'436	54'673	2.7
45 Seychelles		28.1	8.6	384.7	2'252	90'019	6.2
46 Sierra Leone		13.1	26.7	2.9	833	13'697	1.6
47 Somalia/Somalie		...	...	...	...	...	...
48 Sudan/Soudan	[91]	13.1	...	0.5	206	1'518	0.2 [91]
49 Swaziland		22.8	3.3	25.1	1'223	49'902	2.1
50 Tanzania/Tanzanie		67.8	5.0	2.3	767	14'509	2.9 [93]
51 Togo		14.0	-14.3	3.5	654	15'668	1.4
52 Uganda/Ouganda		41.5	9.4	2.2	1'189	34'075	0.9
53 Zaire/Zaïre	[92]	38.9	...	1.0	1'081	...	...
54 Zambia/Zambie		80.2	-4.6	8.7	1'005	28'336	2.6
55 Zimbabwe		122.4	0.4	11.1	908	22'709	2.5 [93]
Sub-Saharan / Subsaharienne		**2'278.9**	**1.8**	**4.4**	**1'019**	**22'201**	**1.5**
AFRICA / AFRIQUE		**6'806.0**	**3.2**	**10.0**	**599**	**26'100**	**1.6**

Note: For data comparability and coverage, see the technical notes /
Pour la comparabilité et le champ de définition des données, voir les notes techniques.

Source: ITU / UIT.

15. Telecommunications investment / Investissements en télécommunication

		Investment / Investissements					Equipment imports / Importations de matériel (M US$) 1993
		Total (M US$) 1994	Average / Moyenne (M US$) 1990-94	P. inhabitant / P. habitant (US$) 1994	As a % of revenue / En % des recettes 1994	As a % of GFCF / En % de la FBCF 1994	
1 Algeria/Algérie		127.5	167.2	5	55.1	0.9	93.4
2 Egypt/Egypte		296.3	245.6	5	55.7	4.0	179.7
3 Libya/Libye	[92]	210.7	188.7	43	75.2	...	94.8 [91]
4 Morocco/Maroc		365.2	293.3	14	66.4	5.5	84.5
5 Tunisia/Tunisie		121.8	97.0	14	55.8	3.2	99.1
North / Nord		**1'121.5**	**991.8**	**9.0**	**61.9**	**2.9**	**551.5**
6 South Africa/Sudafricaine (Rép.)		785.9	653.3	19	28.9	3.6	382.9 [92]
South Africa / Afrique du Sud		**785.9**	**653.3**	**18.9**	**28.9**	**3.6**	**382.9**
7 Angola		...	...	...	...	...	...
8 Benin/Bénin		14.6	12.3	3	61.8	4.9	...
9 Botswana		38.2	48.8	26	55.4	2.6 [92]	...
10 Burkina Faso		11.8	16.9	1	43.9	1.9 [93]	...
11 Burundi	[92]	0.8	3.2	-	5.9	0.4 [92]	1.7 [91]
12 Cameroon/Cameroun		25.5	48.5	2	38.2	3.1	39.4 [91]
13 Cape Verde/Cap-Vert		4.6	4.9	12	21.9	3.3 [93]	...
14 Central African Rep./Centrafricaine (Rép.)		1.3	6.1	-	11.0	1.1	...
15 Chad/Tchad		4.3	7.4	1	49.9	3.8 [93]	...
16 Comoros/Comores	[93]	0.9	1.8	2	19.7	2.4 [93]	...
17 Congo		-	0.9	-	-	- [93]	...
18 Côte d'Ivoire	[93]	40.9	80.5	3	19.3	4.7 [93]	...
19 Djibouti	[92]	8.2	9.1	15	37.8	11.3 [92]	6.3 [92]
20 Equatorial Guinea/Guinée équatoriale		...	-	...	...	...	...
21 Eritrea/Erythrée		2.6	1.5	1	19.8	...	...
22 Ethiopia/Ethiopie		12.0	12.8	-	22.5	1.4	4.0
23 Gabon	[92]	23.6	23.0	24	19.5	1.9 [92]	...
24 Gambia/Gambie		3.4	9.1	3	18.0	5.0	...
25 Ghana	[91]	8.6	7.4	1	17.3	0.7 [91]	11.9 [92]
26 Guinea/Guinée		...	-	...	...	...	...
27 Guinea-Bissau/Guinée-Bissau		...	-	...	...	...	...
28 Kenya		62.6	122.6	2	24.2	4.4	64.5 [92]
29 Lesotho	[91]	4.7	3.9	3	34.6	0.9 [91]	...
30 Liberia/Libéria		...	-	...	...	...	...
31 Madagascar	[92]	7.1	4.5	1	27.4	2.1 [92]	3.3
32 Malawi	[92]	22.7	18.3	2	52.4	6.5 [92]	...
33 Mali		1.4	7.7	-	4.5	0.3	...
34 Mauritania/Mauritanie		3.4	2.6	2	14.8	1.9	...
35 Mauritius/Maurice		33.5	47.2	30	37.2	3.1	23.7
36 Mayotte		...	-	...	...	...	...
37 Mozambique	[93]	21.6	27.0	1	34.9	2.5 [93]	...
38 Namibia/Namibie		19.6	17.0	13	31.7	3.4	...
39 Niger		2.6	2.1	-	16.2	2.1 [93]	...
40 Nigeria/Nigéria		105.2	116.3	1	22.9	2.4	...
41 Réunion		...	37.1	...	...	...	28.0
42 Rwanda		...	-	...	...	...	...
43 S. Tomé & Principe/Sao Tomé-et-Principe		0.4	1.4	3	10.8	1.7	...
44 Senegal/Sénégal		14.6	28.1	2	14.1	2.4	17.5 [91]
45 Seychelles		7.9	6.9	108	28.2	7.2	7.0
46 Sierra Leone		2.1	1.9	-	16.1	2.8	...
47 Somalia/Somalie		...	-	...	...	...	...
48 Sudan/Soudan		...	-	...	...	...	...
49 Swaziland		15.3	11.7	17	67.3	9.2	...
50 Tanzania/Tanzanie		6.9	9.1	-	10.1	0.6 [93]	...
51 Togo		3.2	7.7	1	22.7	2.8	13.4 [91]
52 Uganda/Ouganda		2.9	12.6	-	7.1	0.5	...
53 Zaire/Zaïre		...	-	...	...	...	...
54 Zambia/Zambie		16.2	23.7	2	20.3	5.9	...
55 Zimbabwe		49.1	45.3	4	40.1	3.9 [93]	50.4
Sub-Saharan / Subsaharienne		**604.4**	**848.8**	**1.4**	**25.6**	**2.6**	**270.9**
AFRICA / AFRIQUE		**2'511.8**	**2'493.9**	**4.3**	**36.5**	**3.0**	**1'205.3**

Note: For data comparability and coverage, see the technical notes /
Pour la comparabilité et le champ de définition des données, voir les notes techniques.

Source: ITU / UIT.

16. Multimedia / Multimédia

	Internet hosts / Serveurs Internet		Estimated PCs / PC estimés		Television receivers / Téléviseurs	
	Total	P. 1'000'000 inhab./habit.	Total (k)	P. 100 inhab./habit.	Total (k)	P. 100 inhab./habit.
	1995	1995	1994	1994	1994	1994
1 Algeria/Algérie	16	0.6	...	...	1'945	7.1
2 Egypt/Egypte	591	10.3	194	0.3	6'500 [92]	11.7
3 Libya/Libye	-	-	...	...	600	11.5
4 Morocco/Maroc	234	8.8	...	...	1'830	6.9
5 Tunisia/Tunisie	82	9.3	44	0.5	780	8.8
North / Nord	**923**	**7.4**	**...**	**...**	**11'655**	**9.5**
6 South Africa/Sudafricaine (Rép.)	48'277	1'160.8	875	2.1	4'100	9.9
South Africa / Afrique du Sud	**48'277**	**1'160.8**	**...**	**...**	**4'100**	**9.9**
7 Angola	-	-	...	...	450	4.2
8 Benin/Bénin	-	-	...	...	300	5.7
9 Botswana	-	-	...	...	30	2.1
10 Burkina Faso	-	-	...	...	50 [92]	0.5
11 Burundi	-	-	...	...	40 [93]	0.7
12 Cameroon/Cameroun	-	-	...	...	960	7.5
13 Cape Verde/Cap-Vert	-	-	...	...	1 [92]	0.3
14 Central African Rep./Centrafricaine (Rép.)	-	-	...	...	16	0.5
15 Chad/Tchad	-	-	-	-	7	0.1
16 Comoros/Comores	-	-	...	...	2	0.5
17 Congo	-	-	...	...	42	1.7
18 Côte d'Ivoire	3	0.2	...	...	790 [93]	5.9
19 Djibouti	-	-	...	...	36	6.4
20 Equatorial Guinea/Guinée équatoriale	-	-	...	...	35	9.0
21 Eritrea/Erythrée	-	-	...	...	20 [93]	0.6
22 Ethiopia/Ethiopie	1	-	...	...	230	0.4
23 Gabon	-	-	...	...	51	4.9
24 Gambia/Gambie	-	-	...	...	...	...
25 Ghana	6	0.4	...	...	250 [92]	1.6
26 Guinea/Guinée	2	0.3	...	...	180	2.8
27 Guinea-Bissau/Guinée-Bissau	-	-	...	...	...	...
28 Kenya	17	0.7	...	...	462	1.8
29 Lesotho	-	-	...	...	11 [92]	0.6
30 Liberia/Libéria	-	-	...	...	51 [92]	1.9
31 Madagascar	-	-	...	...	320	2.4
32 Malawi	-	-	...	...	...	...
33 Mali	-	-	...	...	110	1.2
34 Mauritania/Mauritanie	-	-	...	...	79 [93]	3.7
35 Mauritius/Maurice	-	-	...	...	210 [93]	19.2
36 Mayotte	-	-	...	...	...	...
37 Mozambique	-	-	...	...	51	0.3
38 Namibia/Namibie	11	7.3	...	...	46	3.1
39 Niger	-	-	...	...	200	2.3
40 Nigeria/Nigéria	-	-	440	0.4	3'800 [92]	3.7
41 Réunion	-	-	...	...	135	21.0
42 Rwanda	-	-	...	...	10 [93]	0.1
43 S. Tomé & Principe/Sao Tomé-et-Principe	-	-	...	...	...	...
44 Senegal/Sénégal	14	1.7	45	0.6	282 [92]	3.7
45 Seychelles	-	-	...	...	24	32.3
46 Sierra Leone	-	-	...	...	65	1.4
47 Somalia/Somalie	-	-	...	...	113 [92]	1.3
48 Sudan/Soudan	-	-	...	...	2'060 [92]	7.9
49 Swaziland	1	1.1	...	...	65	7.2
50 Tanzania/Tanzanie	-	-	...	...	450	1.6
51 Togo	-	-	...	...	46	1.1
52 Uganda/Ouganda	58	3.1	...	...	400	2.2
53 Zaire/Zaïre	-	-	...	...	1'600	3.8
54 Zambia/Zambie	69 [94]	7.5	...	...	310	3.4
55 Zimbabwe	93	8.5	...	...	280 [92]	2.7
Sub-Saharan / Subsaharienne	**275**	**0.5**	**...**	**...**	**14'669**	**2.9**
AFRICA / AFRIQUE	**49'475**	**70.7**	**...**	**...**	**30'424**	**4.5**

Note: For data comparability and coverage, see the technical notes /
Pour la comparabilité et le champ de définition des données, voir les notes techniques.

Source: ITU, Internet Society. / UIT, Internet Society.

17. Projections / Prévisions

	Main telephone lines / Lignes téléphoniques principales						Estimated investment / Investissements estimés (1995-2000)	
	Total (k)			per 100 inhabitants / pour 100 habitants			(M US$)	
	1994	(I) 2000	(II) 2000	1994	(I) 2000	(II) 2000	(I)	(II)
1 Algeria/Algérie	1'122	1'807	2'000	4.11	5.83	6.45	1'027	1'316
2 Egypt/Egypte	2'456	5'025	3'750	4.27	7.98	5.95	3'853	1'941
3 Libya/Libye	264	350	...	5.06	5.42	...	129	...
4 Morocco/Maroc	993	3'440	2'315	3.75	11.47	7.72	3'671	1'983
5 Tunisia/Tunisie	474	904	1'300	5.38	9.04	13.00	644	1'239
North / Nord	**5'310**	**11'525**	**9'365**	**4.23**	**8.21**	**6.99**	**9'323**	**6'479**
6 South Africa/Sudafricaine (Rép.)	3'845	5'157	5'000	9.24	10.97	10.64	1'969	1'733
South Africa / Afrique du Sud	**3'845**	**5'157**	**5'000**	**9.24**	**10.97**	**10.64**	**1'969**	**1'733**
7 Angola	53 [93]	45	...	0.52	0.34	...	...	...
8 Benin/Bénin	24	42	56	0.46	0.70	0.93	27	48
9 Botswana	50	140	122	3.50	6.99	6.12	134	108
10 Burkina Faso	26	54	125	0.26	0.45	1.04	42	148
11 Burundi	16	34	18	0.25	0.49	0.26	27	3
12 Cameroon/Cameroun	58	94	...	0.45	0.59	...	54	...
13 Cape Verde/Cap-Vert	19	54	44	4.87	12.17	9.89	53	38
14 Central African Rep./Centrafricaine (Rép.)	7	13	27	0.23	0.31	0.68	8	29
15 Chad/Tchad	5	6	7	0.08	0.09	0.09	3	3
16 Comoros/Comores	4	8	6	0.88	1.37	1.05	5	3
17 Congo	21	28	...	0.82	0.94	...	11	...
18 Côte d'Ivoire	108	176	...	0.79	1.04	...	102	...
19 Djibouti	8	12	16	1.33	1.70	2.31	6	13
20 Equatorial Guinea/Guinée équatoriale	3	5	...	0.65	1.08	...	4	...
21 Eritrea/Erythrée	15	...	...	0.44	...	...	...	...
22 Ethiopia/Ethiopie	138	179	306	0.26	0.27	0.46	62	253
23 Gabon	31	58	...	3.03	2.90	...	40	...
24 Gambia/Gambie	18	65	26	1.69	4.69	1.88	70	12
25 Ghana	50	62	110	0.30	0.31	0.55	18	90
26 Guinea/Guinée	9	9	60	0.14	0.11	0.75	...	76
27 Guinea-Bissau/Guinée-Bissau	9	15	25	0.86	1.47	2.51	9	24
28 Kenya	229	344	...	0.88	1.11	...	173	...
29 Lesotho	12 [93]	15	91	0.63	0.74	4.57	4	119
30 Liberia/Libéria	5 [93]	2	...	0.16	0.06	...	...	...
31 Madagascar	34	44	42	0.26	0.28	0.26	16	12
32 Malawi	33	46	242	0.31	0.42	2.20	20	313
33 Mali	15	26	49	0.16	0.22	0.41	17	50
34 Mauritania/Mauritanie	8	16	15	0.38	0.53	0.51	11	10
35 Mauritius/Maurice	129	336	...	11.72	33.59	...	310	...
36 Mayotte	4 [93]	12	...	3.98	8.71	...	12	...
37 Mozambique	57	80	202	0.34	0.40	1.01	35	217
38 Namibia/Namibie	70	100	...	4.65	4.99	...	45	...
39 Niger	12	18	12	0.14	0.16	0.11	8	...
40 Nigeria/Nigéria	369	577	1'000	0.34	0.45	0.78	313	947
41 Réunion	199 [93]	354	...	31.37	49.78	...	233	...
42 Rwanda	15	28	17	0.19	0.31	0.19	19	3
43 S. Tomé & Principe/Sao Tomé-et-Principe	2	3	4	1.97	1.91	2.87	-	2
44 Senegal/Sénégal	72	180	...	0.89	1.80	...	161	...
45 Seychelles	12	22	...	17.08	27.46	...	14	...
46 Sierra Leone	16	20	20	0.34	0.39	0.40	6	6
47 Somalia/Somalie	15	15	...	0.17	0.15	...	...	...
48 Sudan/Soudan	64	69	650	0.23	0.21	1.97	8	879
49 Swaziland	19	29	...	2.05	2.64	...	16	...
50 Tanzania/Tanzanie	88	118	536	0.31	0.36	1.63	45	672
51 Togo	21	48	20	0.53	0.95	0.40	39	...
52 Uganda/Ouganda	35	45	63	0.19	0.21	0.29	16	42
53 Zaire/Zaïre	36	44	...	0.08	0.09	...	13	...
54 Zambia/Zambie	80	109	...	0.87	1.09	...	44	...
55 Zimbabwe	135	157	...	1.23	1.30	...	33	...
Sub-Saharan / Subsaharienne	**2'459**	**3'953**	**3'912**	**0.46**	**0.63**	**0.87**	**2'281**	**4'122**
AFRICA / AFRIQUE	**11'613**	**20'636**	**18'277**	**1.66**	**2.52**	**2.91**	**13'573**	**12'334**

Note: For data comparability and coverage, see the technical notes.
I = projections based on average growth rate in main telephone lines over last 6 years.
II = projections based on national telecommunication development plans.
US$ 1'500 per main line used for estimated investment. /
Pour la comparabilité et le champ de définition des données, voir les notes techniques.
I = prévisions fondées sur le taux de croissance annuel moyen des lignes principales au cours des 6 dernières années.
II = prévisions fondées sur les plans de développpement nationaux.
Estimations des investissements fondées sur un prix de 1'500 US$ par ligne principale.

Source: ITU / UIT.

18. Africa's top telecommunication operators / Premiers exploitants des télécommunications en Afrique

	Telecommunications revenue / Recettes des télécommunications			*Main telephone lines / Lignes principales*		*Employees / Employés*	
		Change / Variation					
			Local currency / Monnaie nationale		*Change / Variation*		*Change / Variation*
	Total (M US$)	*Dollars (%)*	*(%)*	*Total*	*(%)*	*Total*	*(%)*
Operator / Exploitant	*1994*	*1993-94*	*1993-94*	*1994*	*1993-94*	*1994*	*1993-94*
1 Telkom (South Africa / R. Sudafric.)	2'796.79	9.1%	18.7%	3'844'529	5.0%	58'793	-2.3%
2 ONPT (Morocco / Maroc)	638.67	14.3%	13.1%	992'751	20.9%	13'396	6.0%
3 ARENTO (Egypt / Egypte)	531.79	6.1%	7.2%	2'456'161	9.9%	52'383	-1.0%
4 NITEL (Nigeria / Nigéria)	459.67	2.6%	2.3%	368'715	7.7%	14'600	-3.3%
5 KPTC (Kenya)	258.55	5.5%	2.0%	228'522	6.4%	10'578	-21.1%
6 MPT (Algeria / Algérie)	231.25	-14.9%	27.8%	1'122'409	5.1%	18'492	-18.6%
7 DGT (Tunisia / Tunisie)	218.32	13.0%	13.9%	474'253	12.6%	7'600	0.0%
8 GPTC (Libya / Lybie)	*145.17*	...	...	*235'803*	...	*8'886*	...
9 PTC (Zimbabwe)	122.47	17.5%	47.9%	134'812	5.3%	5'392	4.9%
10 TELCOM (Côte d'Ivoire)	118.08	-48.6%	0.9%	103'308	14.6%	3'730	-1.3%
11 SONATEL (Senegal / Sénégal)	103.55	-23.0%	50.9%	72'024	12.4%	1'894	-0.8%
12 OPT (Gabon)	82.61	-20.7%	55.5%	31'398	5.2%	791	6.2%
13 Zamtel (Zambia / Zambie)	80.19	-15.8%	48.9%	79'662	2.2%	2'934	-6.1%
14 TTCL (Tanzania / Tanzanie)	70.10	3.6%	30.2%	88'315	3.9%	4'752	-2.0%
15 BTC (Botswana)	68.93	1.6%	12.8%	50'447	16.0%	1'623	1.3%
16 Mauritius Telecom (Maurice)	67.78	21.9%	24.1%	129'443	21.1%	1'465	3.2%
17 TDM (Mozambique)	64.28	4.0%	68.8%	57'199	-7.9%	2'418	-2.7%
18 Telecom Namibia (Namibie)	61.81	-10.3%	-2.5%	69'784	4.5%	2'050	4.8%
19 PTC (Ghana)	61.55	27.1%	89.5%	50'007	2.7%	3'729	-2.0%
20 ETA (Ethiopia /Ethiopie)	51.44	3.4%	13.0%	137'371	3.7%	5'222	-1.4%
Top 20 / 20 premiers	**6'233.00**	**3.7%**	**16.7%**	**10'726'913**	**8.2%**	**220'728**	**-4.0%**
Africa total / Total Afrique	**6'942.00**	**...**	**...**	**11'586'000**	**...**	**254'000**	**...**

Note: Data for GPTC (Libya) relates to 1992 / Les données de GPTC (Libye) se réfère à 1992.

Source: ITU / UIT.

Algeria / Algérie

Land area / Superficie (km²): 2'381'745
Local currency / Monnaie nationale: Dinar
Capital / Capitale: Algiers

		Year ending / Année se terminant le 31.12				
		1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	25'509	26'096	26'722	27'325	...
Gross Domestic Product / Produit Intérieur Brut	M	844'500	1'045'200	1'161'700	1'483'200	...
GDP per capita / PIB par habitant	US$	1'792	1'834	1'862	1'548	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	5'740	5'380	5'330	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	268'900	322'400	339'200	484'600	...
Average exchange rate per US$ / Taux de change moyen par US$		18.47	21.84	23.35	35.06	...
Consumer price index (1987=100) / Indice des prix à la consommation		167.06	223.39	269.74	348.10	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		883'120	962'247	1'068'094	1'122'409	...
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		3.46	3.69	4.00	4.11	...
Telephone stations (sets) / Postes téléphoniques (appareils)		1'162'211	1'238'969	1'348'200	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		1'112'300	1'253'771	1'290'176	1'378'400	...
% of digital main lines / % de lignes principales numériques	%	...	...	27.2	29.4	...
Waiting list / Liste d'attente		754'900	756'908	687'964	646'700	...
Public pay phones / Publiphones		5'821	6'387	7'386	6'722	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		4'781	4'781	4'781	1'348	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		11'395	11'969	12'429	12'501	...
Estimated facsimile machines / Postes de télécopie estimés (1)		...	5'000	5'500	4'138	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		19'124	19'208	22'712	18'492	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		22	20	21	16	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	4'128.72	5'355.00	6'703.02	8'106.55	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	0.5	0.5	0.6	0.5	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	2'240.00	3'607.20	4'657.25	4'470.00	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	0.8	1.1	1.4	0.9	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (2)	k	1'800	1'825	1'845	1'945	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		7.06	6.99	6.90	7.12	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Ministère des Postes et Télécommunications.
(1) Estimate. 1994: MPT. / Estimation. 1994: MPT.
(2) Sources: Entreprise Nationale de Télévision, EBU, ITU estimates. / Sources: Entreprise Nationale de Télévision, EBU, estimations UIT.

Source: ITU / UIT.

Angola

Land area / Superficie (km²): *1'246'700*
Local currency / Monnaie nationale: *New Kwanza*
Capital / Capitale: *Luanda*

			Year ending / Année se terminant le 31.12				
			1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE							
Population / Population		k	9'542	9'904	10'276	10'674	...
Gross Domestic Product / Produit Intérieur Brut	(1)	M	...	...	...	...	...
GDP per capita / PIB par habitant		US$	...	...	...	...	...
GNP per capita (PPP) / PNB par habitant (PPA)		US$	...	...	...	...	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe		M	...	...	...	...	...
Average exchange rate per US$ / Taux de change moyen par US$			90.00	550.00	6'500.00	...	...
Consumer price index (1987=100) / Indice des prix à la consommation			...	...	...	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE							
Main telephone lines / Lignes téléphoniques principales			72'000	48'900	53'300	...	60'000
Main lines per 100 inhabitants / Lignes principales pour 100 habitants			0.75	0.49	0.52	...	...
Telephone stations (sets) / Postes téléphoniques (appareils)			...	...	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques			...	83'900	...	...	86'500
% of digital main lines / % de lignes principales numériques		%	—	—	—	...	...
Waiting list / Liste d'attente			...	...	...	...	...
Public pay phones / Publiphones			...	19	...	...	...
MOBILE SERVICES / SERVICES MOBILES							
Cellular telephone subscribers / Abonnés au téléphone cellulaire			—	—	1'100	...	1'994
OTHER SERVICES / AUTRES SERVICES							
Telex subscribers / Abonnés télex			798	899	...	642	588
Estimated facsimile machines / Postes de télécopie estimés			...	...	...	...	...
STAFF / EFFECTIFS							
Full-time telecommunication staff / Personnel des télécom à plein temps			2'080	2'090	2'110	2'214	2'247
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes			29	43	40	...	37
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES							
Total telecom revenue / Recettes totales des télécom		M	3'176.72	34'000.00	108'400.00	...	12'105.47
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB		%	...	...	...	...	...
CAPITAL EXPENDITURE / INVESTISSEMENTS							
Annual investment in telecom / Investissement annuel en télécom		M	...	...	...	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.		%	...	...	...	...	...
BROADCASTING / RADIODIFFUSION							
Television receivers / Téléviseurs	(2)	k	59	250	300	450	550
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants			0.62	2.52	2.92	4.22	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Empresa de Telecomunicaçoes de Angola .

(1) GDP at factor cost. Source: Ministry of Transport and Communications. / PIB au coût des facteurs . Source: Ministère des transports et des communications.

(2) Source: Televisão Popular de Angola. / Source: Televisão Popular de Angola.

Source: ITU / UIT.

Benin / Bénin

Land area / Superficie (km²): *112'622*
Local currency / Monnaie nationale: *CFA Franc*
Capital / Capitale: *Porto Novo*

		Year ending / Année se terminant le 31.12				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	4'779	4'929	5'086	5'246	...
Gross Domestic Product / Produit Intérieur Brut	M	535'500	573'700	601'800	845'100	...
GDP per capita / PIB par habitant	US$	397	440	418	290	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	1'500	1'620	1'660	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	76'800	79'300	86'100	165'900	...
Average exchange rate per US$ / Taux de change moyen par US$		282.11	264.69	283.16	555.20	...
Consumer price index (1987=100) / Indice des prix à la consommation		...	...	...	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		15'011	15'760	20'409	23'945	28'206
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.31	0.32	0.40	0.46	...
Telephone stations (sets) / Postes téléphoniques (appareils)		17'811	18'100	23'100	26'445	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		24'400	24'400	35'724	35'724	38'696
% of digital main lines / % de lignes principales numériques	%	—	—	76.0	70.0	70.0
Waiting list / Liste d'attente		...	...	7'370	7'200	...
Public pay phones / Publiphones		...	165	161	166	267
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	1'050
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		283	240	243	225	207
Estimated facsimile machines / Postes de télécopie estimés (1)		184	300	500	600	800
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		1'560	1'531	1'528	1'424	1'389
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		104	97	75	59	49
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	7'273.11	7'391.90	9'558.54	13'129.34	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.4	1.3	1.6	1.6	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	262.35	5'607.00	6'547.00	8'114.91	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	0.3	7.1	7.6	4.9	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (2)	k	83	90	105	300	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		1.74	1.83	2.06	5.72	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Office des Postes et Télécommunications.
(1) 1992: Estimate. / 1992: Estimation.
(2) Source: OPT. / Source: OPT.

Source: ITU / UIT.

Botswana

Land area / Superficie (km^2): 575'000
Local currency / Monnaie nationale: Pula
Capital / Capitale: Gaborone

Year ending / Année se terminant le 31.03

			1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE							
Population / Population		k	1'316	1'357	1'401	1'443	...
Gross Domestic Product / Produit Intérieur Brut		M	6'995	7'810	8'491	10'328	...
GDP per capita / PIB par habitant		US$	2'636	2'700	2'506	2'666	...
GNP per capita (PPP) / PNB par habitant (PPA)		US$	...	5'190	5'160	5'320	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe		M	2'853	3'186	...	...	...
Average exchange rate per US$ / Taux de change moyen par US$			2.02	2.13	2.42	2.68	...
Consumer price index (1987=100) / Indice des prix à la consommation			151.00	175.00	200.00	221.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE							
Main telephone lines / Lignes téléphoniques principales			26'367	32'607	36'477	43'487	50'447
Main lines per 100 inhabitants / Lignes principales pour 100 habitants			2.07	2.48	2.69	3.10	3.50
Telephone stations (sets) / Postes téléphoniques (appareils)			49'807	60'577	66'095	76'069	86'401
Total line exchange capacity / Capacité totale des centraux téléphoniques			31'198	36'806	52'458	58'924	65'512
% of digital main lines / % de lignes principales numériques		%	...	...	97.8	99.7	100.0
Waiting list / Liste d'attente			7'368	8'911	11'230	11'842	24'786
Public pay phones / Publiphones			285	301	413	528	457
MOBILE SERVICES / SERVICES MOBILES							
Cellular telephone subscribers / Abonnés au téléphone cellulaire			—	—	—	—	—
OTHER SERVICES / AUTRES SERVICES							
Telex subscribers / Abonnés télex			623	603	419	383	344
Estimated facsimile machines / Postes de télécopie estimés			820	1'100	1'300	1'700	2'100
STAFF / EFFECTIFS							
Full-time telecommunication staff / Personnel des télécom à plein temps			1'150	1'215	1'479	1'602	1'645
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes			44	37	41	37	33
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES							
Total telecom revenue / Recettes totales des télécom		M	110.44	132.71	147.94	164.10	185.06
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB		%	1.8	1.9	1.9	1.9	1.8
CAPITAL EXPENDITURE / INVESTISSEMENTS							
Annual investment in telecom / Investissement annuel en télécom	(1)	M	52.17	93.72	161.15	134.55	102.61
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.		%	2.1	3.3	5.1	...	...
BROADCASTING / RADIODIFFUSION							
Television receivers / Téléviseurs	(2)	k	20	21	22	28	30
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants			1.57	1.60	1.62	2.00	2.08

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Botwsana Telecommunication Corporation.
(1) Purchase of fixed assets. / Acquisition d'actifs fixes.
(2) Source: Radio Botswana. Note: No local TV service. / Source: Radio Botswana. Note: Pas de services TV locaux.

Source: ITU / UIT.

Burkina Faso

Land area / Superficie (km²): *274'122*
Local currency / Monnaie nationale: *CFA Franc*
Capital / Capitale: *Ouagadougou*

		Year ending / Année se terminant le 31.12				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	9'239	9'498	9'772	10'046	...
Gross Domestic Product / Produit Intérieur Brut	M	776'500	778'000	797'000	...	...
GDP per capita / PIB par habitant	US$	298	309	288	...	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	730	770	770	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	176'300	166'800	176'100	...	...
Average exchange rate per US$ / Taux de change moyen par US$		282.11	264.69	283.16	555.20	...
Consumer price index (1987=100) / Indice des prix à la consommation		105.00	103.00	104.00	130.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		17'844	19'784	21'873	26'328	30'325
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.19	0.21	0.22	0.26	...
Telephone stations (sets) / Postes téléphoniques (appareils)		...	...	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		33'578	33'578	34'036	33'896	38'367
% of digital main lines / % de lignes principales numériques	%	65.0	78.0	81.1	84.8	85.1
Waiting list / Liste d'attente		...	...	...	...	...
Public pay phones / Publiphones		31	54	86	144	148
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		323	306	260	238	173
Estimated facsimile machines / Postes de télécopie estimés		...	...	...	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		1'155	1'171	1'193	1'215	1'220
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		65	59	55	46	40
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	10'287.70	11'961.32	13'516.75	14'925.20	18'508.57
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.3	1.5	1.7	...	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	4'820.00	5'110.00	6'425.19	6'557.00	5'716.02
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	2.7	3.1	3.6	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (1)	k	49	50	...	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		0.53	0.53	...	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Office National des Télécommunications.
(1) Source: Unesco. / Source: Unesco.

Source: ITU / UIT.

Burundi

		Year ending / Année se terminant le 31.12				
Land area / Superficie (km²):	*27'834*					
Local currency / Monnaie nationale:	*Franc*					
Capital / Capitale:	*Bujumbura*	**1991**	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	5'670	5'843	6'026	6'209	...
Gross Domestic Product / Produit Intérieur Brut	M	211'898	226'385	230'240	222'819	...
GDP per capita / PIB par habitant	US$	206	186	157	142	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	750	740	580	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	35'625	44'484	41'110	24'983	...
Average exchange rate per US$ / Taux de change moyen par US$		181.51	208.30	242.78	252.66	...
Consumer price index (1987=100) / Indice des prix à la consommation		136.00	142.00	156.00	179.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		10'236	12'888	15'550	15'804	17'169
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.18	0.22	0.26	0.25	...
Telephone stations (sets) / Postes téléphoniques (appareils)		11'260	14'374	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		16'930	17'130	19'130	...	21'130
% of digital main lines / % de lignes principales numériques	%	84.0	86.0	87.7	88.1	99.0
Waiting list / Liste d'attente		3'300	4'995	...	...	...
Public pay phones / Publiphones		87	108	108	...	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	320	343	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		257	257	285	...	...
Estimated facsimile machines / Postes de télécopie estimés		...	...	78	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		504	559	604	634	607
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		49	43	39	40	35
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	2'386.40	2'966.39	3'200.00	3'770.11	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.1	1.3	1.4	1.7	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	187.47	173.75	...	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	0.5	0.4	...	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (1)	k	5	30	40	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		0.09	0.51	0.66	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Office National des Télécommunications.
(1) Source: Radio Television Nationale du Burundi. / Source: Radio Television Nationale du Burundi.

Source: ITU / UIT.

Cameroon / Cameroun

Land area / Superficie (km²): 475'500
Local currency / Monnaie nationale: CFA Franc
Capital / Capitale: Yaounde

		Year ending / Année se terminant le 31.12				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	11'849	12'181	12'522	12'871	...
Gross Domestic Product / Produit Intérieur Brut	M	3'286'480	3'134'760	2'941'900	3'244'300	...
GDP per capita / PIB par habitant	US$	983	972	830	454	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	2'300	2'100	1'970	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	555'700	457'100	426'800	461'900	...
Average exchange rate per US$ / Taux de change moyen par US$		282.11	264.69	283.16	555.20	...
Consumer price index (1987=100) / Indice des prix à la consommation		103.00	105.00	...	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		41'933	54'672	57'168	58'200	59'650
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.35	0.45	0.46	0.45	...
Telephone stations (sets) / Postes téléphoniques (appareils)		...	...	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		134'600	134'600	134'600	134'600	134'600
% of digital main lines / % de lignes principales numériques	%	58.0	67.5	...	...	68.0
Waiting list / Liste d'attente		8'000	9'000	...	30'000	42'000
Public pay phones / Publiphones		81	128	...	260	300
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	...	1'700	2'485
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		2'115	1'320	...	900	875
Estimated facsimile machines / Postes de télécopie estimés		...	...	...	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps (1)		2'040	2'003	2'000	1'955	1'936
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		49	37	35	34	32
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	18'175.00	20'979.00	...	37'124.00	38'450.00
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	0.6	0.7	...	1.1	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	14'490.00	17'070.00	...	14'185.00	16'500.00
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	2.6	3.7	...	3.1	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (2)	k	279	400	600	960	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		2.35	3.28	4.79	7.46	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Ministère des Postes et Télécommunications.
(1) 1990 - 1992: Not including INTELCAM. / 1990-92: N'inclut pas INTELCAM.
(2) Source: Cameroon Radio Television (CRTV). / Source: Cameroon Radio Television (CRTV).

Source: ITU / UIT.

Cape Verde / Cap-Vert

Land area / Superficie (km²): *4'033*
Local currency / Monnaie nationale: *Escudo*
Capital / Capitale: *Praia*

Year ending / Année se terminant le 31.12

		1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	351	361	370	381	...
Gross Domestic Product / Produit Intérieur Brut	M	20'600	22'600	24'900	27'321	...
GDP per capita / PIB par habitant	US$	823	922	835	876	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	...	...	1'850	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	7'198	7'279	11'100	...	...
Average exchange rate per US$ / Taux de change moyen par US$		71.41	68.02	80.57	81.89	...
Consumer price index (1987=100) / Indice des prix à la consommation		132.00	136.00	144.00	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales (1)		9'095	11'322	15'252	18'566	21'513
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		2.59	3.14	4.12	4.87	...
Telephone stations (sets) / Postes téléphoniques (appareils)		9'095	11'922	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		12'300	18'634	19'800	21'960	25'900
% of digital main lines / % de lignes principales numériques	%	11.0	37.0	49.0	49.0	51.0
Waiting list / Liste d'attente (2)		7'000	8'007	8'503	9'547	11'151
Public pay phones / Publiphones (3)		...	70	121	175	205
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		162	163	131	134	...
Estimated facsimile machines / Postes de télécopie estimés		300	...	...	...	500
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		233	249	279	421	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		26	22	18	23	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	988.05	1'258.00	1'425.00	1'725.00	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	4.8	5.6	5.7	6.3	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	201.46	490.64	569.97	377.06	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	2.8	6.7	5.1	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (4)	k	...	1	...	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		...	0.28	...	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Cabo Verde Telecom, S.A.R.L..
(1) 1990: Estimate. / 1990: Estimation.
(2) Estimate. / Estimation.
(3) Praia / Praia.
(4) Source: Unesco. / Source: Unesco.

Source: ITU / UIT.

Central African Rep. / Centrafricaine (Rép.)

Land area / Superficie (km²): 624'977
Local currency / Monnaie nationale: Franc CFA
Capital / Capitale: Bangui

Year ending / Année se terminant le 31.12

		1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	3'001	3'076	3'156	3'235	...
Gross Domestic Product / Produit Intérieur Brut	M	360'400	352'800	349'300	544'200	...
GDP per capita / PIB par habitant	US$	426	433	391	303	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	1'040	1'010	1'060	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	42'700	41'700	30'100	69'500	...
Average exchange rate per US$ / Taux de change moyen par US$		282.11	264.69	283.18	555.20	...
Consumer price index (1987=100) / Indice des prix à la consommation		94.00	93.00	90.00	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales (1)		5'358	6'092	6'757	7'373	7'769
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.18	0.20	0.21	0.23	...
Telephone stations (sets) / Postes téléphoniques (appareils)		7'259	...	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		7'100	...	...	9'174	...
% of digital main lines / % de lignes principales numériques	%	...	...	97.2	97.3	...
Waiting list / Liste d'attente		...	...	...	586	...
Public pay phones / Publiphones		32	33	56	60	73
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	79
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		160	139	144	138	120
Estimated facsimile machines / Postes de télécopie estimés (2)		32	52	78	103	174
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		362	367	381	379	395
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		68	60	56	51	51
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	3'513.94	3'756.86	4'512.44	6'709.20	7'055.05
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.0	1.1	1.3	1.2	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	1'289.00	1'746.45	3'320.25	741.05	635.43
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	3.0	4.2	11.0	1.1	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (3)	k	14	14	15	16	17
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		0.47	0.46	0.48	0.49	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: SOCATEL.
(1) 1992: Estimate. / 1992: Estimation.
(2) 1992-94: SOCATEL. / 1992-94: SOCATEL.
(3) Source: Unesco. / Source: Unesco.

Source: ITU / UIT.

Chad / Tchad

Land area / Superficie (km²):	*1'284'000*					
Local currency / Monnaie nationale:	*CFA Franc*		*Year ending / Année se terminant le 31.12*			
Capital / Capitale:	*N'Djamena*		**1991**	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE							
Population / Population		k	5'706	5'863	6'010	6'183	...
Gross Domestic Product / Produit Intérieur Brut		M	365'867	346'800	338'900	505'200	...
GDP per capita / PIB par habitant		US$	227	223	199	147	...
GNP per capita (PPP) / PNB par habitant (PPA)		US$	...	710	720	740	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe		M	29'796	29'400	31'900	...	...
Average exchange rate per US$ / Taux de change moyen par US$			282.11	264.69	283.16	555.20	...
Consumer price index (1987=100) / Indice des prix à la consommation			115.00	110.00	101.00	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE							
Main telephone lines / Lignes téléphoniques principales	(1)		4'121	4'200	4'571	4'733	5'334
Main lines per 100 inhabitants / Lignes principales pour 100 habitants			0.07	0.07	0.08	0.08	...
Telephone stations (sets) / Postes téléphoniques (appareils)			8'660	9'080	10'462	10'832	...
Total line exchange capacity / Capacité totale des centraux téléphoniques			5'084	5'084	5'964	6'100	6'100
% of digital main lines / % de lignes principales numériques		%	12.6	13.1	16.0	17.1	17.8
Waiting list / Liste d'attente			1'380	1'420	1'880	2'325	3'485
Public pay phones / Publiphones			24	40	63	64	64
MOBILE SERVICES / SERVICES MOBILES							
Cellular telephone subscribers / Abonnés au téléphone cellulaire			—	—	—	—	—
OTHER SERVICES / AUTRES SERVICES							
Telex subscribers / Abonnés télex			142	143	134	125	117
Estimated facsimile machines / Postes de télécopie estimés			93	117	127	140	174
STAFF / EFFECTIFS							
Full-time telecommunication staff / Personnel des télécom à plein temps			431	448	362	327	328
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes			105	107	79	69	61
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES							
Total telecom revenue / Recettes totales des télécom		M	2'971.61	3'308.02	3'642.40	4'761.99	3'490.00
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB		%	0.8	1.0	1.1	0.9	...
CAPITAL EXPENDITURE / INVESTISSEMENTS							
Annual investment in telecom / Investissement annuel en télécom		M	2'711.40	1'784.62	2'740.46	2'375.08	4'226.39
Telecom investment as % of GFCF / Investissement télécom en % de FBCF		%	9.1	6.1	8.6	...	...
BROADCASTING / RADIODIFFUSION							
Television receivers / Téléviseurs		k	4	4	5	7	7
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants			0.06	0.06	0.08	0.11	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Office National des Postes et des Télécommunications.
(1) 1991: Estimate. / 1991: Estimation.

Source: ITU / UIT.

Comoros / Comores

Land area / Superficie (km²): 1'862
Local currency / Monnaie nationale: Franc CFA
Capital / Capitale: Moroni

		Year ending / Année se terminant le 31.02				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	445	458	471	485	...
Gross Domestic Product / Produit Intérieur Brut	M	68'303	69'129	71'005	87'869	...
GDP per capita / PIB par habitant	US$	544	570	532	435	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	...	...	1'130	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	9'879	13'964	10'356	18'754	...
Average exchange rate per US$ / Taux de change moyen par US$		282.11	264.69	283.16	416.40	...
Consumer price index (1987=100) / Indice des prix à la consommation		...	...	...	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		3'641	3'851	4'010	4'272	...
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.82	0.84	0.85	0.88	...
Telephone stations (sets) / Postes téléphoniques (appareils)		5'278	5'450	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		8'476	8'475	...	...	...
% of digital main lines / % de lignes principales numériques	%	—	—	3.6	5.7	...
Waiting list / Liste d'attente		1'659	1'156	...	...	...
Public pay phones / Publiphones		...	10	...	...	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		61	48	55	...	...
Estimated facsimile machines / Postes de télécopie estimés		57	76	98	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		236	230	199	122	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		65	60	50	29	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	745.53	1'168.33	1'250.35	1'274.68	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.1	1.7	1.8	1.5	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	...	254.00	246.00	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	...	1.8	2.4	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (1)	k	1	2	2	2	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		0.28	0.35	0.41	0.46	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Ministère de l'Information, de la Culture, de la Jeunesse et des Sports chargé des Postes et Télécom.
(1) Source: Société nationale des postes et télécommunications. / Source: Société nationale des postes et télécommunications.

Source: ITU / UIT.

Congo

Land area / Superficie (km²): 342'000
Local currency / Monnaie nationale: CFA Franc
Capital / Capitale: Brazzaville

Year ending / Année se terminant le 31.12

		1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	2'299	2'369	2'443	2'516	...
Gross Domestic Product / Produit Intérieur Brut	M	768'700	747'400	704'500	875'830	...
GDP per capita / PIB par habitant	US$	1'185	1'192	1'018	627	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	2'450	2'440	1'607	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	157'800	128'400	109'300	...	...
Average exchange rate per US$ / Taux de change moyen par US$		282.11	264.69	283.16	555.20	...
Consumer price index (1987=100) / Indice des prix à la consommation		113.00	115.00	118.00	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		16'905	17'915	19'177	20'553	...
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.74	0.76	0.78	0.82	...
Telephone stations (sets) / Postes téléphoniques (appareils)		...	...	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		...	28'976	28'976	28'976	...
% of digital main lines / % de lignes principales numériques	%	...	81.0	83.0	83.0	...
Waiting list / Liste d'attente		1'028	7'023	...	750	...
Public pay phones / Publiphones		128	128	65	65	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		454	417	464	350	...
Estimated facsimile machines / Postes de télécopie estimés		...	110	...	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		1'008	...	885	921	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		60	...	46	45	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	17'258.00	18'501.79	17'779.05	22'883.20	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	2.2	2.5	2.5	2.6	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	539.00	280.30	72.99	6.36	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	0.3	0.2	0.1	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (1)	k	14	14	25	42	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		0.61	0.59	1.02	1.67	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Office National des Postes et des Télécommunications.
(1) Source: TeleCongo (1992-94). / Source: TeleCongo (1992-94).

Source: ITU / UIT.

Côte d'Ivoire

Land area / Superficie (km²): *322'463*
Local currency / Monnaie nationale: *CFA Franc*
Capital / Capitale: *Abidjan*

		Year ending / Année se terminant le 31.12				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	12'399	12'838	13'316	13'780	...
Gross Domestic Product / Produit Intérieur Brut	M	2'690'000	2'681'300	2'641'000	3'728'900	...
GDP per capita / PIB par habitant	US$	769	789	700	487	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	1'640	1'400	1'340	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	267'200	291'000	246'000	466'600	...
Average exchange rate per US$ / Taux de change moyen par US$		282.11	264.69	283.16	555.20	...
Consumer price index (1987=100) / Indice des prix à la consommation		109.00	113.00	116.00	146.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		79'214	86'088	93'882	108'399	...
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.64	0.67	0.71	0.79	...
Telephone stations (sets) / Postes téléphoniques (appareils)		196'800	206'611	229'072	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		143'969	153'589	141'769	...	...
% of digital main lines / % de lignes principales numériques	%	75.9	77.2	81.9	84.0	...
Waiting list / Liste d'attente		...	36'244	...	...	...
Public pay phones / Publiphones		214	229	230	...	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		1'364	1'221	1'173	...	...
Estimated facsimile machines / Postes de télécopie estimés		...	...	...	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		3'887	3'812	3'744	3'628	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		49	44	40	33	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	40'000.00	51'000.00	59'832.00	62'555.00	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.5	1.9	2.3	1.7	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	45'200.00	14'000.00	11'571.00	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	16.9	4.8	4.7	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (1)	k	730	760	790	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		5.89	5.92	5.93	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Société Côte d'Ivoire-TELECOM.
(1) Source: CI-Telecom. / Source: CI-Telecom.

Source: ITU / UIT.

Djibouti

Land area / Superficie (km²): 22'000
Local currency / Monnaie nationale: Franc
Capital / Capitale: Djibouti

		Year ending / Année se terminant le 31.12				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	528	540	557	566	...
Gross Domestic Product / Produit Intérieur Brut	M	76'739	82'110	82'610	...	...
GDP per capita / PIB par habitant	US$	817	855	835	...	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	...	...	...	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	12'858	12'872	10'547	...	...
Average exchange rate per US$ / Taux de change moyen par US$		177.72	177.72	177.72	177.72	...
Consumer price index (1987=100) / Indice des prix à la consommation		...	...	...	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		6'230	6'789	7'349	7'516	...
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		1.18	1.26	1.32	1.33	...
Telephone stations (sets) / Postes téléphoniques (appareils)		13'500	14'600	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		7'656	7'656	10'000	10'000	...
% of digital main lines / % de lignes principales numériques	%	100.0	100.0	100.0	100.0	...
Waiting list / Liste d'attente		66	66	...	47	...
Public pay phones / Publiphones		51	51	40	45	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		169	149	120	124	...
Estimated facsimile machines / Postes de télécopie estimés (1)		128	124	120	93	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		473	456	480	480	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		76	67	65	64	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	3'466.00	3'838.00	3'800.00	3'737.00	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	4.5	4.7	4.6	...	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	1'672.00	1'452.00	...	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	13.0	11.3	...	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (2)	k	24	25	30	36	42
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		4.54	4.63	5.39	6.36	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Office des Postes et Télécommunications.
(1) Source: O.P.T. / Source: O.P.T.
(2) Source: RTD. / Source: RTD.

Source: ITU / UIT.

Egypt / Egypte

Land area / Superficie (km²): *1'000'250*
Local currency / Monnaie nationale: *Pound*
Capital / Capitale: *Cairo*

		Year ending / Année se terminant le 30.06				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	54'266	55'339	56'434	57'556	...
Gross Domestic Product / Produit Intérieur Brut	M	91'067	111'496	119'232	132'841	...
GDP per capita / PIB par habitant	US$	558	606	630	682	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	3'670	3'780	3'610	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	20'164	21'270	22'293	25'370	...
Average exchange rate per US$ / Taux de change moyen par US$		3.01	3.32	3.35	3.39	...
Consumer price index (1987=100) / Indice des prix à la consommation		199.49	226.69	254.10	274.82	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		1'816'530	2'027'680	2'234'715	2'456'161	2'716'213
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		3.35	3.66	3.96	4.27	...
Telephone stations (sets) / Postes téléphoniques (appareils)		2'505'131	2'825'700	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		2'385'753	2'531'908	2'738'293	3'151'258	...
% of digital main lines / % de lignes principales numériques	%	35.4	43.0	47.0	56.3	67.0
Waiting list / Liste d'attente		1'188'771	1'246'407	1'238'112	1'310'175	...
Public pay phones / Publiphones		2'968	3'438	3'873	4'134	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		...	4'913	6'877	7'371	7'368
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		6'205	6'017	5'621	4'994	...
Estimated facsimile machines / Postes de télécopie estimés (1)		11'695	13'638	17'608	21'591	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		56'874	52'705	52'890	52'383	52'291
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		31	26	24	21	19
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	1'406.72	1'489.29	1'680.70	1'800.97	2'167.93
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.5	1.3	1.4	1.4	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	452.73	980.09	931.20	1'003.44	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	2.2	4.6	4.2	4.0	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs	k	6'200	6'500	...	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		11.43	11.75	...	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: ARENTO.
(1) Source: ARENTO. / Source: ARENTO.

Source: ITU / UIT.

Equatorial Guinea / Guinée équatoriale

Land area / Superficie (km²): 28'051
Local currency / Monnaie nationale: CFA Franc
Capital / Capitale: Malabo

Year ending / Année se terminant le 31.12

		1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	361	370	379	389	...
Gross Domestic Product / Produit Intérieur Brut	M	36'842	42'012	44'332	68'651	...
GDP per capita / PIB par habitant	US$	362	428	413	318	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	...	...	...	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	15'949	10'151	11'148	16'503	...
Average exchange rate per US$ / Taux de change moyen par US$		282.11	265.00	283.16	555.20	...
Consumer price index (1987=100) / Indice des prix à la consommation		106.00	98.00	102.00	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales (1)		1'300	1'300	1'300	2'515	...
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.36	0.35	0.34	0.65	...
Telephone stations (sets) / Postes téléphoniques (appareils)		...	...	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		...	2'515	2'515	2'515	...
% of digital main lines / % de lignes principales numériques	%	—	—	—	—	...
Waiting list / Liste d'attente		...	...	...	...	...
Public pay phones / Publiphones		...	...	2	4	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		...	—	—	38	...
Estimated facsimile machines / Postes de télécopie estimés (2)		...	—	50	100	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps (3)		...	341	300	296	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		...	262	231	118	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	...	...	...	...	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	...	...	...	...	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	...	...	...	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF	%	...	...	...	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (4)	k	3	18	25	35	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		0.83	4.86	6.60	9.00	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Ministerio de Transportes, Información y Comunicaciones.

(1) Estimate. 1994: Malabo and Bata. / Estimation. 1994: Malabo et Bata.

(2) Source: Ministry. / Source: Ministère.

(3) 1994: Malabo and Bata. / 1994: Malabo et Bata.

(4) Source: Ministerio de Transportes, Información y Comunicaciones. / Source: Ministerio de Transportes, Información y Comunicaciones.

Source: ITU / UIT.

Eritrea / Erythrée

Land area / Superficie (km²): 93'679
Local currency / Monnaie nationale: Birr
Capital / Capitale: Asmara

			Year ending / Année se terminant le 31.03				
			1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE							
Population / Population	(1)	k	...	...	3'393	3'437	...
Gross Domestic Product / Produit Intérieur Brut		M	...	...	2'537	...	...
GDP per capita / PIB par habitant		US$	...	...	150	...	...
GNP per capita (PPP) / PNB par habitant (PPA)		US$	...	...	...	...	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe		M	...	...	...	...	...
Average exchange rate per US$ / Taux de change moyen par US$			...	5.00	5.00	5.47	...
Consumer price index (1987=100) / Indice des prix à la consommation			...	...	...	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE							
Main telephone lines / Lignes téléphoniques principales			...	...	13'011	13'335	15'192
Main lines per 100 inhabitants / Lignes principales pour 100 habitants			...	...	...	0.39	0.44
Telephone stations (sets) / Postes téléphoniques (appareils)			...	...	15'988	16'372	18'248
Total line exchange capacity / Capacité totale des centraux téléphoniques			...	...	14'240	26'240	27'830
% of digital main lines / % de lignes principales numériques		%	...	...	...	...	53.0
Waiting list / Liste d'attente			...	...	17'916	17'872	36'420
Public pay phones / Publiphones			...	...	102	121	122
MOBILE SERVICES / SERVICES MOBILES							
Cellular telephone subscribers / Abonnés au téléphone cellulaire			—	—	—	—	—
OTHER SERVICES / AUTRES SERVICES							
Telex subscribers / Abonnés télex			...	...	—	—	—
Estimated facsimile machines / Postes de télécopie estimés			...	...	126	313	505
STAFF / EFFECTIFS							
Full-time telecommunication staff / Personnel des télécom à plein temps			...	...	519	521	556
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes			...	...	40	39	37
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES							
Total telecom revenue / Recettes totales des télécom		M	...	...	20.16	57.04	72.41
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB		%	...	...	...	2.2	...
CAPITAL EXPENDITURE / INVESTISSEMENTS							
Annual investment in telecom / Investissement annuel en télécom		M	...	...	1.96	7.69	14.34
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.		%	...	...	...	...	...
BROADCASTING / RADIODIFFUSION							
Television receivers / Téléviseurs		k	...	...	...	20	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants			...	...	...	0.59	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Telecommunications Service of Eritrea.
(1) Source: World Bank. 1994: UN. / Source: Banque Mondiale. 1994: NU.

Source: ITU / UIT.

Ethiopia / Ethiopie

Land area / Superficie (km²): *1'223'500*
Local currency / Monnaie nationale: *Birr*
Capital / Capitale: *Addis Ababa*

Year ending / Année se terminant le 30.06

		1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	48'859	50'339	51'859	53'435	...
Gross Domestic Product / Produit Intérieur Brut	M	19'815	20'380	26'035	27'444	...
GDP per capita / PIB par habitant	US$	196	81	100	94	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	340	...	410	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	1'410	1'898	3'185	4'592	...
Average exchange rate per US$ / Taux de change moyen par US$ (1)		2.07	5.00	5.00	5.47	...
Consumer price index (1987=100) / Indice des prix à la consommation		165.00	182.00	189.00	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		133'091	127'041	132'478	137'731	142'452
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.27	0.25	0.26	0.26	...
Telephone stations (sets) / Postes téléphoniques (appareils)		164'093	154'449	159'764	165'335	170'239
Total line exchange capacity / Capacité totale des centraux téléphoniques		175'653	164'273	169'622	172'742	179'094
% of digital main lines / % de lignes principales numériques	%	31.4	38.5	39.2	39.6	...
Waiting list / Liste d'attente		123'140	122'066	141'035	160'939	178'992
Public pay phones / Publiphones		1'539	1'430	1'463	1'483	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		1'003	880	912	865	793
Estimated facsimile machines / Postes de télécopie estimés		261	520	762	1'057	1'445
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		6'004	5'492	5'296	5'222	5'496
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		45	43	40	38	39
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	189.10	191.70	253.70	292.10	456.99
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.0	0.9	1.0	1.1	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom (2)	M	32.90	35.90	55.02	65.80	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	2.3	1.9	1.7	1.4	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (3)	k	130	150	175	230	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		0.27	0.30	0.34	0.43	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Ethiopian Telecommunications Authority.
(1) End of period. / Fin de la période.
(2) Additions to fixed assets and capital work in progress. /
(3) Source: Ethiopian Television. / Source: Ethiopian Television.

Source: ITU / UIT.

Gabon

Land area / Superficie (km²): 267'667
Local currency / Monnaie nationale: CFA Franc
Capital / Capitale: Libreville

		Year ending / Année se terminant le 31.12				
		1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	973	990	1'012	1'035	...
Gross Domestic Product / Produit Intérieur Brut	M	1'530'100	1'474'900	1'550'700	2'190'500	...
GDP per capita / PIB par habitant	US$	5'574	5'629	5'413	3'812	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	...	...	...	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	406'600	321'000	334'000	554'000	...
Average exchange rate per US$ / Taux de change moyen par US$		282.11	264.69	283.16	555.20	...
Consumer price index (1987=100) / Indice des prix à la consommation		96.00	96.00	96.00	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		26'288	27'630	29'834	31'398	...
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		2.70	2.79	2.95	3.03	...
Telephone stations (sets) / Postes téléphoniques (appareils)		...	...	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		37'651	37'875	...	42'455	...
% of digital main lines / % de lignes principales numériques	%	97.0	97.0	97.8	87.0	...
Waiting list / Liste d'attente		2'450	2'400	...	...	...
Public pay phones / Publiphones		...	...	...	132	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	280	1'200	2'581	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		...	...	...	...	...
Estimated facsimile machines / Postes de télécopie estimés		...	...	...	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		665	713	745	791	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		25	26	25	25	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	31'356.00	32'031.00	29'500.00	45'865.00	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	2.0	2.2	1.9	2.1	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	5'615.00	6'246.00	...	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	1.4	1.9	...	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (1)	k	45	48	50	51	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		4.62	4.84	4.92	4.91	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Office des Postes et Télécommunications.
(1) Source: OPT. / Source: OPT.

Source: ITU / UIT.

Gambia / Gambie

Land area / Superficie (km²): *10'689*
Local currency / Monnaie nationale: *Dalasis*
Capital / Capitale: *Banjul*

			Year ending / Année se terminant le 31.03			
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	959	997	1'042	1'081	...
Gross Domestic Product / Produit Intérieur Brut	M	2'948	3'230	3'420	3'590	...
GDP per capita / PIB par habitant	US$	349	365	346	347	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	...	1'170	1'150	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	581	680	700	660	...
Average exchange rate per US$ / Taux de change moyen par US$ (1)		8.80	8.89	9.48	9.58	...
Consumer price index (1987=100) / Indice des prix à la consommation		147.00	161.00	172.00	175.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales (2)		6'168	10'030	14'000	16'274	18'306
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.67	1.05	1.40	1.56	1.69
Telephone stations (sets) / Postes téléphoniques (appareils)		...	...	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		...	14'679	18'695	22'978	22'978
% of digital main lines / % de lignes principales numériques	%	...	...	96.9	100.0	100.0
Waiting list / Liste d'attente		...	3'627	5'515	9'404	19'535
Public pay phones / Publiphones		57	81	82	94	204
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	204	379	810
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		148	180	180	132	126
Estimated facsimile machines / Postes de télécopie estimés		190	361	365	651	700
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		547	685	695	630	758
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		89	68	50	39	41
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	91.80	111.17	143.00	181.60	182.17
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	3.5	3.8	4.4	5.3	5.1
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	69.70	64.20	106.62	133.40	32.85
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	13.4	11.0	15.7	19.1	5.0
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs	k	...	...	...	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		...	...	...	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: GAmbia Telecommunications Co. Ltd..
(1) Source: IMF. 1993: World Bank. / Source: FMI. 1993: Banque Mondiale.
(2) Excluding public call offices. / Exclut les bureaux d'appel publics.

Source: ITU / UIT.

Ghana

Land area / Superficie (km²): 238'305
Local currency / Monnaie nationale: Cedi
Capital / Capitale: Accra

		Year ending / Année se terminant le 31.12				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	15'478	15'950	16'446	16'944	...
Gross Domestic Product / Produit Intérieur Brut	M	2'574'774	3'008'779	3'949'023	5'186'282	...
GDP per capita / PIB par habitant	US$	452	432	374	320	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	1'890	1'970	2'020	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	424'809	385'124	584'455	845'364	...
Average exchange rate per US$ / Taux de change moyen par US$		367.83	437.09	641.83	956.71	...
Consumer price index (1987=100) / Indice des prix à la consommation		266.00	293.00	366.00	458.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		46'613	47'781	48'681	50'007	59'978
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.30	0.30	0.30	0.30	...
Telephone stations (sets) / Postes téléphoniques (appareils)		80'877	81'341	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		55'915	55'992	56'048	56'048	98'600
% of digital main lines / % de lignes principales numériques	%	31.7	48.4	49.0	58.0	89.5
Waiting list / Liste d'attente		10'033	9'660	10'000	12'838	28'349
Public pay phones / Publiphones		72	26	30	30	37
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	400	1'742	3'336	6'200
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		741	956	960	983	1'175
Estimated facsimile machines / Postes de télécopie estimés		2'677	3'817	4'000	4'500	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		3'711	3'880	1'967	3'729	2'280
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		80	81	40	75	38
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	18'267.00	22'947.10	31'068.18	58'882.20	78'000.00
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	0.7	0.8	0.8	1.1	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	3'159.00	...	...	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	0.7	...	...	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (1)	k	235	250	...	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		1.52	1.57	...	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Posts and Telecommuncations Corporation.
(1) Source: Unesco. / Source: Unesco.

Source: ITU / UIT.

Guinea / Guinée

Land area / Superficie (km²): 245'855
Local currency / Monnaie nationale: Franc
Capital / Capitale: Conakry

Year ending / Année se terminant le 31.12

		1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	5'933	6'116	6'306	6'501	...
Gross Domestic Product / Produit Intérieur Brut	M	2'248'000	2'682'700	3'030'500	3'420'200	...
GDP per capita / PIB par habitant	US$	503	486	503	547	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	...	...	...	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	370'100	442'700	486'400	571'000	...
Average exchange rate per US$ / Taux de change moyen par US$		753.86	903.00	955.90	961.64	...
Consumer price index (1987=100) / Indice des prix à la consommation		...	...	...	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		11'553	10'788	11'579	9'308	10'855
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.19	0.18	0.18	0.14	...
Telephone stations (sets) / Postes téléphoniques (appareils)		...	...	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		17'400	...	...	19'000	20'508
% of digital main lines / % de lignes principales numériques	%	—	—	1.7	2.4	32.5
Waiting list / Liste d'attente		...	...	...	...	...
Public pay phones / Publiphones		—	—	...	22	33
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	42	312	480
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		341	383	414	425	425
Estimated facsimile machines / Postes de télécopie estimés		...	...	...	26	150
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		1'090	1'083	844	853	854
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		94	100	73	92	79
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	23'041.64	...	...	12'000.00	12'000.00
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.0	...	...	0.4	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	...	...	...	...	8.00
Telecom investment as % of GFCF / Investissement télécom en % de FBCF	%	...	...	...	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs	k	42	83	110	180	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		0.71	1.36	1.74	2.77	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Société des Télécommunications de Guinée.

Source: ITU / UIT.

Guinea-Bissau / Guinée-Bissau

Land area / Superficie (km²): 36'125
Local currency / Monnaie nationale: Peso
Capital / Capitale: Bissau

Year ending / Année se terminant le 31.12

			1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE							
Population / Population		k	985	1'006	1'028	1'050	...
Gross Domestic Product / Produit Intérieur Brut		M	868'500	1'542'500	2'434'100	3'127'100	...
GDP per capita / PIB par habitant		US$	241	221	235	231	...
GNP per capita (PPP) / PNB par habitant (PPA)		US$	...	690	840	900	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe		M	233'500	467'400	622'600	617'300	...
Average exchange rate per US$ / Taux de change moyen par US$			3'658.61	6'933.91	10'081.90	12'892.10	...
Consumer price index (1987=100) / Indice des prix à la consommation			607.00	1'030.00	1'526.00	1'757.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE							
Main telephone lines / Lignes téléphoniques principales			6'491	7'813	8'558	8'986	9'414
Main lines per 100 inhabitants / Lignes principales pour 100 habitants			0.66	0.78	0.83	0.86	...
Telephone stations (sets) / Postes téléphoniques (appareils)			15'000	18'200	20'300	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques			22'100	22'100	22'100	22'100	22'100
% of digital main lines / % de lignes principales numériques	(1)	%	40.0	40.0	35.0	40.0	40.0
Waiting list / Liste d'attente			987	...	672	692	742
Public pay phones / Publiphones			...	...	...	...	...
MOBILE SERVICES / SERVICES MOBILES							
Cellular telephone subscribers / Abonnés au téléphone cellulaire			—	—	—	—	—
OTHER SERVICES / AUTRES SERVICES							
Telex subscribers / Abonnés télex			120	120	125	125	125
Estimated facsimile machines / Postes de télécopie estimés	(2)		...	300	380	480	500
STAFF / EFFECTIFS							
Full-time telecommunication staff / Personnel des télécom à plein temps			294	282	268	254	295
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes			45	36	31	28	31
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES							
Total telecom revenue / Recettes totales des télécom		M	22'186.80	69'578.97	94'443.52	128'429.65	209'763.04
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB		%	2.6	4.5	3.9	4.1	...
CAPITAL EXPENDITURE / INVESTISSEMENTS							
Annual investment in telecom / Investissement annuel en télécom		M	...	...	...	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.		%	...	...	...	...	...
BROADCASTING / RADIODIFFUSION							
Television receivers / Téléviseurs		k	...	...	...	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants			...	...	...	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Companhia de Telecomunicaçoes da Guiné-Bissau, sarl.
(1) 1990-92: AICEP. / 1990-92: AICEP.
(2) 1992-93: Guine-Telecom. / 1992-93: Guine-Telecom.

Source: ITU / UIT.

Kenya

		Year ending / Année se terminant le 30.06				
Land area / Superficie (km²): 582'644						
Local currency / Monnaie nationale: Shilling						
Capital / Capitale: Nairobi		**1991**	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	24'015	24'680	25'347	26'017	...
Gross Domestic Product / Produit Intérieur Brut	M	221'250	256'142	320'086	389'868	...
GDP per capita / PIB par habitant	US$	335	322	218	267	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	1'360	1'290	1'350	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	47'020	44'674	58'750	80'256	...
Average exchange rate per US$ / Taux de change moyen par US$		27.51	32.22	58.00	56.05	...
Consumer price index (1987=100) / Indice des prix à la consommation		174.00	225.00	329.00	424.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales (1)		200'000	207'442	214'759	228'522	239'639
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.83	0.84	0.85	0.88	...
Telephone stations (sets) / Postes téléphoniques (appareils)		...	420'567	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		...	334'360	348'530	364'636	377'530
% of digital main lines / % de lignes principales numériques	%	22.0	48.0	48.1	54.0	56.0
Waiting list / Liste d'attente		...	88'035	80'227	70'095	70'581
Public pay phones / Publiphones		...	5'552	5'722	5'787	5'985
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	1'100	1'162	1'990	2'279
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		...	2'031	1'667	1'546	2'168
Estimated facsimile machines / Postes de télécopie estimés (2)		2'500	3'000	...	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps (3)		13'000	13'000	16'767	14'236	13'978
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		65	63	78	62	58
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	5'893.46	8'427.59	14'212.06	14'492.00	18'055.55
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	2.7	3.3	4.4	3.7	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	3'875.99	4'615.14	10'925.73	3'508.20	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	8.2	10.3	18.6	4.4	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (4)	k	388	411	437	462	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		1.62	1.66	1.72	1.77	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Kenya Posts and Telecommunications Corporation.
(1) 1991: Estimate. / 1991: Estimation.
(2) Estimate. / Estimation.
(3) 1991-92: Estimate. / 1991-92: Estimation.
(4) Source: Kenya Broadcasting Corporation. / Source: Kenya Broadcasting Corporation.

Source: ITU / UIT.

Lesotho

Land area / Superficie (km²): 30'344
Local currency / Monnaie nationale: Loti
Capital / Capitale: Maseru

Year ending / Année se terminant le 31.03

		1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	1'841	1'891	1'943	1'996	...
Gross Domestic Product / Produit Intérieur Brut	M	1'800	2'131	2'476	3'145	...
GDP per capita / PIB par habitant	US$	349	395	390	444	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	1'770	1'620	1'720	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	1'456	1'767	2'051	2'700	...
Average exchange rate per US$ / Taux de change moyen par US$		2.80	2.85	3.26	3.55	...
Consumer price index (1987=100) / Indice des prix à la consommation		168.00	197.00	223.00	241.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		12'357	12'275	11'380	12'196	...
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.69	0.67	0.60	0.63	...
Telephone stations (sets) / Postes téléphoniques (appareils)		21'133	21'454	22'421	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		21'798	20'594	20'558	20'558	...
% of digital main lines / % de lignes principales numériques	%	80.4	80.4	80.5	81.0	...
Waiting list / Liste d'attente		8'693	6'485	8'138	8'346	...
Public pay phones / Publiphones		...	176	190	200	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	—
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		237	235	219	244	...
Estimated facsimile machines / Postes de télécopie estimés		283	338	447	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		772	834	818	796	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		62	68	72	65	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	36.52	37.74	...	40.84	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	2.3	2.1	...	1.6	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	7.93	13.06	...	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	0.7	0.9	...	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (1)	k	10	11	11	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		0.56	0.60	0.58	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Lesotho Telecommunications Corporation.
(1) Source: Unesco. / Source: Unesco.

Source: ITU / UIT.

Liberia / Libéria

Land area / Superficie (km²): *111'370*
Local currency / Monnaie nationale: *Dollar*
Capital / Capitale: *Monrovia*

		Year ending / Année se terminant le 31.12				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	2'662	2'751	2'845	2'941	...
Gross Domestic Product / Produit Intérieur Brut	M	...	...	...	...	...
GDP per capita / PIB par habitant	US$	...	...	...	...	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	...	...	...	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	...	...	...	...	...
Average exchange rate per US$ / Taux de change moyen par US$		1.00	1.00	1.00	1.00	...
Consumer price index (1987=100) / Indice des prix à la consommation		...	...	...	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales (1)		3'300	4'500	4'500	...	...
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.12	0.16	0.16	...	...
Telephone stations (sets) / Postes téléphoniques (appareils)		...	...	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		...	...	...	...	...
% of digital main lines / % de lignes principales numériques	%	...	...	...	...	...
Waiting list / Liste d'attente		...	...	...	...	...
Public pay phones / Publiphones		...	...	...	...	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		...	...	...	...	...
Estimated facsimile machines / Postes de télécopie estimés		...	...	...	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		449	527	...	...	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		136	117	...	...	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	5.82	9.54	...	...	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	...	...	...	...	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	...	...	...	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF	%	...	...	...	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (2)	k	49	51	...	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		1.84	1.85	...	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Liberia Telecommunications Corporation.
(1) 1993: Estimate. / 1993: Estimation.
(2) Source: Unesco. / Source: Unesco.

Source: ITU / UIT.

Libya / Libye

Land area / Superficie (km²): *1'759'540*
Local currency / Monnaie nationale: *Dinar*
Capital / Capitale: *Tripoli*

			Year ending / Année se terminant le 31.12			
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	4'706	4'872	5'044	5'222	...
Gross Domestic Product / Produit Intérieur Brut	M	...	...	...	...	...
GDP per capita / PIB par habitant	US$	...	...	...	...	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	...	...	...	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	...	...	...	...	...
Average exchange rate per US$ / Taux de change moyen par US$		0.28	0.28	0.31	0.32	...
Consumer price index (1987=100) / Indice des prix à la consommation		...	...	...	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales (1)		232'980	235'803	240'000	264'000	318'000
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		4.95	4.84	4.76	5.06	...
Telephone stations (sets) / Postes téléphoniques (appareils)		...	...	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		...	338'070	...	...	...
% of digital main lines / % de lignes principales numériques	%	12.0	...	...	...	...
Waiting list / Liste d'attente		231'580	231'715	...	...	...
Public pay phones / Publiphones		...	...	...	...	450
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		...	2'619	2'720	2'670	2'608
Estimated facsimile machines / Postes de télécopie estimés		...	...	...	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		...	8'886	...	...	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		...	38	...	...	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	76.69	79.75	...	...	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	...	...	...	...	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	80.00	60.00	...	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	...	...	...	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (2)	k	457	475	500	600	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		9.71	9.75	9.91	11.49	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: General Post and Telecommunication Company.
(1) 1990: Estimate. / 1990: Estimation.
(2) Source: ITU estimates, GPTC. /

Source: ITU / UIT.

Madagascar

Land area / Superficie (km²): *594'180*
Local currency / Monnaie nationale: *Franc*
Capital / Capitale: *Antananarivo*

Year ending / Année se terminant le *31.12*

			1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE							
Population / Population		k	12'014	12'366	12'728	13'101	...
Gross Domestic Product / Produit Intérieur Brut		M	4'913'602	5'593'398	6'450'900	8'632'200	...
GDP per capita / PIB par habitant		US$	223	243	265	215	...
GNP per capita (PPP) / PNB par habitant (PPA)		US$	...	720	670	670	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe		M	401'500	631'800	738'500	1'009'400	...
Average exchange rate per US$ / Taux de change moyen par US$			1'835.36	1'863.97	1'913.78	3'067.30	...
Consumer price index (1987=100) / Indice des prix à la consommation			168.00	192.00	211.00	294.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE							
Main telephone lines / Lignes téléphoniques principales			36'306	36'583	34'806	33'675	...
Main lines per 100 inhabitants / Lignes principales pour 100 habitants			0.30	0.30	0.27	0.26	...
Telephone stations (sets) / Postes téléphoniques (appareils)			62'498	67'692	74'381	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques			42'683	42'683	42'683	42'683	...
% of digital main lines / % de lignes principales numériques		%	—	—	—	...	...
Waiting list / Liste d'attente	(1)		1'629	3'418	7'589	...	...
Public pay phones / Publiphones	(2)		116	116	117	...	...
MOBILE SERVICES / SERVICES MOBILES							
Cellular telephone subscribers / Abonnés au téléphone cellulaire			—	—	—	—	...
OTHER SERVICES / AUTRES SERVICES							
Telex subscribers / Abonnés télex			471	450	459	...	...
Estimated facsimile machines / Postes de télécopie estimés			...	...	...	...	...
STAFF / EFFECTIFS							
Full-time telecommunication staff / Personnel des télécom à plein temps			3'400	3'400	2'475	2'815	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes			94	93	71	84	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES							
Total telecom revenue / Recettes totales des télécom		M	45'194.00	48'400.00	63'050.00	...	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB		%	0.9	0.9	1.0	...	...
CAPITAL EXPENDITURE / INVESTISSEMENTS							
Annual investment in telecom / Investissement annuel en télécom		M	1'883.00	13'242.00	...	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.		%	0.5	2.1	...	...	...
BROADCASTING / RADIODIFFUSION							
Television receivers / Téléviseurs	(3)	k	248	250	300	320	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants			2.06	2.02	2.36	2.44	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Direction des Télécommunications.
(1) Waiting list in largest city. / Liste d'attente dans la plus grande ville.
(2) Public call offices. / Bureaux d'appel publics.
(3) Source: Direction de la télévision Malagasy. / Source: Direction de la télévision Malagasy.

Source: ITU / UIT.

Malawi

Land area / Superficie (km²): *94'081*
Local currency / Monnaie nationale: *Kwacha*
Capital / Capitale: *Lilongwe*

		Year ending / Année se terminant le 31.12				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	9'696	10'036	10'520	10'843	...
Gross Domestic Product / Produit Intérieur Brut	M	6'106	6'694	8'942	11'326	...
GDP per capita / PIB par habitant	US$	225	185	193	...	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	730	690	600	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	1'230	1'257	1'090	1'756	...
Average exchange rate per US$ / Taux de change moyen par US$ (1)		2.80	3.60	4.40	...	...
Consumer price index (1987=100) / Indice des prix à la consommation		190.00	233.00	278.00	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		28'564	30'804	32'767	33'081	...
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.29	0.31	0.31	0.31	...
Telephone stations (sets) / Postes téléphoniques (appareils)		54'583	56'820	68'378	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		60'985	64'689	65'882	65'754	...
% of digital main lines / % de lignes principales numériques	%	38.5	49.7	52.1	51.8	...
Waiting list / Liste d'attente		15'661	18'550	29'113	21'715	...
Public pay phones / Publiphones		458	492	488	450	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		729	786	735	737	...
Estimated facsimile machines / Postes de télécopie estimés (2)		411	680	915	924	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		2'031	2'031	4'002	4'002	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		71	66	122	121	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	101.59	155.92	115.39	207.12	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.7	2.3	1.3	1.8	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	54.86	81.68	...	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	4.5	6.5	...	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs	k	...	...	...	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		...	...	...	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Posts and Telecommunicatinos Department.
(1) 1993: Source: World Bank. / 1993: Source: Banque Mondiale.
(2) Source: Posts & Telecomm. Dpt. / Source: Posts & Telecomm. Dpt.

Source: ITU / UIT.

Mali

Land area / Superficie (km²): *1'240'142*
Local currency / Monnaie nationale: *CFA franc*
Capital / Capitale: *Bamako*

		Year ending / Année se terminant le 31.12				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	8'707	8'962	9'234	9'524	...
Gross Domestic Product / Produit Intérieur Brut	M	672'300	737'200	753'800	1'038'396	...
GDP per capita / PIB par habitant	US$	274	311	288	196	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	500	520	520	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	155'600	161'400	165'100	275'175	...
Average exchange rate per US$ / Taux de change moyen par US$		282.11	264.69	283.16	555.20	...
Consumer price index (1987=100) / Indice des prix à la consommation		...	...	...	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		12'464	12'837	13'812	15'203	17'162
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.14	0.14	0.15	0.16	...
Telephone stations (sets) / Postes téléphoniques (appareils)		...	...	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		15'723	15'723	15'723	18'828	22'119
% of digital main lines / % de lignes principales numériques	%	72.0	76.2	76.2	78.0	83.3
Waiting list / Liste d'attente		...	...	...	...	...
Public pay phones / Publiphones		103	114	...	282	299
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	—
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		306	287	238	169	172
Estimated facsimile machines / Postes de télécopie estimés		...	...	...	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		1'465	1'421	1'402	1'350	1'366
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		118	111	102	89	80
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	10'151.23	9'768.12	12'132.88	17'030.45	21'315.94
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.5	1.3	1.6	1.6	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	2'246.31	3'870.74	1'650.29	773.79	1'532.19
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	1.4	2.4	1.0	0.3	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (1)	k	85	90	100	110	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		0.98	1.00	1.08	1.15	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Société des Télécommunications du Mali.
(1) Source: Television du Mali. / Source: Television du Mali.

Source: ITU / UIT.

Mauritania / Mauritanie

Land area / Superficie (km²): *1'030'700*
Local currency / Monnaie nationale: *Ouguiya*
Capital / Capitale: *Nouakchott*

		Year ending / Année se terminant le 31.12				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	2'054	2'107	2'161	2'217	...
Gross Domestic Product / Produit Intérieur Brut	M	92'619	103'613	114'450	126'926	...
GDP per capita / PIB par habitant	US$	550	565	438	463	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	1'380	1'490	1'570	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	16'622	21'200	26'781	22'085	...
Average exchange rate per US$ / Taux de change moyen par US$		81.95	87.03	120.81	123.58	...
Consumer price index (1987=100) / Indice des prix à la consommation		129.00	142.00	155.00	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		6'382	6'750	7'566	8'443	9'639
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.31	0.32	0.35	0.38	...
Telephone stations (sets) / Postes téléphoniques (appareils)		16'320	17'261	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		13'112	13'112	13'112	13'112	13'112
% of digital main lines / % de lignes principales numériques	%	89.0	89.0	89.0	90.4	91.3
Waiting list / Liste d'attente		2'000	3'000	...	...	1'472
Public pay phones / Publiphones		146	204	214	263	273
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	—
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		182	190	191	191	198
Estimated facsimile machines / Postes de télécopie estimés		...	...	...	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		392	400	410	456	466
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		61	59	54	54	48
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	1'798.44	2'247.71	2'370.18	2'796.60	3'264.85
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.9	2.2	2.1	2.2	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	164.07	122.24	190.24	414.88	544.15
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	1.0	0.6	0.7	1.9	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs	k	34	49	79	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		1.64	2.33	3.66	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Office des Postes et des Télécommunications.

Source: ITU / UIT.

Mauritius / Maurice

Land area / Superficie (km^2): *1'865*
Local currency / Monnaie nationale: *Rupee*
Capital / Capitale: *Port Louis*

Year ending / Année se terminant le 31.12

		1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	1'069	1'081	1'091	1'104	...
Gross Domestic Product / Produit Intérieur Brut	M	42'854	47'926	54'928	62'150	...
GDP per capita / PIB par habitant	US$	2'562	2'850	2'853	3'134	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	11'390	12'420	13'130	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	11'981	13'707	16'779	19'725	...
Average exchange rate per US$ / Taux de change moyen par US$		15.65	15.56	17.65	17.96	...
Consumer price index (1987=100) / Indice des prix à la consommation		149.00	156.00	173.00	185.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		64'022	79'422	106'926	129'443	148'185
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		5.99	7.35	9.80	11.72	...
Telephone stations (sets) / Postes téléphoniques (appareils)		81'250	100'200	128'000	161'800	175'230
Total line exchange capacity / Capacité totale des centraux téléphoniques		102'008	104'000	146'000	155'000	183'915
% of digital main lines / % de lignes principales numériques	%	100.0	100.0	100.0	100.0	100.0
Waiting list / Liste d'attente		63'533	70'034	67'000	43'838	46'640
Public pay phones / Publiphones		190	211	301	428	859
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire (1)		2'500	2'912	4'037	5'706	11'735
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		613	518	448	391	336
Estimated facsimile machines / Postes de télécopie estimés		1'278	1'559	16'000	18'000	20'000
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		1'337	1'391	1'420	1'465	1'673
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		21	18	13	11	11
REVENUE AND EXPENSE / CHIEFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	559.54	734.69	980.91	1'618.42	1'812.84
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.3	1.5	1.8	2.6	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	981.00	571.00	1'078.23	601.70	885.10
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	8.2	4.2	6.4	3.1	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (2)	k	190	200	210	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		17.78	18.51	19.25	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Mauritius Telecom Limited.
(1) 1991: Estimate. / 1991: Estimation.
(2) Source: Mauritius Broadcasting Corporation. / Source: Mauritius Broadcasting Corporation.

Source: ITU / UIT.

Mayotte

Land area / Superficie (km²): 376
Local currency / Monnaie nationale: French Franc
Capital / Capitale: Mamoudzou

Year ending / Année se terminant le 31.12

		1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	94	99	101	105	...
Gross Domestic Product / Produit Intérieur Brut	M	...	...	...	...	...
GDP per capita / PIB par habitant	US$	...	...	...	...	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	...	...	...	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	...	...	...	...	...
Average exchange rate per US$ / Taux de change moyen par US$		5.64	5.29	5.66	5.55	...
Consumer price index (1987=100) / Indice des prix à la consommation		...	...	...	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		3'246	3'786	4'018	...	...
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		3.44	3.82	3.98	...	...
Telephone stations (sets) / Postes téléphoniques (appareils)		...	...	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		...	...	...	...	...
% of digital main lines / % de lignes principales numériques	%	...	...	...	...	...
Waiting list / Liste d'attente		...	...	...	...	...
Public pay phones / Publiphones		...	...	...	...	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		47	40	...	...	...
Estimated facsimile machines / Postes de télécopie estimés		...	...	...	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		78	...	...	...	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		24	...	...	...	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	...	...	...	...	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	...	...	...	...	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	...	...	...	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	...	...	...	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs	k	...	...	...	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		...	...	...	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: France Télécom.

Source: ITU / UIT.

Morocco / Maroc

Land area / Superficie (km²): *659'970*
Local currency / Monnaie nationale: *Dirham*
Capital / Capitale: *Rabat*

Year ending / Année se terminant le 31.12

		1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	24'850	25'378	25'945	26'488	...
Gross Domestic Product / Produit Intérieur Brut	M	241'407	241'224	247'683	289'924	...
GDP per capita / PIB par habitant	US$	1'116	1'113	1'027	1'189	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	3'270	3'090	3'440	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	55'131	54'744	52'465	61'591	...
Average exchange rate per US$ / Taux de change moyen par US$		8.71	8.54	9.30	9.20	...
Consumer price index (1987=100) / Indice des prix à la consommation		121.89	128.89	135.57	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		496'789	653'937	820'796	992'751	1'128'014
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		2.00	2.58	3.16	3.75	...
Telephone stations (sets) / Postes téléphoniques (appareils)		560'789	714'205	882'695	1'044'958	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		674'900	838'000	949'700	1'134'536	...
% of digital main lines / % de lignes principales numériques	%	77.0	85.8	90.6	91.8	95.0
Waiting list / Liste d'attente		174'036	134'571	107'693	103'636	...
Public pay phones / Publiphones		3'964	4'423	6'164	7'491	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		1'500	3'200	6'725	13'794	29'511
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		8'941	8'637	7'676	6'785	...
Estimated facsimile machines / Postes de télécopie estimés (1)		...	5'000	7'500	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		10'347	11'484	12'632	13'396	13'965
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		21	18	15	13	12
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	3'506.31	4'375.68	4'655.00	5'061.00	5'631.00
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.5	1.8	1.9	1.7	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	3'040.00	2'200.00	2'369.00	3'361.00	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	5.5	4.0	4.5	5.5	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (2)	k	1'900	1'661	1'800	1'830	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		7.65	6.55	6.94	6.91	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Office National des Postes et des Télécommunications.
(1) Estimate. / Estimation.
(2) Source: Ministry of Posts and Telecommunications. / Source: Ministère des Postes et Telecommunications.

Source: ITU / UIT.

Mozambique

Land area / Superficie (km²): *784'754*
Local currency / Monnaie nationale: *Metical*
Capital / Capitale: *Maputo*

			Year ending / Année se terminant le 31.12			
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	14'420	14'790	15'583	16'614	...
Gross Domestic Product / Produit Intérieur Brut	M	2'056'300	3'126'100	5'462'900	8'683'000	...
GDP per capita / PIB par habitant	US$	99	87	94	87	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	570	550	550	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	997'000	1'663'000	3'262'000	5'228'000	...
Average exchange rate per US$ / Taux de change moyen par US$		1'434.47	2'432.70	3'722.70	6'038.59	...
Consumer price index (1987=100) / Indice des prix à la consommation		411.00	598.00	851.00	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		52'910	56'125	62'089	57'199	57'508
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.37	0.38	0.40	0.34	...
Telephone stations (sets) / Postes téléphoniques (appareils)		69'477	74'600	82'000	84'588	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		81'393	90'576	90'626	95'256	94'608
% of digital main lines / % de lignes principales numériques	%	...	73.0	66.7	72.0	74.0
Waiting list / Liste d'attente		32'000	22'560	4'681	3'754	6'172
Public pay phones / Publiphones		...	50	...	121	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	—
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		1'172	1'203	1'173	1'140	987
Estimated facsimile machines / Postes de télécopie estimés		...	1'237	2'000	7'182	598
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		2'590	2'640	2'486	2'418	2'459
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		49	47	40	42	43
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	98'750.85	152'689.00	230'011.36	38'815.54	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	4.8	4.9	4.2	0.4	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	19'362.65	111'947.00	80'261.00	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	1.9	6.7	2.5	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (1)	k	42	44	45	51	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		0.29	0.29	0.29	0.31	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Telecomunicaçoes de Moçambique.
(1) Source: Televisão de Moçambique. / Source: Televisão de Moçambique.

Source: ITU / UIT.

Namibia / Namibie

Land area / Superficie (km²): *824'293*
Local currency / Monnaie nationale: *Rand*
Capital / Capitale: *Windhoek*

		Year ending / Année se terminant le 30.09				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	1'385	1'422	1'461	1'500	...
Gross Domestic Product / Produit Intérieur Brut	M	6'640	7'890	8'370	10'240	...
GDP per capita / PIB par habitant	US$	1'739	1'946	1'753	1'923	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	...	...	3'950	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	1'150	1'700	1'190	2'040	...
Average exchange rate per US$ / Taux de change moyen par US$		2.76	2.85	3.27	3.55	...
Consumer price index (1987=100) / Indice des prix à la consommation		163.00	192.00	208.00	230.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		56'939	60'974	66'749	69'784	78'499
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		4.11	4.29	4.57	4.65	...
Telephone stations (sets) / Postes téléphoniques (appareils)		87'898	92'966	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		71'390	72'275	77'481	82'025	91'581
% of digital main lines / % de lignes principales numériques	%	...	52.0	78.3	71.0	76.0
Waiting list / Liste d'attente		2'349	3'060	...	3'489	7'383
Public pay phones / Publiphones		979	1'076	992	1'077	1'140
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	3'500
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		470	438	438	...	328
Estimated facsimile machines / Postes de télécopie estimés		...	...	...	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		1'709	1'818	1'956	2'050	1'921
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		30	30	29	29	24
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	140.32	176.15	225.00	219.47	266.04
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	2.1	2.2	2.7	2.1	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	17.63	19.65	115.00	69.60	126.62
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	1.5	1.2	9.7	3.4	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (1)	k	31	40	47	46	45
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		2.24	2.81	3.22	3.07	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Namibian Communications Commission.
Prior to 1993: year beginning Apr. 1.

(1) Source: Namibian Broadcasting Corporation. Registered television receivers. / Source: Namibian Broadcasting Corporation. Récépteurs de télévision enregistrés.

Source: ITU / UIT.

Niger

Land area / Superficie (km²): *1'186'408*
Local currency / Monnaie nationale: *CFA Franc*
Capital / Capitale: *Niamey*

		Year ending / Année se terminant le 31.12				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	7'996	8'270	8'550	8'846	...
Gross Domestic Product / Produit Intérieur Brut	M	656'600	620'600	628'700	855'100	...
GDP per capita / PIB par habitant	US$	291	283	260	174	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	740	780	800	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	60'300	33'600	36'000	...	...
Average exchange rate per US$ / Taux de change moyen par US$		282.11	264.69	283.16	555.20	...
Consumer price index (1987=100) / Indice des prix à la consommation		88.00	84.00	83.00	113.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		9'871	10'258	10'503	12'453	13'342
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.12	0.12	0.12	0.14	...
Telephone stations (sets) / Postes téléphoniques (appareils)		14'431	14'036	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		16'389	16'389	16'225	16'225	26'925
% of digital main lines / % de lignes principales numériques	%	—	—	66.9	70.6	74.1
Waiting list / Liste d'attente		803	1'031	1'340	...	1'441
Public pay phones / Publiphones		...	65	174	...	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	—
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		240	209	193	180	168
Estimated facsimile machines / Postes de télécopie estimés		207	268	309	333	327
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		1'178	1'191	1'175	1'175	1'157
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		119	116	112	94	87
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	6'952.15	6'557.46	6'582.19	9'058.38	9'640.47
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.1	1.1	1.0	1.1	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	476.00	185.60	899.80	1'467.50	1'431.60
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	0.8	0.6	2.5	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (1)	k	155	170	180	200	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		1.94	2.06	2.11	2.26	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Office des Postes et des Télécommunications.
(1) Source: ORTN, ITU estimates. / Source: ORTN, estimations UIT.

Source: ITU / UIT.

Nigeria / Nigéria

Land area / Superficie (km²): *923'850*
Local currency / Monnaie nationale: *Naira*
Capital / Capitale: *Lagos*

			Year ending / Année se terminant le 31.12			
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	99'083	101'900	104'900	107'900	...
Gross Domestic Product / Produit Intérieur Brut	M	324'010	549'808	697'095	978'562	...
GDP per capita / PIB par habitant	US$	330	312	301	412	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	1'440	1'400	1'430	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	53'783	91'178	104'957	98'500	...
Average exchange rate per US$ / Taux de change moyen par US$		9.91	17.30	22.07	22.00	...
Consumer price index (1987=100) / Indice des prix à la consommation		282.00	408.00	641.00	1'007.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		294'166	320'934	342'287	368'715	405'073
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.30	0.31	0.33	0.34	...
Telephone stations (sets) / Postes téléphoniques (appareils)		443'057	457'596	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		406'430	487'330	497'848	581'010	600'000
% of digital main lines / % de lignes principales numériques	%	...	18.5	21.3	36.2	48.2
Waiting list / Liste d'attente		557'449	243'089	204'532	194'793	...
Public pay phones / Publiphones		1'428	...	...	347	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	9'049	12'800	13'000
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		7'064	7'329	...	7'280	...
Estimated facsimile machines / Postes de télécopie estimés		...	...	...	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		16'321	15'800	15'027	14'461	14'251
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		55	49	44	39	35
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	3'124.23	6'367.28	9'885.13	10'110.93	20'443.27
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.0	1.2	1.4	1.0	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	2'490.39	1'608.34	1'929.40	2'314.80	4'125.16
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	4.6	1.8	1.8	2.4	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (1)	k	3'650	3'800	...	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		3.68	3.73	...	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Nigerian Telecommunications Plc.
(1) Source: Unesco. / Source: Unesco.

Source: ITU / UIT.

Réunion

Land area / Superficie (km²): *2'510*
Local currency / Monnaie nationale: *French Franc*
Capital / Capitale: *Saint Denis*

		Year ending / Année se terminant le 31.12				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	613	623	633	643	...
Gross Domestic Product / Produit Intérieur Brut	M	...	...	...	...	...
GDP per capita / PIB par habitant	US$	...	...	...	...	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	...	...	...	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	...	...	...	...	...
Average exchange rate per US$ / Taux de change moyen par US$		5.64	5.29	5.66	5.55	...
Consumer price index (1987=100) / Indice des prix à la consommation		114.00	117.00	124.00	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		175'067	187'522	198'524	...	...
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		28.54	30.09	31.37	...	...
Telephone stations (sets) / Postes téléphoniques (appareils)		...	...	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		...	...	...	...	...
% of digital main lines / % de lignes principales numériques	%	...	...	...	...	...
Waiting list / Liste d'attente		...	...	...	...	...
Public pay phones / Publiphones		607	...	...	...	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		2'735	...	...	...	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		716	596	...	...	...
Estimated facsimile machines / Postes de télécopie estimés		1'906	...	...	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		801	...	...	...	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		5	...	...	...	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	...	...	...	...	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	...	...	...	...	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	...	...	...	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	...	...	...	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs	k	110	110	118	135	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		17.93	17.65	18.64	21.03	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: France Télécom.

Source: ITU / UIT.

Rwanda

Land area / Superficie (km^2): *26'330*
Local currency / Monnaie nationale: *Franc*
Capital / Capitale: *Kigali*

Year ending / Année se terminant le 31.12

			1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE							
Population / Population		k	7'169	7'357	7'554	7'750	...
Gross Domestic Product / Produit Intérieur Brut		M	211'100	218'380	215'520	...	...
GDP per capita / PIB par habitant		US$	235	223	198	...	...
GNP per capita (PPP) / PNB par habitant (PPA)		US$	...	770	740	...	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe		M	24'062	30'432	32'115	...	...
Average exchange rate per US$ / Taux de change moyen par US$			125.14	133.35	144.25	...	...
Consumer price index (1987=100) / Indice des prix à la consommation			130.00	142.00	160.00	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE							
Main telephone lines / Lignes téléphoniques principales	(1)		11'298	11'763	12'000	15'000	...
Main lines per 100 inhabitants / Lignes principales pour 100 habitants			0.16	0.16	0.16	0.19	...
Telephone stations (sets) / Postes téléphoniques (appareils)			15'000	...	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques			13'900	17'664	...	...	...
% of digital main lines / % de lignes principales numériques		%	100.0	100.0	100.0	100.0	...
Waiting list / Liste d'attente			7'253	5'000	...	...	...
Public pay phones / Publiphones			...	...	...	...	...
MOBILE SERVICES / SERVICES MOBILES							
Cellular telephone subscribers / Abonnés au téléphone cellulaire			—	—	—	—	...
OTHER SERVICES / AUTRES SERVICES							
Telex subscribers / Abonnés télex			145	142	...	...	...
Estimated facsimile machines / Postes de télécopie estimés			321	481	...	...	...
STAFF / EFFECTIFS							
Full-time telecommunication staff / Personnel des télécom à plein temps			619	593	650	760	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes			55	50	54	51	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES							
Total telecom revenue / Recettes totales des télécom		M	1'347.70	1'625.00	1'760.00	1'800.00	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB		%	0.6	0.7	0.8	...	...
CAPITAL EXPENDITURE / INVESTISSEMENTS							
Annual investment in telecom / Investissement annuel en télécom		M	...	...	...	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF		%	...	...	...	...	...
BROADCASTING / RADIODIFFUSION							
Television receivers / Téléviseurs	(2)	k	3	5	10	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants			0.04	0.06	0.13	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: MInistère des transports et des communications.
(1) 1993: Estimate. / 1993: Estimation.
(2) Source: Office Rwandais D'Information. / Source: Office Rwandais D'Information.

Source: ITU / UIT.

S. Tomé & Principe / Sao Tomé-et-Principe

Land area / Superficie (km²): 964
Local currency / Monnaie nationale: Dobra
Capital / Capitale: Sao Tome

Year ending / Année se terminant le 31.12

		1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	117	120	122	125	...
Gross Domestic Product / Produit Intérieur Brut	M	10'813	13'832	16'837	21'200	...
GDP per capita / PIB par habitant	US$	457	361	321	231	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	...	...	...	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	4'936	7'062	10'010	18'022	...
Average exchange rate per US$ / Taux de change moyen par US$		201.82	320.40	429.85	732.63	...
Consumer price index (1987=100) / Indice des prix à la consommation		...	...	...	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales (1)		2'218	2'360	2'386	2'460	...
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		1.89	1.97	1.96	1.97	...
Telephone stations (sets) / Postes téléphoniques (appareils)		3'105	3'500	3'536	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		2'600	3'055	3'231	3'303	...
% of digital main lines / % de lignes principales numériques	%	—	83.0	93.8	95.0	...
Waiting list / Liste d'attente		479	317	486	900	...
Public pay phones / Publiphones		...	16	26	43	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		79	71	66	54	...
Estimated facsimile machines / Postes de télécopie estimés		31	91	127	145	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		190	180	181	166	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		86	76	76	67	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	609.29	1'271.47	1'859.05	2'880.42	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	5.6	9.2	11.0	13.6	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	813.83	314.78	111.76	310.08	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	16.5	4.5	1.1	1.7	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs	k	...	...	...	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		...	...	...	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Companhis Santomense de Telecomunicaçoes s.a.r.l..
(1) 1990: Estimate. / 1990: Estimation.

Source: ITU / UIT.

Senegal / Sénégal

Land area / Superficie (km²): 196'722
Local currency / Monnaie nationale: CFA Franc
Capital / Capitale: Dakar

			Year ending / Année se terminant le 31.12				
			1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE							
Population / Population		k	7'514	7'706	7'902	8'102	...
Gross Domestic Product / Produit Intérieur Brut		M	1'549'900	1'612'800	1'586'600	2'155'000	...
GDP per capita / PIB par habitant		US$	731	791	709	479	...
GNP per capita (PPP) / PNB par habitant (PPA)		US$	...	1'750	1'650	1'660	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe		M	212'000	222'000	230'500	340'000	...
Average exchange rate per US$ / Taux de change moyen par US$			282.11	264.69	283.16	555.20	...
Consumer price index (1987=100) / Indice des prix à la consommation			97.00	97.00	97.00	128.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE							
Main telephone lines / Lignes téléphoniques principales			48'469	58'095	64'055	72'089	81'988
Main lines per 100 inhabitants / Lignes principales pour 100 habitants			0.65	0.75	0.81	0.89	...
Telephone stations (sets) / Postes téléphoniques (appareils)			...	...	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques			76'972	86'990	91'951	105'180	113'851
% of digital main lines / % de lignes principales numériques		%	63.0	74.0	73.0	76.0	93.2
Waiting list / Liste d'attente			11'254	8'798	10'730	9'606	14'448
Public pay phones / Publiphones	(1)		...	548	594	2'350	3'733
MOBILE SERVICES / SERVICES MOBILES							
Cellular telephone subscribers / Abonnés au téléphone cellulaire			—	—	—	98	122
OTHER SERVICES / AUTRES SERVICES							
Telex subscribers / Abonnés télex			887	888	742	685	633
Estimated facsimile machines / Postes de télécopie estimés			...	...	...	...	...
STAFF / EFFECTIFS							
Full-time telecommunication staff / Personnel des télécom à plein temps			1'913	1'927	1'910	1'894	1'845
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes			39	33	30	26	23
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES							
Total telecom revenue / Recettes totales des télécom	(2)	M	34'011.00	60'295.00	49'288.00	57'491.37	53'061.26
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB		%	2.2	3.7	3.1	2.7	...
CAPITAL EXPENDITURE / INVESTISSEMENTS							
Annual investment in telecom / Investissement annuel en télécom	(3)	M	8'857.00	12'814.00	5'532.00	8'100.00	11'587.00
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.		%	4.2	5.8	2.4	2.4	...
BROADCASTING / RADIODIFFUSION							
Television receivers / Téléviseurs	(4)	k	273	282	...	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants			3.63	3.66	...	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Société Nationale des Télécommunications du Sénégal.

(1) From 1994 including private telecentres. / Depuis 1994 inclut télécentres privés.

(2) 1992: Data are based on an exceptional period of 18 months, for the fiscal year to coincide with the civil year. / 1992: les données sont sur une période exceptionnelle de 18 mois pour faire coincider l'exercice budgétaire avec l'année civile.

(3) 1992: Data are based on an exceptional period of 18 months, for the fiscal year to coincide with the civil year. / 1992: les données sont sur une période exceptionnelle de 18 mois pour faire coicider l'exercice budgétaire avec l'année civile.

(4) Source: Unesco. / Source: Unesco.

Source: ITU / UIT.

Seychelles

Land area / Superficie (km²): 404
Local currency / Monnaie nationale: Rupee
Capital / Capitale: Victoria

		Year ending / Année se terminant le 31.03				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	71	71	72	73	...
Gross Domestic Product / Produit Intérieur Brut	M	1'980	2'179	2'302	2'299	...
GDP per capita / PIB par habitant	US$	5'303	5'975	6'170	6'229	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	...	...	...	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	393	403	529	557	...
Average exchange rate per US$ / Taux de change moyen par US$		5.29	5.12	5.18	5.06	...
Consumer price index (1987=100) / Indice des prix à la consommation		110.00	113.00	115.00	117.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		8'679	9'349	10'068	11'298	12'469
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		12.40	13.24	14.14	15.69	17.08
Telephone stations (sets) / Postes téléphoniques (appareils)		16'505	17'647	17'647	20'654	21'889
Total line exchange capacity / Capacité totale des centraux téléphoniques		...	11'992	12'376	16'000	16'954
% of digital main lines / % de lignes principales numériques	%	65.0	65.0	70.0	100.0	100.0
Waiting list / Liste d'attente		2'226	2'444	2'916	3'053	3'200
Public pay phones / Publiphones		134	155	177	193	200
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	—
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		202	193	178	156	131
Estimated facsimile machines / Postes de télécopie estimés		275	347	439	502	508
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		305	275	312	293	312
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		35	29	31	26	25
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	107.66	115.54	123.73	133.96	142.00
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	5.4	5.8	5.7	5.8	6.2
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom (1)	M	40.53	27.52	37.50	32.80	40.00
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	8.4	7.0	9.3	6.2	7.2
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (2)	k	5	6	10	14	24
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		7.14	8.50	14.05	19.44	32.33

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Cable and Wireless Ltd.
(1) Purchase of tangible fixed assets. / Purchase of tangible fixed assets.
(2) Source: Seychelles Broadcasting Service. / Source: Seychelles Broadcasting Service.

Source: ITU / UIT.

Sierra Leone

Land area / Superficie (km²): 72'326
Local currency / Monnaie nationale: Leone
Capital / Capitale: Freetown

Year ending / Année se terminant le 31.12

		1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	4'252	4'358	4'468	4'587	...
Gross Domestic Product / Produit Intérieur Brut	M	150'175	295'298	395'183	480'379	...
GDP per capita / PIB par habitant	US$	177	160	164	178	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	770	750	770	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	17'914	34'459	36'284	43'590	...
Average exchange rate per US$ / Taux de change moyen par US$		199.03	424.01	539.90	586.74	...
Consumer price index (1987=100) / Indice des prix à la consommation		914.00	1'512.00	1'848.00	2'296.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		13'560	13'839	14'470	15'754	16'627
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.32	0.32	0.32	0.34	...
Telephone stations (sets) / Postes téléphoniques (appareils)		46'300	56'200	62'000	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		18'500	22'272	22'572	22'572	22'572
% of digital main lines / % de lignes principales numériques	%	45.7	82.5	83.0	83.5	85.9
Waiting list / Liste d'attente		2'464	1'206	4'600	5'000	6'500
Public pay phones / Publiphones		9	49	56	88	150
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		350	100	250	150	150
Estimated facsimile machines / Postes de télécopie estimés		48	152	498	800	1'000
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		604	584	936	958	969
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		45	42	65	61	58
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	689.68	3'444.28	7'571.41	7'698.81	13'482.70
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	0.5	1.2	1.9	1.6	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	...	1'707.26	664.39	1'240.63	3'697.64
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	...	5.0	1.8	2.8	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (1)	k	43	56	60	65	73
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		1.01	1.28	1.34	1.42	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Sierra Leone Telecommunications company.
(1) Source: 1992 SLNT. / Source: 1992 SLNT.

Source: ITU / UIT.

Somalia / Somalie

Land area / Superficie (km²): *630'000*
Local currency / Monnaie nationale: *Shilling*
Capital / Capitale: *Mogadiscio*

		Year ending / Année se terminant le 31.12				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	8'789	8'902	8'954	9'077	...
Gross Domestic Product / Produit Intérieur Brut	M	...	...	...	...	...
GDP per capita / PIB par habitant	US$	...	...	...	...	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	...	...	...	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	...	...	...	...	...
Average exchange rate per US$ / Taux de change moyen par US$		...	...	...	...	...
Consumer price index (1987=100) / Indice des prix à la consommation		...	...	...	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales (1)		15'000	15'000	15'000	15'000	...
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.17	0.17	0.17	0.17	...
Telephone stations (sets) / Postes téléphoniques (appareils)		...	...	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		18'000	...	...	...	...
% of digital main lines / % de lignes principales numériques	%	...	...	...	...	...
Waiting list / Liste d'attente		...	...	...	...	...
Public pay phones / Publiphones		...	...	...	...	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		...	...	...	...	...
Estimated facsimile machines / Postes de télécopie estimés		...	...	...	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		1'500	...	...	...	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		100	...	...	...	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	...	...	...	...	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	...	...	...	...	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	...	...	...	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	...	...	...	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (2)	k	108	113	...	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		1.23	1.27	...	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: .
(1) Estimate. / Estimation.
(2) Source: Unesco. / Source: Unesco.

Source: ITU / UIT.

South Africa / Sudafricaine (Rép.)

Land area / Superficie (km²): *1'184'827*
Local currency / Monnaie nationale: *Rand*
Capital / Capitale: *Pretoria*

Year ending / Année se terminant le 31.03

			1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE							
Population / Population		k	38'857	39'766	40'677	41'591	...
Gross Domestic Product / Produit Intérieur Brut		M	310'100	340'100	383'100	432'800	...
GDP per capita / PIB par habitant		US$	2'890	2'999	2'886	2'931	...
GNP per capita (PPP) / PNB par habitant (PPA)		US$	...	...	...	...	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe		M	50'400	50'200	58'500	76'800	...
Average exchange rate per US$ / Taux de change moyen par US$			2.76	2.85	3.26	3.55	...
Consumer price index (1987=100) / Indice des prix à la consommation			171.00	194.00	213.00	232.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE							
Main telephone lines / Lignes téléphoniques principales	(1)		3'315'022	3'434'788	3'524'138	3'659'863	3'844'529
Main lines per 100 inhabitants / Lignes principales pour 100 habitants			8.73	8.84	8.86	9.00	9.24
Telephone stations (sets) / Postes téléphoniques (appareils)			5'128'044	5'207'604	5'206'235	5'275'845	...
Total line exchange capacity / Capacité totale des centraux téléphoniques	(2)		4'134'111	4'276'430	4'406'795	4'603'140	4'696'998
% of digital main lines / % de lignes principales numériques		%	47.6	52.0	56.4	60.0	66.2
Waiting list / Liste d'attente			125'448	127'394	120'365	135'566	133'163
Public pay phones / Publiphones	(3)		42'106	43'437	45'521	49'644	59'647
MOBILE SERVICES / SERVICES MOBILES							
Cellular telephone subscribers / Abonnés au téléphone cellulaire			5'680	7'100	12'510	40'000	340'000
OTHER SERVICES / AUTRES SERVICES							
Telex subscribers / Abonnés télex			13'914	11'341	8'742	...	...
Estimated facsimile machines / Postes de télécopie estimés	(4)		...	...	50'000	60'000	75'000
STAFF / EFFECTIFS							
Full-time telecommunication staff / Personnel des télécom à plein temps			67'667	66'210	61'991	60'172	58'793
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes			20	19	18	16	15
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES							
Total telecom revenue / Recettes totales des télécom	(5)	M	5'806.00	6'393.90	6'831.40	8'348.10	9'642.65
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB		%	2.1	2.1	2.0	2.2	2.2
CAPITAL EXPENDITURE / INVESTISSEMENTS							
Annual investment in telecom / Investissement annuel en télécom		M	1'659.05	...	1'436.60	2'226.70	2'790.58
Telecom investment as % of GFCF / Investissement télécom en % de FBCF		%	3.5	...	2.9	3.8	3.6
BROADCASTING / RADIODIFFUSION							
Television receivers / Téléviseurs		k	3'700	3'800	3'900	4'000	4'100
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants			9.75	9.78	9.81	9.83	9.86

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Telkom SA Limited.

(1) Main telephone services. /

(2) Capacity for automatic exchanges only. /

(3) Coinphones, Cardphones & table-mounted renter's payphone (Chatterboxes). /

(4) Estimate. / Estimation

(5) 1991/3 financial year stretched for 18 months. 1992 estimates derived from 18 month total multiplied by 0.667 /

Source: ITU / UIT.

Sudan / Soudan

Land area / Superficie (km²): 2'505'815
Local currency / Monnaie nationale: Pound
Capital / Capitale: Khartoum

		Year ending / Année se terminant le 31.12				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	25'251	25'934	26'641	27'361	...
Gross Domestic Product / Produit Intérieur Brut	M	197'361	415'907	...	...	...
GDP per capita / PIB par habitant	US$	289	165	...	...	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	...	...	...	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	25'072	...	...	...	...
Average exchange rate per US$ / Taux de change moyen par US$		27.00	97.43	159.21	289.61	...
Consumer price index (1987=100) / Indice des prix à la consommation		1'014.00	2'207.00	4'444.00	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales (1)		63'600	64'000	64'000	64'000	...
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.25	0.25	0.24	0.23	...
Telephone stations (sets) / Postes téléphoniques (appareils)		83'060	...	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		73'600	...	...	84'000	...
% of digital main lines / % de lignes principales numériques	%	...	...	...	5.4	...
Waiting list / Liste d'attente		27'350	...	...	15'000	...
Public pay phones / Publiphones		560	...	...	...	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		1'523	...	...	1'640	...
Estimated facsimile machines / Postes de télécopie estimés (2)		258	...	...	5'000	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		8'619	...	...	2'100	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		136	...	...	33	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	353.22	...	...	...	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	0.2	...	...	...	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	...	...	...	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	...	...	...	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs	k	2'000	2'060	...	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		7.92	7.94	...	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Sudan Telecom Co. Ltd.
(1) 1988-90, 1992-93: Estimate. / 1988-90, 1992-93: Estimation.
(2) Source: Sudatel. / Source: Sudatel.

Source: ITU / UIT.

Swaziland

Land area / Superficie (km²): *17'366*
Local currency / Monnaie nationale: *Lilangeni*
Capital / Capitale: *Mbabane*

Year ending / Année se terminant le 31.03

		1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	821	850	880	906	...
Gross Domestic Product / Produit Intérieur Brut	M	2'613	2'955	3'392	3'913	...
GDP per capita / PIB par habitant	US$	1'155	1'220	1'181	1'216	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	...	...	2'880	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	464	582	598	590	...
Average exchange rate per US$ / Taux de change moyen par US$		2.76	2.85	3.26	3.55	...
Consumer price index (1987=100) / Indice des prix à la consommation		150.00	162.00	190.00	217.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		13'700	14'500	15'184	16'440	18'605
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		1.73	1.77	1.79	1.87	2.05
Telephone stations (sets) / Postes téléphoniques (appareils)		25'293	25'194	30'915	30'364	35'534
Total line exchange capacity / Capacité totale des centraux téléphoniques		18'142	17'420	19'192	29'628	31'890
% of digital main lines / % de lignes principales numériques	%	—	—	10.4	80.0	94.8
Waiting list / Liste d'attente		7'872	8'834	9'050	10'895	15'381
Public pay phones / Publiphones		166	185	266	300	402
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	—
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		280	254	229	222	154
Estimated facsimile machines / Postes de télécopie estimés (1)		341	688	793	800	922
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		398	391	477	512	456
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		29	27	31	31	25
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom (2)	M	51.67	59.90	51.20	64.68	80.80
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	2.2	2.3	1.7	1.9	2.1
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom (3)	M	12.97	19.00	33.98	63.20	54.34
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	2.7	4.1	5.8	10.6	9.2
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs	k	15	15	55	60	65
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		1.89	1.83	6.47	6.82	7.17

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Swaziland Posts and Telecoomunications Corporation.
(1) Source: SPTC. / Source: SPTC.
(2) Including posts. / Inclut les postes.
(3) Additions to fixed assets. /

Source: ITU / UIT.

Tanzania / Tanzanie

Land area / Superficie (km²): 939'762
Local currency / Monnaie nationale: Shillings
Capital / Capitale: Dodoma

Year ending / Année se terminant le 31.12

		1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	26'369	27'162	28'019	28'846	...
Gross Domestic Product / Produit Intérieur Brut	M	626'209	765'617	961'772	...	...
GDP per capita / PIB par habitant	US$	108	95	85	...	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	630	580	...	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	299'735	374'727	487'195	...	...
Average exchange rate per US$ / Taux de change moyen par US$		219.16	297.71	405.27	509.63	...
Consumer price index (1987=100) / Indice des prix à la consommation		242.00	295.00	364.00	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		76'369	81'306	85'005	88'315	90'270
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.29	0.30	0.30	0.31	...
Telephone stations (sets) / Postes téléphoniques (appareils)		143'599	150'678	154'706	158'274	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		106'258	109'054	125'703	129'988	127'117
% of digital main lines / % de lignes principales numériques	%	34.1	42.3	33.8	39.2	42.8
Waiting list / Liste d'attente		130'447	134'315	142'474	144'968	117'980
Public pay phones / Publiphones		676	665	633	615	585
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	371	...
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		1'809	1'816	1'823	1'808	1'781
Estimated facsimile machines / Postes de télécopie estimés (1)		900	2'000	...	...	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		4'707	4'907	4'847	4'671	4'775
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		62	60	57	53	53
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	12'000.75	18'321.19	30'134.62	34'539.17	48'380.70
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.9	2.4	3.1	...	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom (2)	M	1'488.73	4'231.80	2'692.70	3'498.85	2'856.00
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	0.5	1.1	0.6	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (3)	k	42	150	272	450	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		0.16	0.55	0.97	1.56	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Tanzania Telecommunications Company Ltd.
(1) 1990-1992: Estimate. / 1990-1992: Estimation.
(2) 1985-1988: Additions to fixed assets. / 1985-1988: Additions to fixed assets.
(3) Source: Unesco. / Source: Unesco.

Source: ITU / UIT.

Togo

		Year ending / Année se terminant le 31.12				
Land area / Superficie (km²):	*56'785*					
Local currency / Monnaie nationale:	*CFA Franc*					
Capital / Capitale:	*Lome*	**1991**	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	3'645	3'762	3'885	4'010	...
Gross Domestic Product / Produit Intérieur Brut	M	455'500	446'700	380'000	540'400	...
GDP per capita / PIB par habitant	US$	443	449	345	243	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	1'100	1'000	1'060	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	103'900	90'300	21'200	63'700	...
Average exchange rate per US$ / Taux de change moyen par US$		282.11	264.69	283.16	555.20	...
Consumer price index (1987=100) / Indice des prix à la consommation		100.00	102.00	101.00	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		10'730	15'337	17'298	21'400	21'515
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.29	0.41	0.45	0.53	...
Telephone stations (sets) / Postes téléphoniques (appareils)		21'460	30'674	36'000	45'000	50'000
Total line exchange capacity / Capacité totale des centraux téléphoniques		12'193	21'183	23'552	23'614	23'614
% of digital main lines / % de lignes principales numériques	%	—	98.0	98.0	98.0	99.0
Waiting list / Liste d'attente		2'106	201	1'770	7'130	5'075
Public pay phones / Publiphones		68	68	68	68	112
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	—
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		407	393	348	317	301
Estimated facsimile machines / Postes de télécopie estimés (1)		430	590	1'400	4'000	10'000
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		718	849	895	893	888
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		67	55	52	42	41
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	8'234.15	7'947.54	7'576.89	7'768.00	7'632.53
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.8	1.8	2.0	1.4	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	4'126.51	2'251.00	1'258.38	1'761.00	849.00
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	4.0	2.5	5.9	2.8	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (2)	k	30	40	45	46	50
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		0.82	1.06	1.16	1.15	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Office des Postes et Télécommunications du Togo.
(1) Source: OPT. / Source: OPT.
(2) Source: OPT. / Source: OPT.

Source: ITU / UIT.

Tunisia / Tunisie

Land area / Superficie (km²): *164'148*
Local currency / Monnaie nationale: *Dinar*
Capital / Capitale: *Tunis*

Year ending / Année se terminant le 31.12

		1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	8'260	8'456	8'656	8'815	...
Gross Domestic Product / Produit Intérieur Brut	M	10'528	11'877	12'717	13'823	...
GDP per capita / PIB par habitant	US$	1'378	1'589	1'464	1'550	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	5'130	4'780	4'960	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	3'127	4'009	4'284	3'875	...
Average exchange rate per US$ / Taux de change moyen par US$		0.93	0.88	1.00	1.01	...
Consumer price index (1987=100) / Indice des prix à la consommation		133.14	140.89	146.49	153.43	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		331'947	374'848	421'362	474'253	521'742
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		4.02	4.43	4.87	5.38	...
Telephone stations (sets) / Postes téléphoniques (appareils)		463'774	464'811	505'634	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		506'079	561'269	669'071	737'983	...
% of digital main lines / % de lignes principales numériques	%	66.3	71.5	74.6	77.8	80.8
Waiting list / Liste d'attente		141'066	143'365	108'627	125'976	...
Public pay phones / Publiphones		3'600	3'710	4'587	5'669	...
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		1'239	1'974	2'269	2'709	3'185
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		4'059	3'103	2'911	2'738	...
Estimated facsimile machines / Postes de télécopie estimés		5'000	10'000	15'000	20'000	...
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		6'644	7'500	6'314	6'432	5'800
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		20	20	15	14	11
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	142.21	175.53	193.96	220.85	248.92
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.4	1.5	1.5	1.6	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom (1)	M	58.11	111.36	129.13	123.16	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	1.9	2.8	3.0	3.2	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (2)	k	700	725	750	780	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		8.47	8.57	8.66	8.85	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Ministry of Communications.
(1) Including posts. / Inclut les postes.
(2) Source: ERTT. / Source: ERTT.

Source: ITU / UIT.

Uganda / Ouganda

Land area / Superficie (km²): 236'578
Local currency / Monnaie nationale: Shilling
Capital / Capitale: Kampala

		Year ending / Année se terminant le 30.06				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	17'166	17'591	18'026	18'592	...
Gross Domestic Product / Produit Intérieur Brut	M	1'848'082	2'782'517	3'947'590	4'448'810	...
GDP per capita / PIB par habitant	US$	147	140	183	244	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	1'070	900	940	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	273'376	423'837	557'882	573'163	...
Average exchange rate per US$ / Taux de change moyen par US$		734.00	1'133.80	1'195.02	979.45	...
Consumer price index (1987=100) / Indice des prix à la consommation		815.00	1'242.00	1'318.00	1'446.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		28'405	30'047	20'770	34'949	43'245
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.17	0.17	0.12	0.19	...
Telephone stations (sets) / Postes téléphoniques (appareils)		...	55'271	47'419	62'183	74'882
Total line exchange capacity / Capacité totale des centraux téléphoniques		61'136	64'583	62'883	59'897	63'602
% of digital main lines / % de lignes principales numériques	%	...	42.2	60.6	68.0	64.2
Waiting list / Liste d'attente		...	6'233	2'579	3'966	5'045
Public pay phones / Publiphones		...	139	179	288	630
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	1'747
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		...	906	328	326	502
Estimated facsimile machines / Postes de télécopie estimés		...	1'600	...	...	2'500
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		...	1'247	1'246	1'219	...
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		...	42	60	35	...
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	21'474.48	33'396.06	32'768.54	40'683.19	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	1.2	1.2	0.8	0.9	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	12'642.38	29'504.29	14'077.26	2'877.92	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	4.6	7.0	2.5	0.5	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (1)	k	187	300	350	400	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		1.09	1.71	1.94	2.15	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Uganda Posts and Telecommunications Corporation.

(1) These figures are very conservative, since Uganda has not been licensing TVs for the last 4 years. A lot more TV sets have come throught private hands into the country. The figure could as well be over 500'000 now in 1995. /

Source: ITU / UIT.

Zaire / Zaïre

Land area / Superficie (km²): 2'345'410
Local currency / Monnaie nationale: Zaire
Capital / Capitale: Kinshasa

Year ending / Année se terminant le 31.12

		1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	38'648	39'899	41'231	42'552	...
Gross Domestic Product / Produit Intérieur Brut	M	...	...	...	...	...
GDP per capita / PIB par habitant	US$	...	...	...	...	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	...	...	...	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	...	...	...	...	...
Average exchange rate per US$ / Taux de change moyen par US$		15'587.00	645'549.00	...	...	...
Consumer price index (1987=100) / Indice des prix à la consommation		15'242.00	644'621.00	13'452'640.00	11'566'080.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales (1)		35'000	36'000	36'000	36'000	36'000
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.09	0.09	0.09	0.08	...
Telephone stations (sets) / Postes téléphoniques (appareils)		...	...	...	...	...
Total line exchange capacity / Capacité totale des centraux téléphoniques		...	...	...	...	67'712
% of digital main lines / % de lignes principales numériques	%	48.9	48.9	48.9	...	56.4
Waiting list / Liste d'attente		...	...	...	...	6'000
Public pay phones / Publiphones		...	...	...	...	500
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	...	...	...	10'000
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		...	...	...	...	700
Estimated facsimile machines / Postes de télécopie estimés		...	...	...	...	5'000
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		...	...	...	...	1'900
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		...	...	...	...	53
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	...	25'133'047.71	61'709'327.12	...	...
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	...	...	...	...	...
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom	M	...	...	...	...	...
Telecom investment as % of GFCF / Investissement télécom en % de FBCF	%	...	...	...	...	...
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (2)	k	41	55	1'300	1'600	1'800
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		0.11	0.14	3.15	3.76	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Ministère des Postes et Télécommunications.
(1) 1989-94: Estimate. / 1989-94: Estimation.
(2) Source: Unesco. / Source: Unesco.

Source: ITU / UIT.

Zambia / Zambie

Land area / Superficie (km²): *752'617*
Local currency / Monnaie nationale: *Kwacha*
Capital / Capitale: *Lusaka*

		Year ending / Année se terminant le 31.03				
		1991	**1992**	**1993**	**1994**	**1995**
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE						
Population / Population	k	8'396	8'649	8'936	9'196	...
Gross Domestic Product / Produit Intérieur Brut	M	218'276	569'564	1'632'629	2'335'168	...
GDP per capita / PIB par habitant	US$	421	421	420	330	...
GNP per capita (PPP) / PNB par habitant (PPA)	US$	...	...	1'040	1'000	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe	M	24'046	67'731	168'261	213'674	...
Average exchange rate per US$ / Taux de change moyen par US$		61.73	156.25	434.78	769.23	...
Consumer price index (1987=100) / Indice des prix à la consommation		1'485.00	4'417.00	12'764.00	...	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE						
Main telephone lines / Lignes téléphoniques principales		65'057	68'935	75'880	77'966	79'786
Main lines per 100 inhabitants / Lignes principales pour 100 habitants		0.80	0.82	0.88	0.87	0.87
Telephone stations (sets) / Postes téléphoniques (appareils)		99'840	104'518	112'634	115'668	108'028
Total line exchange capacity / Capacité totale des centraux téléphoniques		114'474	122'874	109'992	109'864	110'714
% of digital main lines / % de lignes principales numériques	%	39.3	44.0	55.0	62.0	62.0
Waiting list / Liste d'attente		52'546	57'461	64'137	68'596	71'968
Public pay phones / Publiphones		474	487	533	526	548
MOBILE SERVICES / SERVICES MOBILES						
Cellular telephone subscribers / Abonnés au téléphone cellulaire		—	—	—	—	—
OTHER SERVICES / AUTRES SERVICES						
Telex subscribers / Abonnés télex		2'875	2'901	3'061	2'804	2'406
Estimated facsimile machines / Postes de télécopie estimés		460	460	460	460	460
STAFF / EFFECTIFS						
Full-time telecommunication staff / Personnel des télécom à plein temps		3'737	3'313	3'244	3'126	2'830
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes		57	48	43	40	35
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES						
Total telecom revenue / Recettes totales des télécom	M	2'931.27	6'618.08	20'254.30	47'071.40	61'684.30
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB	%	2.6	3.0	3.6	2.9	2.6
CAPITAL EXPENDITURE / INVESTISSEMENTS						
Annual investment in telecom / Investissement annuel en télécom (1)	M	817.33	2'250.16	2'403.00	10'250.00	12'500.00
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.	%	4.2	9.4	3.5	6.1	5.9
BROADCASTING / RADIODIFFUSION						
Television receivers / Téléviseurs (2)	k	250	253	300	305	310
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants		3.07	3.01	3.47	3.41	3.37

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Zambia Telecommunications Company Ltd.
(1) Tangible fixed assets purchased, net of exchange losses capitalised. 1988: Including posts. /
(2) Source: PTC Ltd. / Source: PTC Ltd.

Source: ITU / UIT.

Zimbabwe

Land area / Superficie (km²): 390'310
Local currency / Monnaie nationale: Dollar
Capital / Capitale: Harare

			Year ending / Année se terminant le 30.06				
			1991	1992	1993	1994	1995
DEMOGRAPHY, ECONOMY / DEMOGRAPHIE, MACRO-ECONOMIE							
Population / Population		k	10'161	10'425	10'739	11'002	...
Gross Domestic Product / Produit Intérieur Brut		M	18'964	22'647	32'408	...	...
GDP per capita / PIB par habitant		US$	544	426	459	...	...
GNP per capita (PPP) / PNB par habitant (PPA)		US$	...	1'970	2'000	2'040	...
Gross Fixed Capital Formation / Formation Brute de Capital Fixe		M	5'381	6'246	8'242	...	...
Average exchange rate per US$ / Taux de change moyen par US$			3.43	5.11	6.58	8.15	...
Consumer price index (1987=100) / Indice des prix à la consommation			176.00	249.00	318.00	389.00	...
TELEPHONE NETWORK / RÉSEAU TELEPHONIQUE							
Main telephone lines / Lignes téléphoniques principales			126'086	127'072	128'069	134'812	154'621
Main lines per 100 inhabitants / Lignes principales pour 100 habitants			1.24	1.22	1.19	1.23	...
Telephone stations (sets) / Postes téléphoniques (appareils)			306'665	319'702	322'398	333'610	350'584
Total line exchange capacity / Capacité totale des centraux téléphoniques			165'462	165'752	167'620	202'415	238'175
% of digital main lines / % de lignes principales numériques		%	3.8	7.0	31.0	32.0	44.0
Waiting list / Liste d'attente			79'620	88'831	99'748	107'587	101'933
Public pay phones / Publiphones	(1)		1'075	1'314	1'308	1'406	1'815
MOBILE SERVICES / SERVICES MOBILES							
Cellular telephone subscribers / Abonnés au téléphone cellulaire			—	—	—	—	—
OTHER SERVICES / AUTRES SERVICES							
Telex subscribers / Abonnés télex			2'982	2'989	2'970	2'923	2'802
Estimated facsimile machines / Postes de télécopie estimés			2'000	2'000	...	10'000	...
STAFF / EFFECTIFS							
Full-time telecommunication staff / Personnel des télécom à plein temps			4'963	5'172	5'139	5'392	5'144
Telecom staff per 1'000 main lines / Agents télécom pour 1'000 lignes			39	41	40	40	33
REVENUE AND EXPENSE / CHIFFRE D'AFFAIRES							
Total telecom revenue / Recettes totales des télécom		M	379.11	568.35	674.88	998.13	1'265.49
Telecom revenue as a % of GDP / Recettes des télécom en % du PIB		%	2.0	2.5	2.1	...	...
CAPITAL EXPENDITURE / INVESTISSEMENTS							
Annual investment in telecom / Investissement annuel en télécom	(2)	M	136.21	281.67	310.44	400.06	384.38
Telecom investment as % of GFCF / Investissement télécom en % de FBCF.		%	2.5	4.5	3.8	...	...
BROADCASTING / RADIODIFFUSION							
Television receivers / Téléviseurs	(3)	k	270	280	...	...	...
Televisions per 100 inhabitants / Téléviseurs pour 100 habitants			2.66	2.69	...	...	...

Notes: Demography, Economy data / Données démographiques, économiques: World Bank / Banque mondiale.
Telecommunication data / Données des télécommunications: Posts and Telecommunications Corporation.
(1) "Public call offices". /
(2) Additions to fixed assets (including posts). /
(3) Source: Unesco. /

Source: ITU / UIT.

Technical notes

General methodology

The compound annual growth rate (CAGR) is computed by the formula:

$$[(P_V / P_n)^{(1/n)}]-1$$

where P_V = Present value

P_n = Beginning value

n = Number of periods

The result is multiplied by 100 to obtain a percentage.

United States dollar figures are reached by applying the average annual exchange rate (from the International Monetary Fund (IMF)) to the figure reported in national currency. For countries where the IMF rate is unavailable or where the exchange rate typically applied to foreign exchange transactions differs markedly from the official IMF rate, a World Bank conversion rate is used. For the few countries where neither the IMF nor World Bank rates are available, a United Nations end-of-period rate was used.

Group figures are either *totals* or weighted *averages* depending on the indicator. For example, for main telephone lines, the total number of *main telephone lines* for each grouping is shown, while for *main lines per 100 inhabitants* the weighted average is shown. Group figures are shown in bold in the tables. In cases of significant missing data, group totals are not shown.

1. Basic indicators

The data for *Population* are mid-year estimates from the World Bank. Population *Density* is based on land area data from the UN; the land area does not include any overseas dependencies but does include inland waters. The data for *Gross Domestic Product* (GDP) are generally from the World Bank. They are current price data in national currency converted to United States dollars by the method identified above. Readers are advised to consult the publications of the international organisations listed in *Sources* for precise definitions of the demographic and macro-economic data. *Main telephone lines* refer to telephone lines connecting a customer's equipment (e.g., telephone set, facsimile machine) to the Public Switched Telephone Network (PSTN) and which have a dedicated port on a telephone exchange. Note that for most countries, main lines also include public payphones but do not include mobile cellular subscribers. *Main telephone lines per 100 inhabitants* is calculated by dividing the number of main lines by the population and multiplying by 100.

2. Main telephone lines

This table shows the number of *main telephone lines* and *main telephone lines per 100 inhabitants* for the years indicated and corresponding annual growth rates.

3. Waiting list

The table shows the total number of applications for a connection to a main telephone line which have had to be held over owing to a lack of technical availability. It should be noted that the waiting list refers to applications received; it does not include figures for those who desire a telephone line but have not submitted an application. *Total demand* for main telephone lines is the sum of the unmet applications and operating main telephone lines. *Satisfied demand* is obtained by dividing the number of main telephone lines by the total demand. *Waiting time* shows the approximate number of years applicants must wait for a telephone line. It is calculated by dividing the number of applicants on the waiting list by the average number of main lines added per year over the past three years.

4. Local telephone network

Capacity used is obtained by dividing the number of main lines in service by the total number of main lines that could be connected to the local public switching exchanges. The *Automatic* percent is calculated by dividing the number of main lines connected to automatic exchanges by the total number of main lines. The *Digital* per cent is calculated by dividing the number of main lines connected to digital exchanges by the total number of main lines. The percentage of *Residential* lines refers to the number of main lines serving households (i.e. lines which are not used for professional purposes or as public telephone stations) divided by the total number of main lines. *Faults per 100 main line per year* refer to the number of reported faults per 100 main telephone lines for the year indicated. It is calculated by dividing the total number of reported faults for the year by the number of main telephone lines and multiplying by 100. Some countries report this on a monthly basis, so an annual estimate is made by multiplying by 12. The definition of a fault varies among countries: some operators include

malfunctioning customer premises equipment while others include only technical faults.

5. Tele-accessibility

Households are ITU estimates based on national and international sources. *Total residential main lines* refer to the number of main lines used by households. *Per 100 households* is obtained by dividing the number of residential main lines by the number of households and multiplying by 100. This is a statistical measurement and may not be comparable with the per cent of households with a telephone, often used in census survey. The number of residential telephone lines per 100 households can exceed 100 because households may have more than one telephone line. *Payphones* refers to the total number of all types of public telephones, including coin- and card-operated ones. Some countries include public phones installed in private establishments. No distinction is made between operational and not operational payphones. *Per 1'000 inhabitants* is obtained by dividing the number of public payphones by the population and multiplying by 1'000.

6. Urban main lines

Largest city population as % of total is obtained by dividing the population in the largest city by the total country population. The population for the largest city comes from the UN and national sources and refers to the urban agglomeration. *Largest city main lines* refer to the number of main lines in the largest city. *Main lines as % of total* is obtained by dividing the number of main lines in the largest city by the total number of main lines in the country. *Largest city teledensity* is obtained by dividing the main lines in the largest city by the population of the largest city and multiplying by 100. Note that the boundary of the largest city used by telecommunication operators may not always coincide with the areas covered by the official population. *Rest of country teledensity* is obtained by subtracting the main lines in the largest city from the main lines for the country, dividing that amount by the difference between the largest city population and the population of the country, and multiplying by 100. *Overall country teledensity* refers to the entire country and is obtained by dividing the number of main lines in the country by the population of the country and multiplying by 100.

7. Telephone tariffs

The table shows the costs associated with local residential and business telephone service. *Installation* refers to connection charges for basic telephone service. *Monthly subscription* refers to the recurring fixed charge for subscribing to the PSTN. This indicator is not always comparable since some countries include a number of free local calls in the subscription. When subscription charges are reported annually or bi-monthly, they are converted to their corresponding monthly amount. *Local call* refers to the cost of a 3-minute call within the same exchange area using the subscriber's equipment (i.e., not from a public telephone). This is the minimum amount the subscriber must pay for a 3-minute call and not the average price for each 3 minutes. A figure of zero means that there is no local charge. Any taxes involved in these three charges are included to improve comparability. The *Subscription as % of GDP per capita* shows the cost of an annual residential telephone subscription as a percentage of Gross Domestic Product per capita.

8. Cellular indicators

Mobile subscribers refer to users of portable telephones subscribing to an automatic public mobile telephone service using cellular technology that provides access to the PSTN. *Cellular tariffs* follow the same definitions as those shown for telephone tariffs (see above) but are applicable for users of cellular mobile.

9. International telephone traffic

Outgoing telephone traffic refers to total telephone traffic measured in minutes that originated in the specified country with a destination outside the country. A growing number of countries report minutes of traffic billed in the country. *Minutes per inhabitant* is obtained by dividing outgoing international minutes by the number of inhabitants in the country. *Minutes per subscriber* is obtained by dividing outgoing international minutes by the number of main lines. *International telephone circuits* refer to the number of links (voice channel equivalents) with other countries for establishing telephone communications.

10. African call charges

This matrix shows the cost of a three minutes, standard rate, direct-dialled telephone call using the PSTN between African countries. It includes all relevant taxes.

11. African telephone traffic

This matrix shows bilateral African outgoing telephone traffic measured in millions of minutes. The data shows traffic *from* each country listed in the first column *to* other countries in Africa.

12. Text communications

Telex subscribers refer to the lines connecting the subscriber's terminal equipment to the public telex

network and which have a dedicated port in the telex exchange equipment. The *estimated* number of *facsimile machines* refer to all types of equipment (e.g., Group 2, 3, 4) and includes both publicly available (i.e., Bureaufax) and private equipment (i.e., Telefax) connected to the PSTN. Some operators report only the equipment sold, leased or registered by them and therefore the actual number is almost certainly much higher.

13. Telecommunication staff

Telecommunication staff refer to the total number of full-time staff (part-time staff converted to full-time equivalents) employed by telecommunication enterprises providing public telecommunication services. In some cases where posts and telecommunication organisations are combined, no breakdown of telecommunication staff is available. Note that the figure would generally not include sub-contract staff. *Main lines per employee* is computed by dividing the number of main lines by the number of employees. Caution should be used in interpreting this figure as some countries may subcontract a proportion of work, in which case the number of main lines per employee would be overstated.

14. Telecommunication revenue

This table shows the revenues (turnover) received from providing telecommunication services in each country. United States dollar values are obtained by the method described earlier. Data may not be strictly comparable due to a number of factors. First, it is assumed that the data relate to revenues of all PTOs providing service in the country. This is not unequivocally known and may be impossible to determine since there may be no legal requirement for all operators to provide financial information, or operators may be part of parent companies that only provide consolidated accounts. The data does not usually include revenues from cellular mobile telephone, radio paging or data services if these services are not provided by the main fixed-link operator. Second, the operators may have subsidiaries with financial activities unrelated to telecommunication services which may be included. Third, in the case of countries where posts and telecommunications are combined, a perfect allocation of revenues is not always possible. Fourth, there are definition and accounting differences among countries.

Total telecommunication revenue consists of all telecommunication revenues earned during the financial year under review. *CAGR* refers to the United States dollar change in revenue 1990; this figure can be affected by exchange rate fluctuations. *Per inhabitant* shows current revenues divided by the number of inhabitants in the country. *Per main line* is obtained by dividing current revenues by main lines. *Per employee* is obtained by dividing current revenues by employees. For some countries, no breakdown between postal and telecommunication staff is available and the figure may thus be unrealistically low. *As a % of GDP* shows current telecommunication revenues divided by Gross Domestic Product (GDP) and expressed as a percentage.

15. Telecommunication investment

Investment refers to the annual expenditure associated with acquiring ownership of property and plant used for telecommunication services and includes land and buildings. Also commonly referred to as "capital expenditure". *Total investment* shows total current investments for the year indicated; the United States dollar figure is arrived at by the method described above. Note that in some countries investment can fluctuate widely from year to year. *Average investment* shows the average annual investment for the latest five years. *Per inhabitant* is obtained by dividing total current investment by the population. *As a % of revenue* is obtained by dividing total current investment by total current revenues. *As a % of GFCF* shows telecommunications investment divided by Gross Fixed Capital Formation (GFCF) and expressed as a percentage. For some countries where GFCF is not available, Gross Domestic Investment is used. This is similar to GFCF except that it does not include changes in the inventories which tend to compromise a small proportion of GFCF. *Equipment imports* data come from the United Nations in United States dollar values. They correspond to the Standard Industrial Trade Classification (SITC, Revision 2 or latest) category "764 Telecommunication Equipment, Parts and Accessories".

16. Multimedia

Internet hosts refer to the number of computers in the economy that are directly linked to the world-wide Internet network. *Estimated PCs* shows the number of Personal Computers in different countries, both in absolute numbers and in terms of PC ownership per 100 inhabitants. These numbers are derived from the annual questionnaire supplemented by other sources. *Television receivers* represent the estimated total number of both black and white and colour television sets in use. Some countries have a licensing scheme where television sets must be registered. Since households may have more than one television receiver or may not register, the number of licensed receivers may

understate the true number especially if there is widespread avoidance of the licensing scheme. These data are generally submitted by annual questionnaire completed to broadcasting authorities; in a few instances data have been drawn from UNESCO.

17. Projections

Main telephone lines, total and per 100 inhabitants show the current figure for this item for the countries concerned and the estimated figure for the year 2000 based on two different scenarios. *Estimated investment* shows the total amount in millions of US$ required from 1995-2000 for expenditure on main lines to reach the teledensity level shown for the year 2000. An estimated cost of US$ 1'500 per main line is used. The two scenarios are based on alternative assumptions concerning growth. Scenario (I) is a projection based on historical growth rates over the last six years. Scenario (II) presents analysis of what would be necessary to reach the targets of the national telecommunication development plans by the year 2000, where such plans are available.

18. Africa's top telecommunication operators

This table gives a ranking of Public Telecommunication Operators of the African region in terms of their annual revenue for their most recent financial year together with their one-year growth. The listing shows all operators with revenues in excess of US$ 50 million.

COUNTRY PAGES

For the country where the fiscal year is ending 31 March, the derived time series (i.e., main lines per 100 inhabitants) are using demographic of macro-economic data from previous year. This is because most of the activity (e.g., nine months) took place in the previous year.

Demography, Economy

The data for *Population* are mid-year estimates from the World Bank unless otherwise noted. The data for *Gross Domestic Product* (GDP) are generally from the IMF or World Bank. They are current price data in national currency. *GDP per capita* is shown converted to United States dollars by the method identified above. *GNP per capita (PPP)* shows Gross National Product per person expressed in international dollars converted at purchasing power parity (PPP). The PPP is defined as the number of units of a country's currency required to buy the same amounts of goods and services in the domestic market as one dollar would buy in the United States. This data comes from the World Bank. *Gross Fixed Capital Formation* includes outlays of industries, producers of government services and producer of private non-profit services to households, on additions to their stocks of fixed assets less, net sales of similar second-hand and scrapped goods. *Average exchange rate per US$* is the most frequently used conversion rate regularly published by the IMF and refers to annual average based on the exchanges rates communicated to the IMF by the monetary authority of each member country and agreed by the Fund. For countries where the IMF rate is unavailable or where the exchange rate typically applied to foreign exchange transactions differs markedly from the official IMF rate, a World Bank conversion rate is used. *Consumer Price Index* is the most frequently used indicator of inflation and reflect changes in the cost of acquiring a fixed basket of good and services by the average consumer.

Telephone network

Main telephone lines refer to telephone lines connecting a customer's equipment (e.g., telephone set, facsimile machine) to the Public Switched Telephone Network (PSTN) and which have a dedicated port on a telephone exchange. Note that for most countries, main lines also include public payphones but do not include mobile cellular subscribers. *Main telephone lines per 100 inhabitants* is calculated by dividing the number of main lines by the population and multiplying by 100. *Telephone stations (sets)* is the total number of telephone sets (stations) in the country including extensions. Not to be confused with number of main lines or the number of subscribers. *Total line exchange capacity* corresponds to the total number of main lines that could be connected to the local public switching exchanges. This number includes, therefore, main lines already connected and main lines available for future connection, including those used for the technical operation of the exchange (test numbers).The measure should be the actual capacity of the system rather than the theoretical potential when the system is upgraded or compression technology is employed. *% digital main lines* is calculated by dividing the number of main lines connected to digital exchanges by the total number of main lines. *Waiting list* shows the total number of applications for a connection to a main telephone line which have had to be held over owing to a lack of technical availability. It should be noted that the waiting list refers to applications received; it does not include figures for those who desire a telephone line but have not submitted an application. *Public pay phones* refers to the total

number of all types of public telephones, including coin- and card-operated ones. Some countries include public phones installed in private establishments. No distinction is made between operational and not operational payphones.

Mobile services

Cellular telephone subscribers refers to users of portable telephones subscribing to an automatic public mobile telephone service which provides access to the Public Switched Telephone Network (PSTN) using cellular technology. This can include analogue and digital cellular systems but should not include non-cellular systems. Subscribers to public mobile data services or radio paging services should not be included in this definition.

Other services

Telex subscribers is the number of lines connecting the subscriber's terminal equipment to the public telex network and which has a dedicated port in the telex exchange equipment. The *estimated* number of *facsimile machines* refer to all types of equipment (e.g., Group 2, 3, 4) and includes both publicly available (i.e., Bureaufax) and private equipment (i.e., Telefax) connected to the PSTN. Some operators report only the equipment sold, leased or registered by them and therefore the actual number is almost certainly much higher.

Staff

Full-time telecommunication staff is the full-time staff employed by telecommunication network operators in the country for the provision of public telecommunication services. Part-time staff should be expressed in terms of full-time staff equivalents. As far as possible, staff not working principally for the provision of telecommunications services (e.g. those working in postal services or broadcast operations) should be excluded. *Telecom staff per 1'000 main lines* is obtained by dividing the total number of employees by the number of main telephone lines and multiplying by 1'000.

Revenue and expense

Total telecom revenue consists of the revenues (turnover) received from providing telecommunication services in each country and earned during the financial year under review. *Telecom revenue as a % of GDP* shows current telecommunication revenues divided by Gross Domestic Product (GDP) and expressed as a percentage.

Capital expenditure

Annual investment in telecom is the expenditure associated with acquiring the ownership of property (including intellectual and non-tangible property such as computer software) and plant. These include expenditure on initial installations and on additions to existing installations where the usage is expected to be over an extended period of time. Also referred to as "capital expenditure". *Telecom investment as % of GFCF* shows telecommunications investment divided by Gross Fixed Capital Formation (GFCF) and expressed as a percentage.

Broadcasting

Television receivers represent the estimated total number of both black and white and colour television sets in use. Some countries have a licensing scheme where television sets must be registered. Since households may have more than one television receiver or may not register, the number of licensed receivers may understate the true number especially if there is widespread avoidance of the licensing scheme. These data are generally submitted by annual questionnaire completed to broadcasting authorities; in a few instances data have been drawn from UNESCO. *Television receivers per 100 inhabitants* is obtained by dividing the number of television receivers by the total population and multiplying by 100.

Méthodologie générale
Le taux de croissance annuelle cumulé (TCAC) est calculé selon la formule suivante:

$$[P_V/P_O)^{(1/n)}]-1$$

où P_V = Valeur actuelle

P_O = Valeur au départ

n = Nombre d'années

Ce résultat multiplié par 100 donne le pourcentage.

Pour calculer les montants en dollars des Etats-Unis, on a appliqué le taux de change annuel moyen (déterminé par le Fonds monétaire international (FMI)) aux valeurs annoncées en monnaie nationale. Quand ce taux était inconnu ou qu'il différait considérablement de celui utilisé normalement pour les échanges internationaux, on a appliqué le taux de conversion déterminé par la Banque mondiale. Quand les taux du FMI et de la Banque étaient tous deux inconnus, on a utilisé le taux établi par les Nations Unies pour la fin de la période considérée.

Selon le type d'indicateur, les valeurs de groupe sont soit des *totaux*, soit des *moyennes* pondérées. Dans le cas des lignes téléphoniques principales, par exemple, on donne le nombre total de *lignes téléphoniques principales* par groupe, alors que le nombre de *lignes principales pour 100 habitants* est une moyenne pondérée. Les valeurs de groupe sont reproduites en caractères gras dans les tableaux. Dans certains cas, où des données significatives manquent, les totaux de groupe ne figurent pas.

1. Indicateurs de base
Les données relatives à la *population* reposent sur des estimations de la Banque mondiale faites vers le milieu de l'année. Les données relatives à la *densité* de population proviennent des données de l'ONU sur les régions; celles-ci ne tiennent pas compte des territoires d'outre-mer mais englobent les eaux intérieures. Les données relatives au *Produit Intérieur Brut* (PIB) proviennent généralement de la Banque mondiale; il s'agit des niveaux en vigueur exprimés en dollars des Etats-Unis après conversion par la méthode décrite plus haut. Les lecteurs sont invités à consulter les publications des organisations internationales énumérées dans les *sources des données* qui contiennent les définitions exactes s'appliquant aux données démographiques et macro-économiques.

Les *lignes téléphoniques principales* sont des lignes qui relient l'équipement terminal de l'abonné (tel que poste téléphonique ou télécopieur) au réseau téléphonique public à commutation (RTPC), avec accès individuel aux équipements du central. On notera que pour la plupart des pays, les lignes principales englobent les téléphones publics à prépaiement, mais excluent les abonnés au mobile cellulaire. Pour calculer le nombre de *lignes principales pour 100 habitants* on divise le nombre de lignes principales par la population et on multiplie le résultat par 100.

2. Lignes téléphoniques principales
Ce tableau indique le nombre de *lignes téléphoniques principales* et les *lignes principales par 100 habitants* pour les années indiquées, ainsi que les taux de croissance effectifs correspondants.

3. Liste d'attente
Ce tableau indique le nombre total de personnes dont la demande de raccordement à une ligne principale est en attente pour des raisons d'indisponibilité technique. Il s'agit de la liste des demandes effectivement reçues, compte non tenu des personnes qui souhaitent l'installation du téléphone mais qui n'en ont pas fait la demande. La *demande totale* de lignes téléphoniques principales est la somme des demandes non satisfaites et des lignes téléphoniques principales en service. La *demande satisfaite* est le nombre de lignes principales divisé par la demande totale. Le *temps d'attente* est le nombre d'années approximatif que les candidats doivent attendre pour leurs lignes téléphoniques; on le calcule en divisant le nombre de candidats de la liste d'attente par le nombre moyen de lignes principales mises en place annuellement au cours des trois dernières années.

4. Réseau téléphonique local
La *capacité utilisée* est obtenue en divisant le nombre de lignes principales en service par le nombre total de lignes principales pouvant être connectées aux commutateurs public locaux. Pour obtenir le pourcentage de lignes *automatiques* on divise le nombre de lignes principales reliées à des commutateurs automatiques par le nombre total de lignes principales. Le pourcentage de lignes *numériques* est le nombre de lignes principales reliées à des commutateurs numériques divisé par le nombre total de lignes principales. Sous *résidentielles*, on trouve le nombre de lignes principales desservant des particuliers (c'est-à-dire des lignes qui ne sont pas utilisées à des fins

professionnelles ou qui ne desservent pas des publiphones), divisé par le nombre total de lignes principales. La colonne *dérangements pour 100 lignes principales par an* indique le nombre de dérangements signalés pour 100 lignes téléphoniques principales au cours de l'année indiquée. Ce nombre correspond au nombre total de dérangements signalés pendant l'année divisé par le nombre de lignes téléphoniques principales et multiplié par 100; dans certains pays, ce nombre étant présenté en valeur mensuelle, il suffit alors pour obtenir une estimation annuelle de multiplier par 12. La définition de dérangement varie d'un pays à l'autre; pour certains opérateurs, le terme inclut les dérangements dont peut être victime l'équipement des abonnés, alors que d'autres ne retiennnent que les pannes techniques.

5. Accès au téléphone

Le nombre de *ménages* est une estimation de l'UIT faite sur la base de sources nationales et internationales. Le *total des lignes principales résidentielles* est le nombre de lignes principales utilisées par des ménages. On obtient la valeur *pour 100 ménages* en divisant le nombre de lignes principales résidentielles par le nombre de ménages et en multipliant le résultat par 100. Cette estimation est statistique et ne peut pas être comparée avec le pourcentage de ménages équipés du téléphone, valeur qui est souvent utilisée dans les enquêtes de recensement. Le nombre de lignes téléphoniques résidentielles pour 100 ménages peut être supérieur à 100, des ménages pouvant en effet avoir plus d'une ligne téléphonique. Le nombre de *publiphones* est le total des téléphones publics de tous les types, à prépaiement et à carte. Dans certains pays, il englobe les publiphones installés dans des établissements privés. Aucune distinction n'est faite entre les téléphones exploités et ceux qui ne le sont pas. La valeur *pour 1'000 habitants* est le nombre de publiphones divisé par la population et multiplié par 1'000.

6. Lignes principales urbaines

La *population de la plus grand ville en % du total* est le nombre d'habitants de la première ville du pays divisé par la population nationale. Les chiffres, communiqués par les Nations Unies ou tirés de sources nationales, concernent l'agglomération urbaine. Le nombre de *lignes principales* est celui de la ville en question. Le nombre de *lignes principales en % du total* est le nombre de lignes principales de la ville divisé par le total national de lignes principales. La *télédensité* de la plus grande ville du pays est le nombre de lignes principales de la ville en question divisé par sa population et multiplié par 100. A noter que les limites dans lesquelles les opérateurs de télécommunications circonscrivent la principale ville d'un pays peuvent ne pas toujours coïncider avec la zone habitée par la population officielle. On obtient la *télédensité dans le reste du pays* en déduisant le nombre de lignes de la première ville du nombre de lignes du pays et en divisant le résultat par la différence entre la population nationale et la population de la ville en question, puis en multipliant le résultat par 100. La *télédensité nationale* est le nombre de lignes du pays divisé par la population nationale et multiplié par 100.

7. Tarifs téléphoniques

Ce tableau concerne le coût des services téléphoniques locaux, résidentiels et commerciaux. La rubrique *installation* recouvre les taxes de raccordement pour le service téléphonique de base. Par *abonnement mensuel* on entend la redevance fixe perçue périodiquement auprès des abonnés du RTPC. Cet indicateur n'est pas toujours comparable étant donné que quelques pays incluent dans l'abonnement un certain nombre d'appels locaux gratuits. Les taxes d'abonnement annuelles ou bimestrielles ont été converties en taxes mensuelles. Sous *communication locale*, on trouve le coût d'une communication de trois minutes effectuée dans la même zone urbaine au moyen d'un équipement d'abonné (et non d'un publiphone). Il s'agit de la somme minimale qu'un abonné doit payer pour un appel de trois minutes et non du prix moyen de chaque période de trois minutes; une valeur nulle indique l'absence de taxe de commmunication locale. Les taxes éventuelles sont incluses dans ces trois indicateurs afin de rendre leur comparaison plus objective. L'*abonnement mensuel en % du PIB par habitant* montre le coût d'un abonnement téléphonique annuel souscrit par un particulier et rapporté au produit intérieur brut par habitant.

8. Indicateurs cellulaires

Les *abonnés au mobile* sont les utilisateurs de téléphone portatifs abonnés à un service téléphonique mobile public automatique à structure cellulaire donnant accès au RTPC. Les tarifs du cellulaires suivent les définitions données ci-dessus pour les tarifs téléphoniques, mais s'appliquent aux abonnés des services mobiles cellulaires.

9. Trafic téléphonique international

Sous *trafic téléphonique sortant*, on trouve le trafic téléphonique total, exprimé en minutes, au départ du pays mentionné et à destination d'un pays tiers. Un nombre croissant de pays indiquent le nombre de minutes de trafic qu'ils ont facturés. Les *minutes*

par habitant sont obtenues en divisant les minutes de trafic sortant par le nombre d'habitants du pays. Les *minutes par abonné* sont obtenues en divisant les minutes de trafic sortant par le nombre de lignes principales. Les *circuits téléphoniques internationaux* renvoient au nombre de liaisons (équivalent à des voies téléphoniques) permettant d'établir des communications avec d'autres pays.

10. Coût des appels africain

Cette matrice montre le coût d'une communication téléphonique en automatique, au tarif standard, d'une durée de trois minutes de la RTPC entre pays africains. Toute taxe pertinente est incluse.

11. Trafic téléphonique africain

Cette matrice montre le trafic téléphonique bilatéral africain de départ exprimé en millions de minutes. Les données montrent le trafic *de* chaque pays de la première colonne *vers* les autres pays en Afrique.

12. Transmission de texte

Sous *abonnés télex,* on trouve le nombre de lignes qui relient l'équipement terminal de l'abonné au réseau télex public et qui possèdent un accès individualisé aux équipements d'un central télex. Le nombre *estimé* de *télécopieurs* désigne tous les types de matériel (tels que groupes 2, 3 et 4) et englobe tant les équipements publics (bureaufax) que les équipements privés (téléfax) reliés au RTPC. Certains exploitants signalent uniquement le nombre d'équipements vendus, loués ou enregistrés par leur soins et dans ce cas il est presque certain que le chiffre réel est nettement supérieur.

13. Personnel des télécommunications

Le *personnel des télécommunications* représente le nombre total de personnes (les emplois à temps partiel sont convertis en équivalents d'emploi à temps complet) employées à plein temps par les entreprises assurant des services de télécommunications publiques. Dans certains cas, où les organisations des postes et des télécommunications sont réunies, la répartition du personnel n'est pas connue. On notera que le chiffre annoncé n'englobe généralement pas le personnel des sous-traitants. Le nombre de *lignes principales par employé* est le nombre de lignes principales divisé par le nombre d'employés. On prendra garde, dans l'interprétation de ce chiffre, au fait que certains pays sous-traitent une partie du travail et que dans ce cas le nombre de lignes principales par employé est excessif.

14. Recettes des télécommunications

Ce tableau indique les recettes (chiffres d'affaire) obtenues contre la fourniture de services de télécommunication dans chaque pays. Les montants en dollars des Etats-Unis sont calculés suivant la méthode décrite plus haut. Pour un certain nombre de raisons, les données ne sont peut-être pas tout à fait comparables. Premièrement, on suppose que les données représentent les recettes de toutes les exploitations de télécommunication publique du pays, mais cela ne peut être établi avec certitude car tous les exploitants ne sont pas légalement tenus de fournir des renseignements financiers, et certains dépendent de sociétés mères qui ne publient que des comptes consolidés. Les données n'englobent généralement pas les recettes provenant des téléphones mobiles cellulaires, de la radiorecherche de personnes et des transmissions de données si ces services ne sont pas assurés par le prestataire du service fixe. Deuxièmement, les exploitants incorporent parfois dans leurs résultats ceux de filiales dont les activités financières ne sont pas liées à des services de télécommunication. Troisièmement, dans les pays où les postes et les télécommunications dépendent du même organisme, il n'est pas toujours possible de ventiler exactement les recettes. Enfin, il y a des divergences de définition et de comptabilisation entre les pays.

Le *total des recettes des télécommunications* englobe toutes les sommes perçues au cours de l'exercice financier considéré. Le *TCAC* désigne l'évolution, exprimée en dollars des Etats-Unis, des recettes par rapport au 1990; il peut varier suivant les fluctuations des taux de change. La colonne *par habitant* contient les chiffres résultant de la division des recettes de l'année par le nombre d'habitants du pays. Les recettes *par ligne principale* sont les recettes divisées par le nombre de lignes principales. Les recettes *par employé* proviennent de la division des recettes par le nombre d'employés. Comme on ne dispose pas, pour certains pays, de statistiques séparées pour les postes et les télécommunications, les chiffres indiqués dans ces colonnes peuvent être nettement inférieurs à la réalité. Les recettes *en % du PIB* sont les recettes de l'année divisées par le Produit Intérieur Brut (PIB) et exprimées en pourcentage.

15. Investissements

Les investissements sont les dépenses consacrées à l'achat de biens et d'installations utilisées pour les services des télécommunications, terrains et bâtiments compris; ils sont communément appelés "dépenses d'équipement". La colonne *total* reprend l'ensemble des investissements pour l'année indiquée; les montants en dollars des Etats-Unis sont obtenus selon la méthode décrite plus haut. On notera que dans certains pays les investissements peuvent être différents d'une année à l'autre. La

colonne *moyenne* représentent l'investissement annuel moyen réalisé au cours des cinq dernières années. Les valeurs de la colonne *par habitant* sont obtenues en divisant l'investissement courant total par la population. Les valeurs de la colonne *en % des recettes* représentent l'investissement courant total divisé par les recettes annuelles. Les investissements en télécommunication *en % de la FBCF* sont les investissements dans les télécommunications divisés par la formation brute de capital fixe (FBCF) et exprimée en pourcentage. Pour les pays dont la FBCF est inconnue, on a utilisé l'investissement intérieur brut, qui est proche de la FBCF à cela près qu'il n'inclut pas les modifications des stocks qui sont susceptibles d'englober une faible partie de la FBCF. Les *importations de matériel* de télécommunication sont des valeurs en dollars des Etats-Unis tirées de la Classification type pour le commerce international (CTCI, révision 2 ou ultérieure) des Nations Unies, sous la catégorie "764 Equipement de télécommunication et parties, pièces détachées et accessoires".

16. Multimédia

La colonne *serveurs Internet* indique le nombre d'ordinateurs directement raccordés, dans un pays, au réseau mondial Internet. le nombre de *PC estimés* indique le nombre d'ordinateurs individuels de différents pays, en valeur absolue et en nombre de PC possédés pour 100 habitants. Ces chiffres sont extraits du questionnaire annuel, complété par d'autres sources. Les *Téléviseurs* représentent le nombre total estimé de récepteurs, noir et blanc ou couleurs, utilisés. Certains pays appliquent un système de concession faisant obligation aux utilisateurs de déclarer les téléviseurs qu'ils possèdent. Toutefois, étant donné que des ménages peuvent posséder plus d'un téléviseur ou ne pas le déclarer, le nombre des téléviseurs répertoriés peut être inférieur au nombre réel, notamment si les utilisateurs sont nombreux à ne pas déclarer leur téléviseur. Ces données sont en général extraites d'un questionnaire annuel que remplissent les autorités de radiodiffusion, et dans certains cas elles ont été empruntées à l'UNESCO.

17. Projections

Les colonnes *lignes téléphoniques principales, total et pour 100 habitants* présentent d'une part le nombre de lignes actuelles dans les pays visés et d'autre part unes estimation pour l'an 2000, établie à partir de deux scénarios différents. Les *investissements estimés* indiquent le montant total en millions de dollars des Etats-Unis qui devra être dépensé pour la période 1995-2000 au titre des lignes principales pour atteindre la densité prévue pour l'an 2000; on utilise à cette fin un coût estimatif de 1'500 dollars par ligne principale. Les deux scénarios mentionnés se fondent sur deux hypothèses différentes de croissance: le scénario (I) est une projection des taux de croissance enregistrés au cours des six dernières années; le scénario (II) correspond à une analyse des moyens qui devraient être mis en oeuvre pour permettre d'atteindre les buts des plans nationaux de développement des télécommunications d'ici l'an 2000, lorsque ces plans existent.

18. Premiers exploitants des télécommunications en Afrique

Ce tableau dresse le classement des premiers exploitants des télécommunications publiques en Afrique selon les recettes perçues au cours de leur dernier exercice financier, et montre la croissance par rapport à l'année précédente. La liste correspond aux exploitants dont les recettes sont supérieures à 50 millions de dollars.

PAGES PAR PAYS

Pour les pays dont l'exercice financier finit le 31 mars, les séries chronologiques dérivées (les lignes principales pour 100 habitants, par exemple) sont calculées avec les données démographiques et macro-économiques de l'année antérieure, puisque la plupart de l' activité (neufs mois) a lieu lors de l'année précédente.

Démographie, Macro-économie

Les données relatives à la *population* reposent sur des estimations de la Banque mondiale faites vers le milieu de l'année, sauf indication contraire. Les données relatives au *Produit Intérieur Brut* (PIB) proviennent généralement de la Banque mondiale; il s'agit des niveaux aux prix courants et en monnaie nationale. Le *PIB par habitant* apparaît exprimé en dollars des Etats-Unis après conversion par la méthode décrite plus haut. Le *PNB par habitant (PPA)* indique le Produit National Brut par personne exprimé en dollars internationaux convertis à la parité de pouvoir d'achat (PPA). La PPA est définie comme le nombre d'unités de monnaie nationale nécessaires pour acheter le même panier de biens et services sur le marché intérieur que pourrait acheter un dollar aux Etats-Unis. Ces données proviennent de la Banque mondiale. La *Formation Brute de Capital Fixe* comprend l'ensemble des dépenses des branches d'activités marchandes, des branches non marchandes des administrations publiques et des branches non marchandes des institutions privées

sans but lucratif au service des ménages, ayant pour but d'ajouter des biens durables neufs à leur capital fixe, déduction faite des ventes de ces branches, nettes de leurs achats de biens analogues, d'occasion ou de rebuts. Le *taux de change moyen par US$* est le facteur de conversion le plus fréquemment employé qui est publié à intervalles réguliers par le FMI; il s'agit d'une moyenne annuelle des taux de change communiqués au FMI par l'autorité monétaire de chaque pays membre et accepté par le Fonds. Quand ce taux était inconnu ou qu'il différait considérablement de celui utilisé normalement pour les échanges internationaux, on a appliqué le taux de conversion déterminé par la Banque mondiale. L'*indice des prix à la consommation* est l'indicateur d'inflation le plus fréquemment employé; il reflète les variations du prix auxquel un consommateur moyen achète un panier fixe de biens et services.

Réseau téléphonique

Les *lignes téléphoniques principales* sont des lignes qui relient l'équipement terminal de l'abonné (tel que poste téléphonique ou télécopieur) au réseau téléphonique public à commutation (RTPC), avec accès individuel aux équipements du central. On notera que pour la plupart des pays, les lignes principales englobent les téléphones publics à prépaiement, mais excluent les abonnés au mobile cellulaire. Pour calculer le nombre de *lignes principales pour 100 habitants* on divise le nombre de lignes principales par la population et on multiplie le résultat par 100. Les *postes téléphoniques (appareils)* indiquent au nombre total de postes téléphoniques (appareils) dans le pays qui ont une extension. A ne pas confondre avec le nombre de lignes principales ou le nombre d'abonnés. La *capacité totale des centraux téléphoniques* correspond au nombre total de lignes principales qui peuvent être raccordées aux commutateurs publics locaux. Ce nombre inclut par conséquent les lignes déjà connectées et les lignes principales disponibles pour de futurs raccordements, y compris celles utilisées pour l'exploitation technique du commutateur (numéros d'essai). La mesure devrait être la capacité effective du système et non son potentiel théorique une fois qu'il aura été modernisé ou qu'on lui aura appliqué une technique de compression. Le *% de lignes principales numériques* est le nombre de lignes principales reliées à des commutateurs numériques divisé par le nombre total de lignes principales. La *liste d'attente* indique le nombre total de personnes dont la demande de raccordement à une ligne principale est en attente pour des raisons d'indisponibilité technique. Il s'agit de la liste des demandes effectivement reçues, compte non tenu des personnes qui souhaitent l'installation du téléphone mais qui n'en ont pas fait la demande. Le nombre de *publiphones* est le total des téléphones publics de tous les types, à prépaiement et à carte. Dans certains pays, il englobe les publiphones installés dans des établissements privés. Aucune distinction n'est faite entre les téléphones exploités et ceux qui ne le sont pas.

Services mobiles

Les *abonnés au téléphone cellulaire* sont les utilisateurs de téléphones portatifs abonnés à un service téléphonique mobile public automatique qui donne accès au réseau téléphonique public à commutation (RTPC) et utilise une technique cellulaire. On peut en outre faire une distinction entre systèmes analogues et services numériques, mais on ne devrait pas tenir compte des abonnés aux systèmes non cellulaires. Les abonnés aux services mobiles publics de transmission de données ou aux services de radiorecherche de personnes ne devraient pas être inclus dans cette définition.

Autres services

Sous *abonnés télex,* on trouve le nombre de lignes qui relient l'équipement terminal de l'abonné au réseau télex public et qui possèdent un accès individualisé aux équipements d'un central télex. Le nombre *estimé* de *postes de télécopie* désigne tous les types de matériel (tels que groupes 2, 3 et 4) et englobe tant les équipements publics (bureaufax) que les équipements privés (téléfax) reliés au RTPC. Certains exploitants signalent uniquement le nombre d'équipements vendus, loués ou enregistrés par leur soins et dans ce cas il est presque certain que le chiffre réel est nettement supérieur.

Effectifs

Le *personnel des télécom à plein temps* est le personnel employé à plein temps par les exploitants du réseau de télécommunication du pays pour la fourniture de services publics de télécommunication. Le personnel employé à mi temps devrait être mentionné sur la base des équivalents à temps complet. Dans la mesure du possible, il convient de ne pas tenir compte des agents qui ne sont pas principalement affectés à la fourniture des services de télécommunication (par exemple ceux qui travaillent dans les services postaux ou pour l'exploitation de la radiodiffusion). Le nombre d'*agents télécom pour 1'000 lignes* est obtenu en divisant le nombre total d'employés par le nombre de lignes téléphoniques principales et en multipliant par 1'000.

Chiffre d'affaires

Les *recettes des télécom* englobent les recettes (chiffres d'affaire) obtenues contre la fourniture de services de télécommunication dans chaque pays et perçues au cours de l'exercice financier considéré. Les *recettes des télécom en % du PIB* sont les recettes de l'année divisées par le Produit Intérieur Brut (PIB) et exprimées en pourcentage.

Investissements

L'*investissement annuel en télécom* désigne les dépenses consacrées à l'acquisition de biens (y compris de la propriété intellectuelle et de biens incorporels comme le logiciel) et d'installations. Il comprend les dépenses afférentes aux premières installations et au développement des installations existantes lorsqu'il est prévu de les utiliser pendant une longue période. On utilise aussi le terme de "dépenses d'équipement". L'*investissement télécom en % de FBCF* montre les investissements dans les télécommunications divisés par la formation brute de capital fixe (FBCF) et exprimée en pourcentage.

Radiodiffusion

Les *Téléviseurs* représentent le nombre total estimé de récepteurs, noir et blanc ou couleurs, utilisés. Certains pays appliquent un système de concession faisant obligation aux utilisateurs de déclarer les téléviseurs qu'ils possèdent. Toutefois, étant donné que des ménages peuvent posséder plus d'un téléviseur ou ne pas le déclarer, le nombre des téléviseurs répertoriés peut être inférieur au nombre réel, notamment si les utilisateurs sont nombreux à ne pas déclarer leur téléviseur. Ces données sont en général extraites d'un questionnaire annuel que remplissent les autorités de radiodiffusion, et dans certains cas elles ont été empruntées à l'UNESCO. Le nombre de *téléviseurs pour 100 habitants* est le nombre de téléviseurs divisé par la population totale et multiplié par 100.

Data Sources / Sources des données

Demographic and macro-economic / Démographie et macro-économie

International Bank for Reconstruction and Development. World Development Report. Various years. Washington D.C.
-----. World Tables (on diskette). 1993.Washington D.C.
International Monetary Fund. International Financial Statistics. Various years. Washington D.C.

Telecommunications / Télécommunications

Telecommunications data are from the ITU/BDT's World Telecommunication Indicators database. The data are obtained by questionnaires sent to telecom ministries, regulators and operators as well as from annual reports issued by telecom entities and reports prepared by ITU staff. These reports are identified below.

Les données relatives aux télécommunications proviennent de la base de données du UIT/BDT (Indicateurs des télécommunications du monde entier). Elles sont obtenues à l'aide des questionnaires qui ont été envoyés aux ministères des télécommunications, aux responsables de la réglementation et aux exploitants dans ce domaine; elles peuvent provenir aussi des rapports annuels que publient les organismes de télécommunication et des rapports élaborés par le personnel de l'UIT. Voir ci-dessous.

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Cape Verde / Cap Vert	UIT, PNUD. 1990. *Plan directeur des télécommunications 1989-2008*. Genève.
Ethiopia / Ethiopie	Ethiopian Telecommunication Authority. Various years. *Annual Report*. Addis Ababa.
Gambia / Gambie	Gambia Telecommunication Company Ltd. Various years. *Report and Accounts*. Banjul.
Kenya	Kenya Posts and Telecommunications Corporation. Various years. *Annual Report and Accounts*. Nairobi.
Liberia / Libéria	Liberia Telecommunications Corporation. Various years. *Annual Report*. Monrovia.
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Mauritius	Mauritius Telecommunication Services Ltd. 1990. *Annual Report*. Port Louis.
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Nigeria	Nigerian Telecommunications PLC. 1993. *Annual Report*. Lagos.
Rwanda	Direction générale des télécommunications. 1991. *Rapport Annuel*. Kigali.
Sao Tome & Principe / Sao Tomé et Principe	UIT, PNUD, BAD. 1990. *Plan directeur des télécommunications 1990-2010*. Genève.
Seychelles	Cable and Wireless (Seychelles) Ltd. 1992. *Accounts to 31st March*. Victoria.
South Africa / Sudafricaine (Rép.)	Postmaster General. 1991. *Annual Report of the Postmaster General*. Pretoria. Telkom. 1993. *Annual Report*. Pretoria.
Swaziland	Swaziland Posts and Telecommunications Corporation. Various years. *Annual Report*. Mbabane.
Tanzania / Tanzanie	Tanzania Posts and Telecommunication Corporation. Various years. *Annual Report and Accounts*. Dar es Salaam.
Tunisia / Tunisie	Minister des Communications. Various years. *Rapport annuel*. Tunis.
Zambia / Zambie	Zambia Posts and Telecommunication Corporation. Various years. *Annual Report*. Ndola.
Zimbabwe	Zimbabwe Posts and Telecommunication Corporation. Various years. *Annual Report* Harare.

AFRICAN TELECOMMUNICATION ORGANIZATIONS

ORGANISATIONS DES TELECOMMUNICATIONS AFRICAINES

III. Telecommunication organizations / Organisations des télécommunications

Algeria / Algérie

Ministry/Ministère

Ministère des Postes et Télécommunications (MPT)	Boulevard Salah Bouakouir Alger	Tel. Fax	+213 2 711 220 +213 2 646 990
○⊙			

Angola / Angola

Ministry/Ministère

Ministério dos Transportes e Comunicaçoes	Av. 4 de Fevereiro, 42-9 Luanda	Tel.	+244 2 372 668

Regulator/Régulateur

Direcçao National de Correios e Telecomunicaçoes	Rua Frederich Engels No. 92-7 Caixa Postal 1459 Luanda	Tel. Fax	+244 2 338 352 +244 2 339 356

Telecommunication operator(s)/Opérateurs des télécommunications

Angola Telecom	Caixa Postal 1321 Rua 1o. Congresso do MPLA No. 26 2o. Andar Luanda	Tel. Fax	+244 2 331 032 +244 2 391 032
○⊙			

Benin / Bénin

Ministry/Ministère

Ministère de la Culture et des Communications	B.P. 120 Cotonou	Tel. Fax	+229 31 22 27 +229 31 59 31

Telecommunication operator(s)/Opérateurs des télécommunications

Office des postes et télécommunications (OPT)	B.P. 5959 Cotonou	Tel. Fax	+229 312 045 +229 313 843
○⊙			

Botswana / Botswana

Ministry/Ministère

Ministry of Works, Transport & Communication	Private Bag 007 Gaborone	Tel. Fax	+267 358 504 +267 313 303

Telecommunication operator(s)/Opérateurs des télécommunications

Botswana Telecommunications Corporation (BTC)	Khama Cresent P.O. Box 700 Gaborone	Tel. Fax	+267 358 000 +267 314 000
○⊙			

Burkina Faso / Burkina Faso

Ministry/Ministère

Ministère de la communication et de la culture	03 BP 7045 Ougadougou 03	Tel. Fax	+226 31 2551 +226 31 0363

○ *Local telephone service / Service téléphonique local*
⊙ *International telephone service / Service téléphonique international*
□ *Cellular mobile service / Service mobile cellulaire*

Telecommunication operator(s)/Opérateurs des télécommunications

Office national des télécommunications (ONATEL) ○⊙	Avenue Nelson Mandela BP 10000 Ouagadougou 01	Tel. Fax	+226 334 001 +226 307 764

Burundi / Burundi

Ministry/Ministère

Ministère des Transports, Postes et Télécommunications	B.P. 2000 Bujumbura	Tel.	+257 22 2923

Telecommunication operator(s)/Opérateurs des télécommunications

Office National des Télécommunications (ONATEL) ○⊙	B.P. 60 Bujumbura	Tel. Fax	+257 223 196 +257 226 917
TELECEL Burundi □	Bujumbura	Fax	+257 292 911

Cameroon / Cameroun

Ministry/Ministère

Ministère des postes et des télécommunications	Yaounde	Tel.	+237 23 2055

Telecommunication operator(s)/Opérateurs des télécommunications

Direction des Télécommunications ○□	Yaounde	Tel. Fax	+237 223 550 +237 231 510
Société des Télécommunications Internationales du Cameroun (INTELCAM) ⊙	B.P. 719 Douala	Tel. Fax	+237 40 57 20 +237 40 22 20

Cape Verde / Cap-Vert

Ministry/Ministère

Ministério das Infrastructuras e Transportes	Caixa postal 15 Praia	Tel.	+238 61 4124

Regulator/Régulateur

Direcção Geral das Comunicações	P.O. Box 7 Praia	Fax	+238 613 069

Telecommunication operator(s)/Opérateurs des télécommunications

Cabo Verde Telecom Sarl ○⊙	Caixa postal 220 Praia	Tel. Fax	+238 613 126 +238 614 226

Central African Rep. / Centrafricaine (Rép.)

Ministry/Ministère

Ministère des transports, de l'aviation civile, des postes et des télécommunications	Bangui	Tel. Fax	+236 61 2946 +236 61 1938

○ *Local telephone service / Service téléphonique local*
⊙ *International telephone service / Service téléphonique international*
□ *Cellular mobile service / Service mobile cellulaire*

Telecommunication operator(s)/Opérateurs des télécommunications

Société centrafricaine des télécommunications internationales ⊙	Bangui	Tel. Fax	+236 61 0634 +236 61 3561
Société Centrafricaine des Télécommunications (SOCATEL) ○	BP 939 Bangui	Tel. Fax	+236 61 4268 +236 61 5048

Chad / Tchad

Ministry/Ministère

Ministère des Communications	B.P. 154 N'Djamena	Tel. Fax	+235 514 164 +235 516 034

Telecommunication operator(s)/Opérateurs des télécommunications

Office National des Postes et Télécommunications (ONPT) ○	N'djamena	Tel. Fax	+235 513 080 +235 512 835
Société des Télécommunications Internationales du Chad (TIT) ⊙	B.P. 1132 N'djamena	Tel. Fax	+235 515 782 +235 515 066

Comoros / Comores

Ministry/Ministère

Ministère des Postes et Télécom., de l'Information, de la Culture, de la Jeunesse et des Sports	B.P. 1315 Moroni	Tel. Fax	+269 74 42 52 +269 73 18 03

Telecommunication operator(s)/Opérateurs des télécommunications

Société Nationale des Postes et Télécommunications (SNPT) ○⊙	B.P. 5000 Moroni	Tel. Fax	+269 730 610 +269 731 079

Congo / Congo

Ministry/Ministère

Ministère des Postes et des Télécommunications	Boîte Postale 114 Brazzaville	Tel. Fax	+242 83 76 20 +242 83 07 94

Telecommunication operator(s)/Opérateurs des télécommunications

Office National des Postes et des Télécommunications (ONPT) ○⊙	Avenue Patrice Lumumba B.P. 703 Brazzaville	Tel. Fax	+242 83 1686 +242 83 5938

Côte d'Ivoire / Côte d'Ivoire

Ministry/Ministère

Ministère de l'Equipement, des Transports et des Télécommunications	Abidjan	Tel.	+225 34 73 16

○ *Local telephone service / Service téléphonique local*

⊙ *International telephone service / Service téléphonique international*

□ *Cellular mobile service / Service mobile cellulaire*

Regulator/Régulateur

Direction de la règlementation générale	Ministère des postes et télécommunications Boîte postale 8635 Abidjan 01	Tel.	+225 34 72 76

Telecommunication operator(s)/Opérateurs des télécommunications

Société Côte d'Ivoire-TELECOM (CI-TELCOM) ○⊙	Boîte postale 275 Abidjan 17	Tel. Fax	+225 22 22 22 +225 34 68 65

Djibouti / Djibouti

Ministry/Ministère

Ministère des Transports, des Télécommunications et du Tourisme	P.O. Box 15011 Djibouti	Tel. Fax	+253 350 990 +253 355 975

Telecommunication operator(s)/Opérateurs des télécommunications

Office des Postes et Télécommunications (OPT) ○	Direction générale de l'OPT Boulevard de la République Djibouti	Tel. Fax	+253 35 0669 +253 35 5757
Société Telecom International (STID) ⊙	BP 2031 Djibouti	Tel. Fax	+253 35 12 87 +253 35 01 09

Egypt / Egypte

Ministry/Ministère

Ministry of Transport and Telecommunications	Ramses Street Cairo	Tel. Fax	+202 355 5567 +202 355 5544

Telecommunication operator(s)/Opérateurs des télécommunications

Arab Republic of Egypt National Telecommunication Organization (ARENTO) ○⊙□	P.O. Box 2271 Cairo 11511	Tel. Fax	+202 777 551 +202 771 306

Equatorial Guinea / Guinée équatoriale

Ministry/Ministère

Ministerio de Transportes, Correos y Telecomunicaciones	Malabo	Tel. Fax	+240 9 2843 +240 9 2515

Telecommunication operator(s)/Opérateurs des télécommunications

Dirección General de Correos y de Telecommunicaciones ○⊙	Malabo	Tel. Fax	+240 9 2214 +240 9 2919

Eritrea / Erythrée

Regulator/Régulateur

Posts and Telecommunications Authority		Tel. Fax	+291 1 112868 +291 1 120938

○ *Local telephone service / Service téléphonique local*

⊙ *International telephone service / Service téléphonique international*

□ *Cellular mobile service / Service mobile cellulaire*

Telecommunication operator(s)/Opérateurs des télécommunications

Telecommunications Service of Eritrea ○⊙		Tel. Fax	+291 1 112868 +291 1 120938

Ethiopia / Ethiopie

Ministry/Ministère

Ministry of Transport and Communication	P.O. Box 1238 Addis Ababa	Tel. Fax	+251 1 51 61 66 +251 1 51 56 65

Telecommunication operator(s)/Opérateurs des télécommunications

Ethiopian Telecommunications Authority (ETA) ○⊙	P.O. Box 1047 Addis Ababa	Tel. Fax	+251 1 510 500 +251 1 515 777

Gabon / Gabon

Ministry/Ministère

Ministère de la communication, des postes et télécommunications	Boîte postale 2280 Libreville	Tel. Fax	+241 76 01 09 +241 76 34 35

Telecommunication operator(s)/Opérateurs des télécommunications

Office des postes et des télécommunications (OPT) ○	Boîte postale 20 000 Libreville	Tel. Fax	+241 78 70 00 +241 78 67 70
Télécommunications Internationales Gabonaises (TIG) ⊙	B.P. 2261 Libreville	Tel. Fax	+241 78 73 53 +241 74 71 68

Gambia / Gambie

Ministry/Ministère

Ministry of Works and Telecommunications	Banjul	Tel.	+220 22 82 51

Telecommunication operator(s)/Opérateurs des télécommunications

Gambia Telecommunications Co. Ltd. (GAMTEL) ○⊙	Gamtel House 3, Nelson Mandela St. P.O. Box 387 Banjul	Tel. Fax	+220 22 9999 +220 27 214

Ghana / Ghana

Ministry/Ministère

Ministry of Transport and Communications	PO Box M.38 Accra	Tel.	+233 21 665 421

Telecommunication operator(s)/Opérateurs des télécommunications

Millicom (Ghana) Company Limited (Mobitel) □	E 168/2 Barns Road PO Box 178 Accra	Tel.	+233 21 223 614
Posts and Telecommunications Corporation ○⊙	Headquaters Accra-North	Tel. Fax	+233 21 22 2000 +233 21 77 2606

○ *Local telephone service / Service téléphonique local*
⊙ *International telephone service / Service téléphonique international*
□ *Cellular mobile service / Service mobile cellulaire*

Guinea / Guinée

Ministry/Ministère

Ministère des postes et télécommunications	7° Avenue Bis Conakry	Tel. Fax	+224 44 1216 +224 44 2012

Telecommunication operator(s)/Opérateurs des télécommunications

Société des Télécommunications de Guinée (SOTELGUI) ○⊙	7° Avenue Bis B.P. 2066 Conakry	Tel. Fax	+224 41 32 18 +224 41 32 18

Guinea-Bissau / Guinée-Bissau

Ministry/Ministère

Ministério da Informaçao e das Telecomunicaçoes	Direcçao Geral dos Correios e Telecomunicaçoes C.P. 200 Bissau	Tel.	+245 21 2914

Regulator/Régulateur

Direcçao General dos Correios e das Telecomunicaçoes	CP 200 Bissau	Tel.	+245 21 2914

Telecommunication operator(s)/Opérateurs des télécommunications

Companhia de Telecomunicaçoes da Guiné-Bissau, sarl (Guiné-Telecom) ○⊙	Av. Amílcar Cabral Apartado 100 1011 Codex Bissau	Tel. Fax	+245 21 2173 +245 21 1300

Kenya / Kenya

Ministry/Ministère

Ministry for Transport and Communications	P.O. Box 52692 Nairobi	Tel.	+254 2 729 200

Telecommunication operator(s)/Opérateurs des télécommunications

Kenya Posts and Telecommunications Corporation (KPTC) ○⊙□	PO Box 30301 Nairobi	Tel. Fax	+254 2 227 401 +254 2 330 435

Lesotho / Lesotho

Telecommunication operator(s)/Opérateurs des télécommunications

Lesotho Telecommunications Corporation (LTC) ○⊙	P.O. Box 1037 Maseru 100	Tel. Fax	+266 1 21 1000 +266 1 31 0091

Liberia / Libéria

Ministry/Ministère

Ministry of Posts and Telecommunications	Monrovia	Tel. Fax	+231 22 3208 +231 22 3331

○ *Local telephone service / Service téléphonique local*
⊙ *International telephone service / Service téléphonique international*
□ *Cellular mobile service / Service mobile cellulaire*

Telecommunication operator(s)/Opérateurs des télécommunications

Liberia Telecommunications Corporation (LTC)	Lynch Street Telecommunications Bldg. Mail Bag No. 9039 Monrovia	Tel.	+231 222 222

Libya / Libye

Ministry/Ministère

Secretary for Communication and Maritime Transport	Al-Zawiya Street Tripoli	Tel. Fax	+218 21 609 011 +218 21 605 605

Telecommunication operator(s)/Opérateurs des télécommunications

General Post and Telecommunication Company (GPTC) ○⊙	P.O. Box 886 Tripoli	Tel. Fax	+218 21 605 406 +218 21 605 607

Madagascar / Madagascar

Ministry/Ministère

Ministère des postes et des télécommunications	Antaninarenina Antananarivo	Tel. Fax	+261 2 6121 +261 2 277 73

Telecommunication operator(s)/Opérateurs des télécommunications

Telecom Malagasy (TELMA S.A.) ○⊙	Alarobia Antananarivo	Tel. Fax	+261 2 427 05 +261 2 426 54

Malawi / Malawi

Ministry/Ministère

Ministry of Transport and Communications	P/Bag 322, Capital City Lilongwe 3	Tel.	+265 780 122

Telecommunication operator(s)/Opérateurs des télécommunications

Posts and Telecommunications Department ○⊙	P.O. Box 537 Blantyre	Tel. Fax	+265 620 977 +265 620 188

Mali / Mali

Ministry/Ministère

Ministère de la Culture et de la Communication	B.P. 116 Bamako	Tel.	+233 22 66 47

Telecommunication operator(s)/Opérateurs des télécommunications

Société des Télécommunications du Mali (SOTELMA) ○⊙	Route de Koulikoro Boîte postale No.740 Bamako	Tel. Fax	+223 22 52 80 +223 22 30 22

Mauritania / Mauritanie

Ministry/Ministère

Ministère de l'intérieur des postes et télécommunications	P.O. Box 195 Nouakchott	Tel.	+222 2 52 020

○ *Local telephone service / Service téléphonique local*

⊙ *International telephone service / Service téléphonique international*

□ *Cellular mobile service / Service mobile cellulaire*

Telecommunication operator(s)/Opérateurs des télécommunications

Office des postes et télécommunications ○⊙	Nouakchott	Tel. Fax	+222 2 52 340 +222 2 51 700

Mauritius / Maurice

Ministry/Ministère

Telecommunications Authority	6th Floor Blendax House Dumas Street Port Louis	Tel. Fax	+230 212 9252 +230 211 2871

Telecommunication operator(s)/Opérateurs des télécommunications

Emtel Ltd. □	1, Boundary Road Rose Hill	Tel. Fax	+230 454 5400 +230 454 1010
Mauritius Telecom Limited ○⊙	2nd Floor, P.C.L. Building 43, Sir William Newton Street P.O. Box 1009 Port Louis	Tel. Fax	+230 208 3829 +230 208 1070

Mayotte / Mayotte

Telecommunication operator(s)/Opérateurs des télécommunications

France Télécom	2, rue Marcel Pagnol 97494 Ste Clothide Cedex	Tel. Fax	+262 404 142 +262 404 218

Morocco / Maroc

Ministry/Ministère

Ministère des Postes et des Télécommunications	Boulevard Moulay Al Hassan Rabat	Tel. Fax	+212 7 702 004 +212 7 705 641

Telecommunication operator(s)/Opérateurs des télécommunications

Office National des Postes et des Télécommunications (ONPT) ○⊙	6, rue Oqbah Rabat	Tel. Fax	+212 7 774 301 +212 7 777 416

Mozambique / Mozambique

Ministry/Ministère

Ministério dos Transportes e Comunicaçoes	Caixa postal 1937 Maputo	Tel.	+258 1 49 0131

Telecommunication operator(s)/Opérateurs des télécommunications

Telecomunicaçoes de Moçambique (TDM) ○⊙	P.O. Box 25 Rua da se No. 2 Maputo	Tel. Fax	+258 1 43 1921 +258 1 43 1944
Teledata de Mozambique, LDA	PO Box 4170 Maputo		

○ *Local telephone service / Service téléphonique local*
⊙ *International telephone service / Service téléphonique international*
□ *Cellular mobile service / Service mobile cellulaire*

Namibia / Namibie

Ministry/Ministère

Ministry of Works, Transport & Communications ○⊙	PO Box 287 Windhoek 9000	Tel. Fax	+264 61 201 9111 +264 61 226 500

Regulator/Régulateur

Namibia Communications Commission (NCC)	Private Bag 13309 Windhoek	Tel. Fax	+264 61 222 666 +264 61 222 790

Telecommunication operator(s)/Opérateurs des télécommunications

Telecom Namibia ○⊙	P.O. Box 297 Windhoek 9000	Tel. Fax	+264 61 201 9111 +264 61 223 323

Niger / Niger

Ministry/Ministère

Ministère de la communication	Niamey	Tel.	+227 722 135

Telecommunication operator(s)/Opérateurs des télécommunications

Office des Postes et des Télécommunications ○⊙	P.O. Box 5351 Niamey	Tel. Fax	+227 722 000 +227 735 812
Société des Télécommunications Internationales du Niger (STIN) ⊙	B.P. 208 Niamey	Tel. Fax	+227 72 29 98 +227 72 24 78

Nigeria / Nigéria

Ministry/Ministère

Ministry of Transport and Communication	Private Mail Bag No. 12755 G.P.O. Marina Lagos	Tel. Fax	+234 1 655 055 +234 1 610 069

Telecommunication operator(s)/Opérateurs des télécommunications

Mobile Telecommunications Services Ltd. (MTS) □	234 A Adeola Odeku Street Victoria Island Lagos	Tel. Fax	+234 1 264 7282 +234 1 262 0027
Nigerian Telecommunications Limited (NITEL) ○⊙□	3/5 Tafawa Balewa P.O. Box 12550 Lagos	Tel. Fax	+234 1 659 666 +234 1 610 069

Réunion / Réunion

Telecommunication operator(s)/Opérateurs des télécommunications

France Télécom	2, rue Marcel Pagnol 97494 Ste Clothide Cedex	Tel. Fax	+262 404 142 +262 404 218

○ *Local telephone service / Service téléphonique local*

⊙ *International telephone service / Service téléphonique international*

□ *Cellular mobile service / Service mobile cellulaire*

Rwanda / Rwanda

Ministry/Ministère

Ministère des transports et des communications	B.P. 720 Kigali	Tel. Fax	+250 75304 +250 76836

Telecommunication operator(s)/Opérateurs des télécommunications

Rwandatel S.A. (RWANDATEL) ○⊙	B.P. 1332 Kigali	Tel. Fax	+250 76777 +250 73110

S. Tomé & Principe / Sao Tomé-et-Principe

Ministry/Ministère

Ministerio do Equipamento Social e Ambiente		Tel. Fax	+239 12 21 631 +239 12 22 824

Regulator/Régulateur

'Companhia Santomense de Telecomunicaçao		Tel. Fax	+239 12 22 226 +239 12 22 500

Telecommunication operator(s)/Opérateurs des télécommunications

Companhia Santomenese de Telecomunicaçôes s.a.r.l. (CST) ○⊙	Av. 12 de Julho Caixa postal 141 Sao Tome	Tel. Fax	+239 12 22 226 +239 12 21 324

Senegal / Sénégal

Ministry/Ministère

Ministère de la Communication	Boîte postale 4027 Dakar	Tel. Fax	+221 23 10 65 +221 21 45 04

Telecommunication operator(s)/Opérateurs des télécommunications

Société Nationale des Télécommunications du Sénégal (SONATEL) ○⊙	Boîte postale 69 6, rue Wagane Diouf Dakar	Tel. Fax	+221 23 10 23 +221 22 14 92

Seychelles / Seychelles

Ministry/Ministère

Ministry of Finance and Communication	P.O. Box 313 Central Bank Building Independence Avenue Victoria, Mahe	Tel. Fax	+248 22 5252 +248 22 5265

Telecommunication operator(s)/Opérateurs des télécommunications

Cable and Wireless (Seychelles) Ltd. ○⊙	P.O. Box 4 Francis Rachel Street Victoria, Mahe	Tel. Fax	+248 222 221 +248 222 777

○ *Local telephone service / Service téléphonique local*

⊙ *International telephone service / Service téléphonique international*

□ *Cellular mobile service / Service mobile cellulaire*

Sierra Leone / Sierra Leone

Ministry/Ministère

Secretary of State - Department of Tourism, Transport and Communications	Government Wharf Freetown	Tel. Fax	+232 22 222588 +232 22 272197

Telecommunication operator(s)/Opérateurs des télécommunications

Sierra Leone Telecommunications Company	P.O. Box 80 7, Wallace Johnson Street Freetown	Tel. Fax	+232 22 222 801 +232 22 224 439

Somalia / Somalie

Ministry/Ministère

Ministry of Posts and Telecommunications	Mogadishu	Tel.	+252 1 29 005

Telecommunication operator(s)/Opérateurs des télécommunications

Telecommunication Department	Ministry of Posts and Telecommunications Mogadishu	Tel.	+252 1 29 005

South Africa / Sudafricaine (Rép.)

Regulator/Régulateur

Department of Posts and Telecommunications	Private Bag X860 Pretoria 0001	Tel. Fax	+27 12 311 8003 +27 12 311 8030

Telecommunication operator(s)/Opérateurs des télécommunications

Mobile Telephone Network	P.O. Box 782508 Sandton	Tel. Fax	+27 11 445 6000 +27 11 444 4930
Telkom SA Limited (Telkom) ○⊙	Private Bag X74 Pretoria 0001	Tel. Fax	+27 12 311 1031 +27 12 311 4001
Vodacom Group Pty Limited (Vodacom)	Royal Cape Park, 15 London Road Gottry PO Box 15379 Cape Town	Tel. Fax	+27 21 762 2340 +27 21 762 3814

Sudan / Soudan

Ministry/Ministère

Ministry of Public Communications	Khartoum	Tel. Fax	+249 11 72168 +249 11 75599

Telecommunication operator(s)/Opérateurs des télécommunications

Sudan Telecommunications Company Ltd. (Sudatel) ⊙	Baraka Tower 1st Floor P. O. Box 11155 Khartoum	Tel. Fax	+249 11 773930 +249 11 451111
Sudan Telecommunications Public Corporation (STPC)	Ministry of Public Communications Khartoum	Tel. Fax	+249 11 72168 +249 11 75599

○ *Local telephone service / Service téléphonique local*

⊙ *International telephone service / Service téléphonique international*

□ *Cellular mobile service / Service mobile cellulaire*

Swaziland / Swaziland

Ministry/Ministère

Ministry of Transport and Communications	P.O. Box 58 Mbanane	Tel. Fax	+268 46420 +268 46438

Telecommunication operator(s)/Opérateurs des télécommunications

Swaziland Posts and Telecommunications Corporation (SPTC) ○⊙	Phutfumani Building Warner Street P.O. Box 125 Mbanane	Tel. Fax	+268 42341 +268 43130

Tanzania / Tanzanie

Ministry/Ministère

Minister of Works, Communications and Transport	PO Box 9144 Dar-Es-Salaam	Tel.	+255 51 46 160

Regulator/Régulateur

Tanzania Communications Commission (TCC)	P.O. Box 474 Dar-Es-Salaam	Tel.	+255 51 23 677

Telecommunication operator(s)/Opérateurs des télécommunications

MIC Tanzania Limited □	TACS Cellular Network Operator Lugode Street P.O. Box 21231 Dar-Es-Salaam	Tel. Fax	+255 811 320100 +255 811 123014
Tanzania Telecommunications Company Limited ○⊙	PO Box 9070 Samora Avenue Dar Es Salaam	Tel. Fax	+255 51 31155 +255 51 46661

Togo / Togo

Ministry/Ministère

Ministère de l'Equipement	Lome	Tel.	+228 21 11 01

Telecommunication operator(s)/Opérateurs des télécommunications

Office des Postes et Télécommunications du Togo (OPTT) ○⊙	Boîte postale 333 Avenue Nicolas Gumitzky Lome	Tel. Fax	+228 21 44 01 +228 21 03 73

Tunisia / Tunisie

Ministry/Ministère

Ministère des communications	3 bis, rue d'Angleterre 1030 Tunis	Tel. Fax	+216 1 245 136 +216 1 352 353

Telecommunication operator(s)/Opérateurs des télécommunications

Direction générale des télécommunications (DGT) ○⊙□	Bd. du 9 avril La Kasbah Tunis	Tel. Fax	+216 1 566 030 +216 1 564 357

○ *Local telephone service / Service téléphonique local*

⊙ *International telephone service / Service téléphonique international*

□ *Cellular mobile service / Service mobile cellulaire*

Uganda / Ouganda

Ministry/Ministère

Ministry of Works,Transport and Communications	P.O. Box 10 Entebbe	Tel.	+256 42 20580

Telecommunication operator(s)/Opérateurs des télécommunications

Celtel Cellular Ltd □	7th Floor Greenland Towers P.O. ox 6771 Kampala	Tel. Fax	+256 41 230 110 +256 41 230 106
Uganda Posts and Telecommunications Corporation (UPTC) ○⊙	P.O. Box 7171 Kampala	Tel. Fax	+256 41 258 855 +256 41 245 907

Zaire / Zaïre

Ministry/Ministère

Département des postes et des télécommunications	Boîte postale 800 Kinshasa-1	Tel.	+243 12 23 123

Telecommunication operator(s)/Opérateurs des télécommunications

Office National des postes et des télécommunications du Zaïre (ONPTZ) ○⊙	Boîte postale 7070 Kinshasa 1	Tel.	+243 12 22 876

Zambia / Zambie

Ministry/Ministère

Ministry of Power, Transport and Communications	Fairley Road P.O. Box 50065 Lusaka	Tel.	+260 1 213 211

Telecommunication operator(s)/Opérateurs des télécommunications

Zambia Telecommunications Company Limited (Zamtel) ○⊙□	Provident House P.O. Box 71660 Ndola	Tel. Fax	+260 2 611 111 +260 2 613 055

Zimbabwe / Zimbabwe

Telecommunication operator(s)/Opérateurs des télécommunications

Posts and Telecommunications Corp. (PTC) ○⊙	P.O. Box 8061 107 Union Avenue Causeway Harare	Tel. Fax	+263 4 728 811 +263 4 731 980

○ *Local telephone service / Service téléphonique local*

⊙ *International telephone service / Service téléphonique international*

□ *Cellular mobile service / Service mobile cellulaire*

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 28-E
16 April 1996
Original: English

For Information/Support

Agenda item: 2.1 **PLENARY MEETING**

SOURCE: THE TELECOMMUNICATIONS EXECUTIVE MANAGEMENT INSTITUTE OF CANADA (TEMIC)

TITLE: EXECUTIVE MANAGEMENT TRAINING

Abstract

Business transformation is now the main challenge and central task of senior managers. This is particularly true for the telecommunications sector which is undergoing changes of unprecedented magnitude.

The TELECOMMUNICATIONS EXECUTIVE MANAGEMENT INSTITUTE OF CANADA (TEMIC), draws the strength of its programs from the success of the telecommunications industry of Canada as well as the successful transformation of its sector from a monopolistic to a fully competitive environment. TEMIC is committed to share this Canadian experience which offers significant learning opportunities for the developing world as it goes through a similar transformation.

Introduction

The new reality

The importance of telecommunications in what is now an information based economy has been eloquently demonstrated time and time again.

The success of an organization, a region or a country increasingly depends on how well telecommunications are developed and managed. Telecommunications now serves as both the motor and fertiliser of the economy.

The need for transformation

In this new reality, all stakeholders in the telecommunications sector will be held accountable. The extent and quality of economic, social and cultural improvement worldwide will be directly proportional to the extent and quality of the development of the telecommunications sector.

This will require a reform in sector policy and the regulatory framework and necessitate a substantial transformation of the activities and management of the carriers. Senior managers will be responsible to lead their organization through a transition from a monopoly environment to one where their enterprise becomes customer - focused, competitive and profitable.

Training implications

Managers will need a new set of skills to lead their entity throughout this transition such as:

- Strategic Management and Policy Deployment.
- Total Quality Management.
- Marketing and Sales.
- Transformation and Transition Management.
- Benchmarking.
- Financial Management.
- etc.

This new environment will have significant and profound training implications from the very top of every telecommunications organization. Transformation and training must start and be supported at the summit of the organizational pyramid.

In the past years, numerous studies have demonstrated that the quality of an organization's management will make this organization stand out from its competitors regardless of its sector of activity and regardless of its region's development level.

In fact, for an organization to succeed, its access to capital and technology have become essential factors but yet these remain secondary to management quality.

TEMIC and telecommunications executive management training

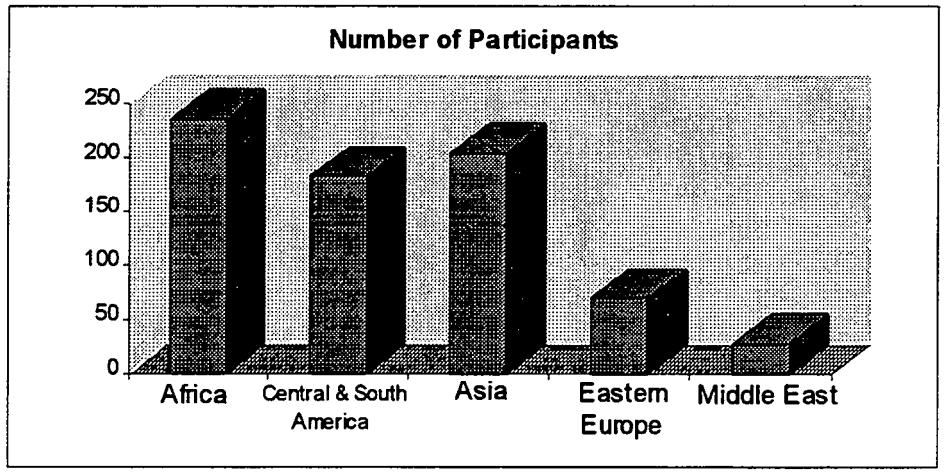
With the foregoing in mind, Canada's telecommunications industry, in collaboration with the Federal Government, responded in 1986 to the training recommendations in the Maitland Commission's Report.

TEMIC was established with a mandate to assist telecommunication organizations from developing countries to expand their capacity to create their future. TEMIC's focus on executive management training is rooted in the belief that human resource development is the key to sustainable development. Business transformation is now the main challenge and primary task of business leaders. TEMIC is committed and its programs are designed to help senior managers lead their organization through this transition successfully.

Based in Montreal, TEMIC, a non-profit organization, holds training seminars at various locations across Canada. This allows participants to acquire, from Member organizations, first-hand knowledge on the latest management techniques and technologies available in Canadian telecommunications.

The Institute is supported by 40 different organizations from the Canadian telecommunications industry. Government support is mainly provided though Foreign Affairs and International Trade, Industry Canada and the Canadian International Development Agency. The Institute offers a minimum of four seminars annually, in English or French, Canada's two official languages. In addition, a program in the Spanish language is offered periodically.

Participation in TEMIC programs is by invitation from the Institute. Participants' living expenses during their stay in Canada are generally paid for by the Institute. As from February 1996, 719 executives and senior managers from 109 developing or newly industrialized countries have attended the seminars offered by TEMIC since its inception. As the following graph demonstrates, participants from the African region represent the largest contingent of participants.



Number of countries represented	44	30	17	11	7

Consistent with its philosophy to invest in the productivity of people, TEMIC is actively working with the ITU/BDT in setting up plans, programs and targets aimed at increasing the number of executives trained in quality management.

The Canadian experience

TEMIC draws the strength of its programs from the success of the telecommunications industry in Canada. The Canadian telecommunications model and experience offers significant learning opportunities for the developing world:

1) 98.5% of Canadian households have telephone service.

2) The Canadian territory covers ten million square kilometres; spanning six time zones and fronting three oceans. Canada's achievements in telecommunications have often been qualified as a victory of technology over geography.

3) The national regulatory environment has evolved over the years from monopolistic to what is now total competition in all sectors of telecommunications.

4) Canada is a recognized technological leader, for example:
   - 1874: Alexander Graham Bell conceived the telephone (in Brantford, Canada);
   - 1901: World's first transatlantic wireless message;

- 1971: World's first domestic digital microwave;
- 1990: World's longest continuous cellular network corridor.

5) Reliable, accessible and affordable; surveys have demonstrated over the years that Canadian telecommunications services meet the needs of business as well as those of residential markets.

The Institute's Programs

TEMIC's first seminar, for executives and senior managers, took place in September 1987. This seminar covered the following topics:

- Telecommunications network planning, technological development, regulatory matters, network management and maintenance, customer services, rural telecommunications and an overview of financial and human resources management.

During the initial senior management programs, a significant number of participants identified training requirements for their subordinates. This resulted in the development of the following seminars dealing with specific functions related to the management of telecommunications:

- Telecommunications Switching Network Planning and Management (November 1989).
- Telecommunications Customer Services Management (February 1990).
- Telecommunications Human Resources Management (November 1990).
- Telecommunications Financial Planning and Management (February 1992).
- Rural and Wireless Telecommunications Planning and Management (November 1992).
- Policy, Regulation and Transition Management (April 1996).

The content of the programs is being updated on a continuous basis to reflect the needs identified by the ITU as well as the needs identified in the evaluations of the seminar participants.

The importance of Total Quality Management (TQM) for telecommunications organizations is now being recognized around the world. Every TEMIC program contains a TQM component that includes practical examples particular to the telecommunications carrier industry and as well as the review of an actual transformation plan to TQM.

Further, changing the management culture, as well as the adaptation of organizations to the progressive liberalization and competitive environment, are important issues covered in every program. Transformation and transition management is an important topic of every TEMIC program.

For the different modules of a specific seminar, subject matter experts are loaned to the Institute from Member organizations. This approach offers the advantages of presenting various views on a particular subject and of hearing conflicting opinions from competing companies.

Training methodology

The basic forms of training include traditional classroom settings, computer model case study, demonstrations and field or site visits. The transfer of knowledge and skills occurs mainly through this participatory method. TEMIC ensures that the learning opportunities are relevant to the work situations of the participants, understandable, subject to being translated into practical actions and supported by the evidence of their validity.

The breadth of knowledge, the interaction between participants and the ability to interact with managers from both the public and private sectors have been praised by participants in independent third party evaluations of the programs. In general, Fellows of the Institute have found the seminars helpful in increasing their knowledge of telecommunications. Almost all have stated that they were able to apply the knowledge acquired.

Conclusion

The TEMIC Programs, which draw upon the practical experience of Canadian telecommunications companies, have proven to be an effective way of training telecommunications executives from the developing world. These programs, which have evolved to keep pace with changes in the telecommunications sector, meet the needs of telecommunications executives in today's competitive environment. The training methodology, which places an emphasis on participation and practical, case study examples, has been shown to be appropriate to the needs of executives and will help them lead their organization through the business transformation that has become their main managerial responsibility.

Pierre Derome
Managing Director & Chief Executive Officer

March 1996

INTERNATIONAL TELECOMMUNICATION UNION
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Agenda item: 2.4

PLENARY MEETING

SOURCE: PAN AFRICAN TELECOMMUNICATIONS UNION

TITLE: REVIEW OF THE PANAFTEL NETWORK

Review of the PANAFTEL Network

1. INTRODUCTION

The PANAFTEL network was conceived by African Government South of the Sahara in the early 1960's with the broad objective of providing a high quality and reliable telephone network enabling all African countries to communicate with one another without having to transit through countries outside Africa. It has two network layers, the lower layer is composed of national networks and the upper layer is the international network interconnecting the national networks in the lower layer. The implementation of the network started in the early 1970's and in order to move forward it is necessary to examine the performance of the network in relation with the environment in which it is working. The next section describes a situation review out of which a line of action for moving forward will be derived.

2. A SITUATION REVIEW

2.1 Telephone Density

The penetration ratio of telephones per 100 inhabitants in Africa is as follows :

Sub Region	Inhabitants	Main Lines	Density/100 inhabitants
E & S Africa	194625726	805485	0.41
W. Africa	192798733	460369	0.24
C. Africa	79284782	190305	0.24

Data Source : Yearbook of Common Telecommunications Statistics (17th Edition) Geneva, 1990. This means the density for sub Sahara Africa was 0.3 main lines/100 inhabitants.

The densites of the other regions are as follows :

Region	Density
N. Africa	2.38
Asia	38
Latin America	6.1
C & E Europe	13.0
W. Europe	43.7
N. America	50.7

The PANAFTEL network has therefore the lowest density of telephone in the world.

2.2 Distribution of Local Telephone Switching Systems

The installed local switching centres in 1990 was as follows :

	E & S Africa		W. Africa		C. Africa		Total	
	Nº	Capacity	Nº	Capacity	Nº	Capacity	Nº	Capacity
SxS	182	307205	42	57600	11	10448	235	375253
Xbar	254	486598	395	547363	97	157757	746	1191718
Manual	1245	86469	750	22957	102	9931	209	7119357
Digital	154	242348	28	62844	30	48276	212	353468
Total	1835	1122620	1215	690764	240	226412	3290	2039796

It is observed that most of the switching equipment was analogue.

2.3 Distribution of International Telephone Switching Systems :

The installed capacity of the above systems in 1990 was as follows :

Sub Region	Digital	Analogue	Installed capacity	Connected Capacity
E & S Africa	13	9	32225	17622
W Africa	8	9	10785	4848
C Africa	4	6	4195	2003

The above data show that analogue switching systems were still in use.

2.4 International Links

Sub Region	Inter-Africa Channel Capacity	Intercont. Channel Capacity
E & S Africa	1833	1117
W Africa	984	1488
C Africa	208	865

2.5 Earth Satellite Stations

There were twenty earth stations in the Eastern and Southern Africa sub region in 1990 and at the same time there were twenty and twelve in West and Central Africa sub regions respectively.

2.6 Results of Traffic Analysis of the PANAFTEL Network for 1989

The above analysis was carried out in 1991 for the traffic carried in 1989 in the PANAFTEL network. It is perhaps the latest most comprehensive analysis available. The above analysis do not include the countries in North Africa sub region and the Republic of South Africa.

(i) Extra-African total traffic represented about 60% of the PANAFTEL traffic. This sample data means that Africa has a higher community of interest with other continents than with itself. It is expected that when the African Economic Community is operational, the intra-African traffic would be stimulated on the expense of the extra-African traffic.

(ii) **Examining the sampled intra-African traffic further the following observations were made :**

(a) About 47% of the traffic went to the Republic of Southern Africa and the countries in North Africa.

(b) About 20% went to East Africa sub region.
(c) About 15% went to West Africa sub region.
(d) About 12% went to Southern Africa sub region.
(e) About 6% went to Central Africa sub region.

(iii) **Analysing the intra-African traffic using the routing criterion, the following results were obtained :**

(a) About 88% of the traffic was routed using direct routes between countries.
(b) About 10% was routed using transit centres outside the continent.
(c) About 1% of the traffic was routed using transit centre in the Republic of South Africa.
(d) About 1% of the traffic was routed through transit centres within the PANAFTEL network.

It has been estimated that African countries pay annually US $900m to foreign telecommunications administrations for handling intra-African traffic using transit switching centres outside the region. This situation should not be allowed to continue for a long time. Section 2.10 of this document addresses the strategy for resolving this long drawn-out problem.

2.7 Tariff and International Accounting

Tariffs are an essential component of a viable PANAFTEL Network. Consequently during the entire period of the PANAFTEL programme as funded by the UNDP, tariffs and traffic accounting were accorded high priority. It should be mentioned that PATU was closely associated with this activity.

Whilst major achievements were made including the establishment of sub-regional Tariffs Groups, specific tariff recommendations at regional and sub-regional level and the production of accounting manuals, the subject of tariff harmonisation and application still remains a major task.

The following are considered factors which have impaired the establishment and application of harmonised tariff structures in Africa :

i) Adoption of economic routing plans including agreed transit centres in order to derive appropriate tariff levels;

ii) Effective coordination of accounting rates to avoid disharmony in bilateral rates on inter-country routes;

iii) Review and adjustment of national collection rates to avoid dissymetry in tariffs;

iv) Application of standard accounting procedures and regular exchange of traffic accounting data;

v) Introductionn of analytical cost accounting standards and procedures throughout all Administrations so as to create a sound basis for cost and tariff assessment;

vi) Introduction of agreed and harmonised tariff structures at sub-regional and regional levels.

The above form the main activities that will need to continue to be given attention by Administrations as well as PATU.

2.8 Management Information System

Information is a resource for man's activities. Without information no action can be undertaken. Similarly, telecommunication administrations cannot perform well without information. For example, for telecommunication administrations, traffic data is a very useful information; it is a raw material for nearly all activities in the telecommunication operations and network development. Efforts must be taken to measure it regularly, analyse it and use it for various activities in the sector.

In the PANAFTEL Network, there have been considerable difficulties in obtaining data for the PANAFTEL Network. Questionnaires have been sent by PATU to administrations to get information on the performance of the network, unfortunately the responses have not been good; a number of countries do not respond to the questionnaires. While traffic can be analysed on per country basis for the countries which respond to the questionnaire, a regional or sub-regional analysis cannot be obtained accurately for lack of responses from a number of administrations.

In general it is difficult to get all type of data from administrations and hence it is difficult to built up a regional data bank which could be used for managing regional and sub-regional telecommunications activities. Administrations are urged to be interested in operations data for their network so that they know the level of performance of their networks and that all data from administrations could be used to get the performance indicators for the region. There is hope that with the advent of liberalisation in Africa, administrations will be conscious of the value of operations data which will assist them to know where they are in business. In turn, PATU will be in better position to build a regional data bank for the management of regional activities.

2.9 Modern Information Technology

Information technology is simply a way by which society receives and stores information, analyses it, and transmits it from one place to another. Information technology is part and parcel of any society and its evolution is dependent on the society itself. The information technology of the modern society uses computers to store and analyse information and telecommunications network to receive and distribute it. One of the advantages of computers compared to a human being is that they are faster in processing data and they are capable of storing large volume of data. One of the advantages of telecommunications is that it is the fastest method of transferring information.

The technological development in computers and telecommunications fields have made these facilities cheaper now and hence more people could use these facilities. The technological development in these fields is still changing at a fast rate aiming at, among other things reducing cost of equipment so that a common man could be connected to the world-wide Modern Information Technology (MIT) network.

In any information technology, whether modern or out of date, information is the raw material for man's activities. MIT is therefore a basic infrastructure for any man's activity name it : political, social, cultural and economic. It is needed for developed and developing countries, it is a tool required by all people : rich or poor. It is therefore a HUMAN RIGHT to have access to MIT.

The planning and implementation of the second generation PANAFTEL network should bear the following points in mind :

(a) The network should be as close as possible to all people living in both urban and rural areas of Africa.
(b) The network infrastructure should cater for service demands foreseen in the next twenty years.
(c) The network should use digital technology.

2.10 Some Aspects of Network Planning for the PANAFTEL Network

Routing of the PANAFTEL Traffic

The objective of the routing plan is to ensure that any subscriber in one country of the PANAFTEL network can be connected to any other subscriber in any country of the network using the most economic routing technique. With reference to Fig 1 three sub regions X, Y, Z are shown with countries A, B, C belonging to the sub region X; and countries D, E, F belonging to the sub region Z.

Without going in the details of the merits and demerits of mesh and star networks, suffice only to state that a two-level hierarchical routing is planned for the network. In this routing, each sub region will have one or two transit switching centres where international switching centres for each country are connected forming a star network. Then the transit switching centres of each sub region are interconnected to form a mesh network. Hence with reference to Fig. 1 countries A, B, C use country B as a transit switching centre for sub region X while country E is the transit switching centre for countries D, E, F of sub region Z.

A subscriber A3 in country A wishing to communicate with a subscriber D3 in country D will use the following transmission facilities : A2-A1, A1-B1, B1-E1, E1-D1 and D1-D2; that is at most five transmission links will be used. This is the most economic routing plan which caters for all situations.

Transmission Plan

Having set the routing plan, the transmission routes have to be engineered to meet the requirements of the transmission plan. In qualitative terms, the transmission plan should enable any two subscribers in the network to communicate with each other effectively.

When the RASCOM provides a dedicated communication satellite for intra-African traffic, it is possible to provide satellite links to the five transmission links above, needed by the routing plan. But if this is done, the two subscribers will not be able to communicate effectively because of the unacceptable transmission delay caused by five satellite hops. While ITU-T recommendation has specified for one satellite hop to guarantee an effective connection, PANAFTEL transmission plan could specify at most two satellite hops. When aiming for at most two satellite hops in any connection, it means that the other three transmission links must be non-satellite, i.e. they must be terrestrial or submarine. The best candidate for terrestrial or submarine links are A2-A1, D2-D1, D1-E1, A1-B1 i.e four transmission links, leaving the other link suitable for satellite connection. But RASCOM could provide satellite connection to remote and isolated areas of a country, i.e. A2-A1 and D2-D1 could be satellite transmission links. In this case it is mandatory to have the remaining links terrestrial or submarine. Hence links between transit centres of sub regions must have both satellite and submarine/terrestrial transmission facilities. The links between countries within the same region must therefore be terrestrial or submarine.

The implementation of the first generation PANAFTEL network started with the provision of direct circuits connecting neighboring countries to do away with the routing of intra-African traffic through transit outside the continent.

This fact is confirmed by the traffic analysis given in section 2.6 for the traffic carried in 1989 where it shows that 88% of the intra-African traffic is routed on direct routes. The same analysis shows that about 10% of the intra-African traffic is routed using transit switching centres outside Africa.

The planning and implementation of the next generation PANAFTEL network should also take the following points into considerations :

(a) Sub regional transit switching centres should be established and interconnected first.
(b) Then the routes between each country and its corresponding home sub regional switching centres should be connected.
(c) Direct routes could be provided between countries when justified by traffic.

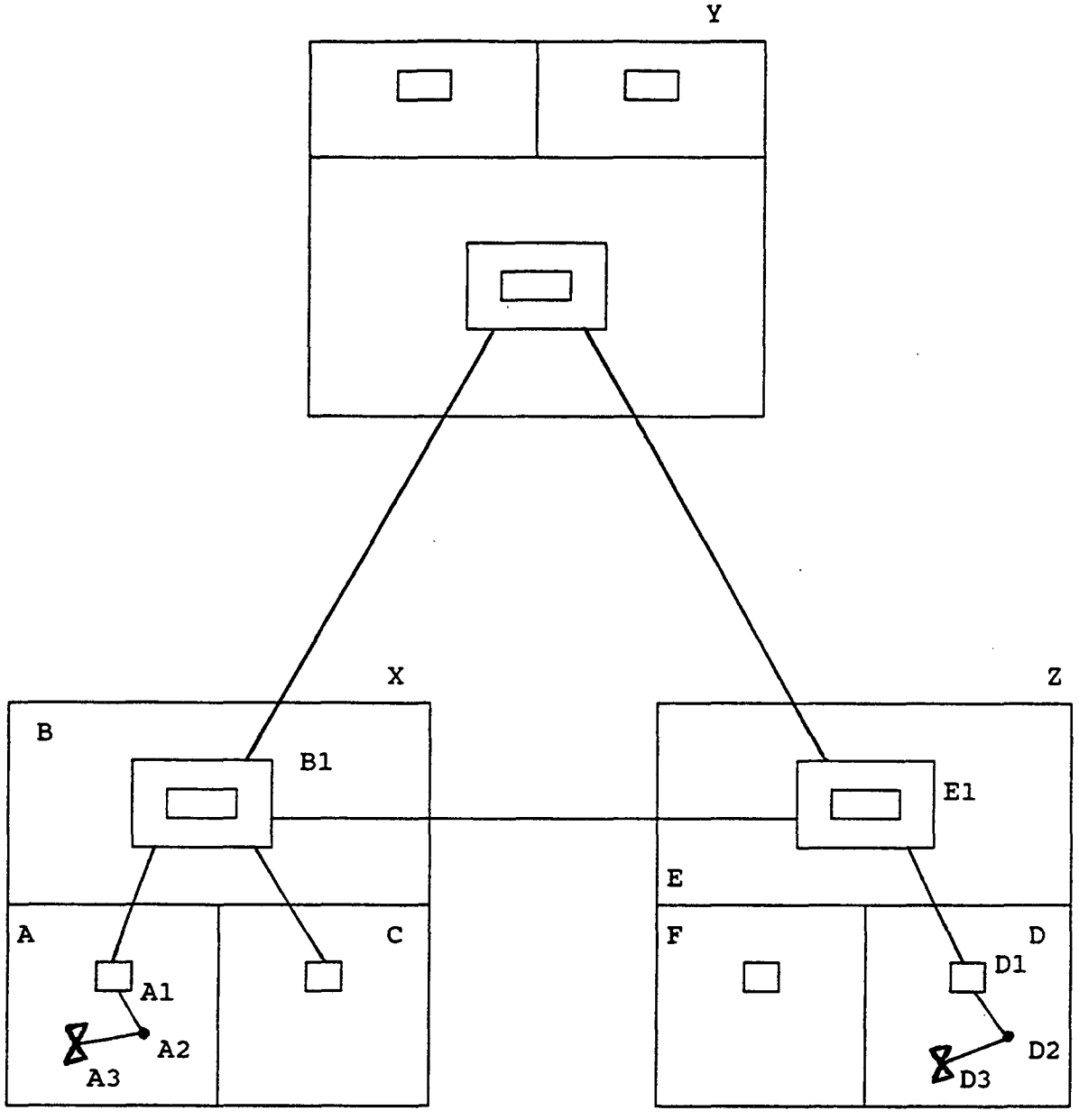
(d) The list of missing links should include the above links when they are not provided.
(e) Needless to mention it, the entire network should have a digital connectivity.

The advantages of taking the above actions are :

(a) No intra-African traffic will be routed using transit centres outside Africa;
(b) The quality of transmission will be better than it is now;
(c) Will stimulate intra-African traffic;
(d) Tariff for the transit will be based on cost of service and may lower the collection rate and hence to the advantage of the end users;
(e) Will stimulate Intra-African trade;
(f) Total integration of national networks will have been achieved to build up a better PANAFTEL network using economic methods;
(g) Aspiration of the African Economic Community will be achieved faster.

FIG I

ROUTING PLAN FOR THE PANAFTEL TRAFFIC



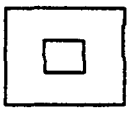
Nomenclature :

A3 & D3 : Subscribers in countries A and D respectively.

X, Y, Z : Subregions

A, B, C and D, E, F : countries of subregions X and Z respectively

: International Switching centre serving one country

 : Transit Switching centre serving a group of countries in subregion

2.11 **Maintenance of PANAFTEL Network**

a) The quality of service offered by the current generation of the PANAFTEL network is not up to the international standard and has therefore lead to big loss of revenue. The following facts describe the general situation on maintenance :

(i) A poor quality of service offered on national and inter-African network is far below the standards accepted in developed countries;

(ii) The trunk telephone call success rate is of the order of 20%, as against 60% for industrialised countries, the international call success rate is of the order of 25% as against 40% in the industrialised countries (this rate can be as low as 15% on some PANAFTEL routes).

b) The enormous investment made in telecommunications in the PANAFTEL inter-state network is not generating sufficient returns in terms of utilisation and revenue :

(i) Rapid deterioration of equipment, many of which break down and are often prematurely replaced;

(ii) Chronic shortage of space-parts, tools, logistic resources necessary for maintenance;

(iii) Under-qualified and inexperienced technical operation and maintenance personnel;

(iv) Low staff productivity on account of frequently unsuitable working methods and lack of motivation;

(v) Insufficient co-operation among the various African Administrations.

c) The result is that telecommunication services are not as effective as they should be in furthering the economic development in the countries and the region as a whole. This situation has hindered and continues to hamper development of services themselves. The improvements expected from new investments may be completely obscured by poor condition of the existing equipment. Interworking between equipment in good condition and faulty equipment is bound to produce poor results.

d) The problems of maintenance have been addressed by a number of UNDP-funded projects which have created awareness of the same to the African Administrations. Although Administrations are now aware of these problems, the problem of inertia will make them take some time to cultivate the maintenance culture.

e) Another way to solve the problem of maintenance is to use the concept of "**manufacturers taking maintenance responsibility for their own products**". The manufacturers should maintain the equipment they supply using locally recruited personnel under their supervision.

The following advantages will emerge :

For Administrations :

(a) Better quality of service of the installed equipment;
(b) Better revenue generation;
(c) Fewer employees;
(d) More concentration on the core business of providing service to the subscribers;

For the Manufacturers :

(a) Better field experience on the performance of their equipment;
(b) Will be in better position to evolve better products;
(c) Will take care of their equipment and hence the PANAFTEL network will be more efficient.

For the African Region:
Transfer of technology to Africa would be more effective.

Action required by African countries :

The contracts for the procurement and installation of the second generation PANAFTEL network should include the above provisions on maintenance.

2.12 **Promotion of MIT industries for the PANAFTEL Network**

Considering that it is a HUMAN RIGHT to have access to MIT, the investment required to accelerate the development of telecommunications in Africa is enormous. Statistics indicate that there were about 1.5 m main telephone lines in Africa in 1990.

If the African countries have to increase from the ratio of 1.52 telephone lines per 100 inhabitants to three per 100 inhabitants by the year 2000, a total investment of about US $30.8b would be required. For a density of two by the year 2000, the investment required would be US $12.8b assuming a cost of about US$ 2000 per additional line.

The magnitude of funding required for the level of investment is beyond the financial means of many African countries, given current levels of income. Even if they were to increase the percentage of income allocated to telecommunications from the current 3.2, the target cannot be met. The above indicates that radical policies have to be undertaken in order to tap investment from non-traditional sources.

Nearly all equipment required for the development of MIT in Africa is imported. Since MIT is a permanent requirement for the continent, technology transfer of MIT and establishment of MIT industries should be the long term objective for sustaining the PANAFTEL network for African development. A prerequisite for tapping the technology and promoting industries is manpower development and manpower management.

The success in enhancing African expertise and effective technological transfer should manifest in the creation of local industries in MIT. In turn, the telephone penetration ratio should be seen to be growing and at last the socio-economic development of the continent as whole should be seen to be growing. In order to accelerate industrialization in Africa the following strategies need be taken :

At national level :

(a) Since Africa has not participated in the development of MIT, a national policy should be put in place to allow administrations to recruit keen students from high institution of learning;
(b) Administrations should use universities to undertake research in MIT and set funds for these projects;
(c) Administrations should even sponsor keen students for University education;
(d) Administrations should establish attractive incentive schemes for its experts;
(e) Administrations should create incentive schemes for early retirement of staff who will be replaced by more keen staff;
(f) They should create a standards department with highly qualified staff who would be taking part in selected ITU study groups.

At regional level :

(a) Regional organisations should be manned by the best experts in Africa drawn from administrations.
(b) Regional organisations should be capable of initiating regional industries for MIT using experts from the administrations.

2.13 Emergence of New Satellite Services

At the World Radiocommunication Conference (WRC-95) held in Geneva in 1995 radio spectra for a number of satellite services were allocated. Of particular interest to the PANAFTEL network, are the mobile satellite services (MSS) and the fixed satellite services (FSS) in the non-geostatonary orbits (NGSO).

These services are global and have the advantage of having negligible propagation delay as compared to the geostationary satellites. Some designs of FSS have broadband features. The advantages of these services are that they could also be used in the PANAFTEL countries to serve rural and isolated areas where conventional services cannot be used because the cost to provide them is prohibitive.

Some of the advantages of the new satellite services are :

(a) The telephone penetration ratio will go up faster for the advantage of the African Economic Community.
(b) In addition, African countries will invest less in using this network because the network is ready made for use by network operators.

Action needed by African countries :

(a) They have to review the Telecommunications Master Plan and indicate where such new systems could be used.
(b) They should use these services in order to increase the penetration ratio faster, especially in rural areas where most of the African population lives.

2.14 Regional African Satellite Communication Organisation (RASCOM)

An African organisation called (RASCOM) has been created to undertake the implementation of a satellite network and its operations. The plans for the implementation of the RASCOM network are underway. This network is an African solution for the implementation of the PANAFTEL network. Its advantage lies in the fact that it has inherent features to serve the rural and remote areas of Africa where most of the population live. It will also remove the inter-connectivity problem which exists with the INTELSAT System for African countries connected to different satellites.

In theory the RASCOM network is capable of connecting one African country to any other African country. But this would be uneconomic routing because the traffic volume does not justify this type of routing and would therefore be expensive to the end-users. The use of the satellite connections to link subregional transit switching centres and connecting rural areas by satellite (see 2.10) are some of the obvious use of the RASCOM network. In future, when the Community of interest between African countries grows, there will be justification to use direct satellite connections between a number of countries.

The following actions are needed by African countries :

(a) To continue giving the financial support needed by RASCOM so that the satellite network is implemented as soon as possible.

(b) To follow the regional routing plan (see 2.10) in routing of its traffic so that the end-users do not suffer the high tariff imposed by using uneconomic routing plans.

2.15 Africa One

Africa One network is a proposed optical fibre submarine cable which among other things will go round the African Continent to form a ring network. Landlocked countries will also benefit from this project through a terrestrial connection between one landing point and the relevant landlocked country. The links to landlocked countries form part of the project. When completed the project is potentially capable of connecting one African country to any other African country.

As mentioned earlier in section 2.14 on RASCOM, mesh network is not advantageous to the subscriber compared to the hierarchical routing proposed under item 2.10 because the traffic volume between African countries is small at the moment. In the future, however, when the African Economic Community is in full operation, it is expected that the traffic volume between some countries will increase to justify direct routes.

African countries should therefore do the following :

(a) To support the Africa One financially and then use it.

(b) To use the cable to interconnect subregional transit switching centres.

(c) To use it to connect individual countries to their home subregional transit switching centres.

The advantages of taking the above actions are:-

(i) The upper layer (international) of the Panaftel network will be a high capacity digital network which is capable of providing even modern services.

(ii) There will be no missing links in the upper layer because the system has potential capability of linking one country to the rest if needed although this is not the initial requirement.

(iii) All intra-Africa traffic will be routed using switching centres in Africa, rather than using extra-African Switching Centres.

2.16 African Economic Community

The Treaty establishing the African Economic Community (AEC) was signed by Heads of State and Government attending the Organisation of African Unity (OAU) Summit in Abuja, Nigeria in June, 1991. The initial preoccupation of the OAU was to ensure that all countries of the continent were liberated from foreign rule. Seeing that all countries were independent, OAU decided to focus its attention to intra-African economic and cultural development. It is worth mentioning that the treaty contains a protocol on transport and communications.

The impacts of the AEC on the network are :

(a) The network should operate on commercial lines and generate profits for its own growth.
(b) The network should serve all countries in Africa and not only the sub Sahara Africa.
(c) The network should be managed by PATU which should derive its existence partly from the exploitation of the network itself.

2.17 Funding the PANAFTEL Projects

The United Nations Development Programme (UNDP) has played a leading role in funding the development studies of the network. Following the results of these studies, African Telecommunications Administrations funded the investment programme. UNDP continued to finance catalyst projects for ensuring that the network is properly managed and that it is efficient. The International Telecommunications Union (ITU) was the executing agency for these UNDP funded projects. UNDP assistance to the network stopped in 1991. Africa One is financing the co-ordination of the

implementation of a submarine cable Project going round Africa. The financial assistance from Africa One will also stop when the implementation of this project is completed. The United Nations through Economic Commission for Africa has financed the co-ordination of two projects connected with the telecommunications network in Africa. The first project was called the United Nations Transport and Communication Decade for Africa (UNTACDA 1).

The second project is the current project called UNTACDA 2). It should be expected also that the UN will not continue proclaiming these decade programmes for Africa forever. Another fact is that the International Telecommunication Union (ITU) has created a sector dealing with telecommunications development for developing countries. Consequently, ITU has established a number of offices in Africa dealing with telecommunications network in the region. For all intents and purposes, the ITU is dealing with the PANAFTEL network. ITU presence in the region cannot be regarded to be permanent because ITU will leave the region when its mission is accomplished.

African countries should therefore :

(a) bear it in mind that all foreign aid is finite;
(b) re-organise the participation of foreign telecommunications contributors in such a way that all contributors work within the framework of PATU,the legally established regional telecommunications organisation;
(c) make arrangement so that financial aid for regional telecommunications development and operations is channelled through PATU.

2.18 Restoration of the PANAFTEL Steering Committee

The last UNDP funded PANAFTEL projects were managed as follows :

A Steering Committee was established whose terms of reference were among other things, to monitor progress and issue guidelines for further project activities. It met once a year and was composed of representatives of UNDP, ITU, PATU and ECA and one representative per sub regional organisation. In addition, the meeting was attended by the project co-ordinators and experts.The project co-ordinators submitted to the meeting detailed monthly breakdown of their work plan and a detailed report on the activities of the projects.

When UNDP stopped funding the PANAFTEL project, the above arrangement was discontinued and PATU took the role of the co-ordinator without the Steering Committee. The situation now has changed so that a review of the management of the network is necessary.

A Steering Committee should be re-established with the same terms of reference.

Representatives from following organisations are proposed for its membership:

OAU : For African Economic Community;
ECA : Regional organ of the UN involved in development of Africa;
RASCOM : Organisation dealing with African satellite network;
Africa One : Dealing with submarine cable;
Five sub regional economic groupings;
PATU : The regional organisation charged by OAU to co-ordinate the development of telecommunications in Africa.

Initially, extra-budgetary funds should be made available to PATU to cover expenses of co-ordination of the PANAFTEL projects. In the long term, however, PATU should be able to generate funds out of regional projects, part of the revenue could be used to finance the co-ordination of the PANAFTEL projects.

The main function of PATU are:-

(a) To draw up a short and the long term plans for the operations and development of the PANAFTEL network and submit it to the Steering Committee for approval;

(b) To draw up a rolling implementation plan and implement it using experts recruited from local and international market;
(c) To look for funds for implementing the studies of the PANAFTEL projects.

For the start-up of the committee, the following actions have to be done:-

(a) African countries and the international community should be requested to contribute to" the PANAFTEL projects co-ordination fund" to be managed by the Steering Committee;
(b) In the long term, the fund shall be raised by PATU from commercial regional enterprises in telecommunications and PATU should be allowed to undertake and run commercial projects financed by African countries and the international community.

2.19 Strengthening PATU, the Co-ordinator of PANAFTEL Projects

The Pan African Telecommunications Union (PATU), was established in December 1977 as a specialised agency of the Organisation of African Unity (OAU) in the field of telecommunications so as to ensure the orderly development of African telecommunications at a pace commensurate with the political, economic and social development of Africa, to develop African telecommunication networks and services in a concerted, planned and integrated manner. One of the major problems of PATU associated with the development of the PANAFTEL network is lack of financial resources. The financial situation of the Union is briefly described below.

The budget of the Union is funded by contributions of its Member States. The financial performance of the Union has not been good for a number of years. Member States owe the Union a substantial amount of money in arrears of contributions accumalated for a number of years. Consequently, the General Secretariat has been unable to implement fully its programme of activities.

One lesson which can be learnt out of this situation is that the revenue of the Union should be diversified i.e. it should not depend on contributions of its members only. It is proposed that PATU should be allowed to initiate regional commercial projects and be allowed to run them. The Union should be assisted by Member States and international institutions in establishing at least the first regional project which could be regarded as a seed project for other projects because the establishment of the other projects will be funded partly from profits of this first project. In this way PATU would play the role of UNDP and ITU for the PANAFTEL projects, the major difference being that the funding and the execution of the projects would then be done by an establishment created by African countries for Africa. With better financial position, PATU would be able to attract the best personnel from the open market and this would in turn enable the Union to undertake its mission effectively.

3. Recommendations

3.1 Countries should accept the concept that access to Modern Information Technology is a Human Right and hence the PANAFTEL network should be planned and implemented in such a way that the network moves to where people live rather than people moving to look for the PANAFTEL network.

3.2 The second generation PANAFTEL network should be planned and implemented using the most modern technology which meets the service demands of the region.

3.3 The implementation of the second generation PANAFTEL network should commence by the installation of sub regional transit switching centres and their inter-connecting links in the upper layer of the PANAFTEL network, using both satellite and terrestrial/submarine systems.

3.4 African countries should as far as possible use hierarchical routing for routing intra-African traffic in order to provide an economic traffic routing for their subscribers who should in turn benefit from reduced tariff.

3.5 African countries should review their respective telecommunications master plans and identify areas where mobile and fixed satellite services could be used in order to accelerate the growth of telephone penetration ratio.

3.6 African Administrations should use the concept of manufacturers taking responsibility for their own products as far as maintenance of the PANAFTEL network is concerned, using as far as possible local manpower under their supervision. This concept should be included in supply contracts of equipment.

3.7 African countries should establish national data banks which could be used for national management information system and release it to PATU for the purpose of creating regional data bank to be used for regional management information system.

3.8 Administrations should invest more in manpower development and should recruit keen students from academic institutions in order to create a sufficient bank of African experts capable of exploiting MIT and use it to establish telecommunications industries which will reduce drain of foreign exchange and increase telephone penetration ratio.

3.9 All African countries should continue giving financial support to the RASCOM and above all use its services.

3.10 African countries should give financial support to Africa One and then use its service when the implementation of the submarine cable project is completed.

3.11 Countries in the North Africa sub region and the Republic of South Africa should be included in the PANAFTEL network.

3.12 In view of the increasing difficulties in obtaining foreign aid for telecommunications financing, African countries should look for new sources of financing at national level.

3.13 Foreign aid for the development of regional telecommunications should be channelled through PATU and foreign establishments in regional telecommunications should work within the framework of PATU.

3.14 PATU the co-ordinator of PANAFTEL projects, should be strengthened financially through its involvement in running at least one regional commercial enterprise in telecommunications, in particular, the management of the upper layer of the PANAFTEL network.

3.15 African countries and the world community should assist PATU to establish at least one regional telecommunications enterprise which could be regarded as a seed project for other regional projects.

3.16 The restoration of the PANAFTEL Steering Committee, composed of OAU, ECA, RASCOM, Africa One, five sub-regional economic groupings and PATU whose terms of reference is to monitor progress and issue guidelines for further projects activities.

3.17 The establishment of the PANAFTEL projects co-ordination fund to be managed by and for starting up the PANAFTEL Steering Committee. African countries and the international community shall be requested to contribute to it.

4. Conclusions

The implementation of the above recommendations will produce the following results :

(a) The performance of the PANAFTEL network would meet its objectives faster and would generate revenue to support the development of a regional telecommunications infrastructure needed to support the African Economic Community.

(b) PATU, the regional organisation which co-ordinates the activities of the network would be strengthened financially and technically, and would be a strong regional force recognised by international community for its contributions in the telecommunications sector.

(c) In the long run Africa would be in better position to participate in the development of MIT products needed by Africa and the world community and in this way save foreign exchange and increase the telephone penetration ratio of the continent.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 30-E
16 April 1996
Original: French

For Information/Support

Agenda item: 1.2 **PLENARY MEETING**

SOURCE: PAN-AFRICAN TELECOMMUNICATIONS UNION

TITLE: ROLE OF REGIONAL AND SUBREGIONAL ORGANIZATIONS

A Introduction

1 Organizations always respond to the need to defend and promote the common interests of a country, a group of countries or a continent. Accordingly, they are either national, regional or subregional. Whatever their level, they imply for their members the transfer of certain national prerogatives to a common structure. In conformity with the goals and objectives they have set for themselves these organizations strive, under well-defined conditions, to harmonize policies, to pool and exploit the material, intellectual, cultural and economic resources of their members, and to search for additional resources and areas of cooperation.

B Background

2 With the advent of national sovereignty in most African countries in the early sixties, it became clear that common structures for dialogue and development would be essential in order to achieve the vitally-needed integration of the continent. Made up of numerous States with different but essentially low levels of development, Africa could not genuinely aspire to development without first ensuring the integration of its national economies. In a world of large-scale economic and strategic alliances that excluded Africa, this was the only viable solution. Hence the birth of the OAU and many other regional, subregional and specific organizations.

3 These organizations are generally either economic, or specialized and technical, the Pan-African Telecommunications Union (PATU) belonging to the latter category. They were created in the wake of a commitment by the African political leaders to the individual and collective promotion of economic and social development and the integration of the African economies with a view to enhancing self-dependence and fostering endogenous and self-sustained development. Thus, their purpose is to help to attain the objective of self-sufficiency within the framework of

endogenous development. For specific sectors considered to be of special importance, technical institutions such as PATU were created.

Its role is to harmonize development policies in the telecommunications sector and to give an impetus to that development. Article 52 of the Treaty Establishing the African Economic Community stipulates that "Member States shall take all necessary measures to prepare and implement joint scientific research and technological development programmes", and in Article 63, paragraphs a) and b), the Member States undertake to:

"a) develop, modernize, coordinate and standardize their national telecommunications networks in order to provide reliable interconnection among Member States;" and

"b) establish a Pan-African Telecommunications Network and ensure its utilization and maintenance".

These fundamental objectives can only be attained through permanent and efficient regional and subregional structures.

C International context

4 In a world which is developing around hubs of economic activity, Africa's presence is sorely lacking. Africa seems destined, in this emerging world order, to be a mere consumer. This trend must be reversed, for it is essential that Africa should meet the information challenge.

It is interesting to observe that the frequently-mentioned cooperation axes do not include Africa; and yet individually, these African countries themselves connect or express their wish to connect with one of the hubs. With its vast material potential and human resources, Africa can and must rely on itself to create and sustain the elements necessary to its integration while at the same time developing a concerted policy of cooperation in support of that effort.

D Performance of the organizations

5 The reason why the existing organizations have not, for the most part, been able to attain the objectives set for them, is that very often they have not been given all of the material and human support and confidence they need. Moreover, in spite of all the resolutions and the grand declarations, which have remained purely theoretical, the political will has also essentially been lacking.

6 If Africa wants to occupy the place it deserves in the future, it is essential that it should assume its responsibilities and take all of the necessary measures. This means, in particular, analysing the profusion of different bodies and reorganizing them in a more rational way, eliminating some of them and restructuring others to make them more efficient. The introduction of mechanisms to ensure more effective interaction between regional and subregional entities is also essential.

E Role of the organizations

7 Before the role of the African organizations can be strengthened, it is above all essential that the Africans should have full confidence in their institutions. This confidence would ensure that the countries which agree to second their officials to such organizations would choose them sensibly, according to their true skills and their vision of the management of Pan-African affairs. It

is also essential that stricter control should be maintained over the established programmes at the level of the deliberative bodies of the institutions. These established programmes must be coherent, their aims must be precise and their implementation properly followed up. If they are to be efficient, the bodies must be flexible and manageable, i.e. they must not necessarily be composed of politicians, but of **high-level** officials capable of orienting and supervising their activities. The results must be assessed rigorously, taking due account of the means made available.

8 At the international level, the African institutions must act as an interface between the international organizations and, in particular, between the United Nations and the Member States. They must at least be involved in subregional and regional projects with technical and material assistance from other international organizations, if not responsible for their management. The various resolutions adopted by the Conferences of Harare (1990), Buenos Aires (1994) and Kyoto (1994) have placed particular emphasis on the role of regional presence, i.e. of the regional organizations, and on the need to strengthen those organizations. H.E. Mr. Robert Mugabe, President of the Republic of Zimbabwe, made this point very clearly in his opening address at the Harare Conference. Moreover, it would be entirely superfluous to introduce other mechanisms to follow up the implementation of the decisions adopted by the different conferences, a task which should logically go to the organizations responsible for the management of regional projects. Every bit as important is the need to harmonize the African positions at international conferences.

9 In view of the increasingly marked liberalization of national economies, the association of the private sector with the actions of the intergovernmental organizations must be effective in order to strengthen the role of those organizations.

F Conclusion

10 Before they can be implemented in any concrete form, these ideas should be given more thorough consideration by the Conference. This second Conference on the development of telecommunications in Africa must also clearly define the process of rehabilitation of the different regional bodies.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 31-E
16 April 1996
Original: French

For Action

Agenda item: 2.2 **PLENARY MEETING**

SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU

TITLE: MANAGEMENT INFORMATION SYSTEM (MIS) - ONGOING ACTIVITIES IN AFRICA

Background

Programme No. 11 of the BAAP (Buenos Aires Action Plan of the BDT): Information services, aimed at establishing a detailed and comprehensive database with broad coverage of the telecommunication sector, in order to enable the BDT to offer a better range of services and to be more responsive to the information requirements of its members. Certain publications concerning indicators, such as the "*World Telecommunication Development Report: information infrastructures and world telecommunication indicators*", are already well known.

The ITU is helping countries in their efforts to improve the use of indicators and of management information systems in Africa. This document summarizes a technical proposal by the BDT, "*Système d'information pour l'amélioration de la gestion technique du réseau, de l'acheminement du trafic et de la qualité de service*" ("Information system for the improvement of the technical management of the network, traffic routing and quality of service"), as well as the actions under way.

Purpose of this document

The aim of this document is to stress the value of indicators as decision-making tools at different levels (political, technical, operational) as well as to provide a summary of the work done in Africa. Mention is made of the role of management information systems in the assessment of quality of service (QOS) and network performance (NP).

Management information system (MIS)

1 Management and measurement of the performance of an enterprise

Company management consists in achieving predetermined objectives through the efficient use of the material, human and financial resources with which the company equips itself in order to carry out its tasks. Information must be considered a necessary management resource on the same basis as the organizational resources referred to above.

The term "management" carries the connotation of performance as a basis for assessing the results of company activities. Performance indicators are used to measure the performance of an enterprise. They may take two forms: evaluation of the result achieved or evaluation of the objective.

In the telecommunication sphere, many African administrations/enterprises have adopted a classification of indicators based on the following main fields of activity: *finance and management, marketing, production, traffic and quality of service, human resources, logistics.*

The management information system (MIS) may be defined as the range of ways and means of assembling the necessary management data and ensuring the dissemination of information obtained from the processing of such data.

2 Management information system (MIS) and information technology (IT)

Most executives agree that information is becoming a strategic business asset and that a worldwide "information revolution" is under way. However, it is a long way from awareness of the new role of information to the development and concrete implementation of an efficient management information system.

Management information systems are frequently treated as an information technology problem involving the selection, installation and efficient utilization of appropriate hardware and software. But this is only one aspect of the problem. Information technology is a key factor in determining what type and quantity of information a company will be capable of assembling, processing and analysing. However, the choice of the information needed to prepare and take decisions does not lie with the computer specialist, but rather with the user of information. Company managers are the users of information!

3 Company managers, the users of management information systems in the decision-making process

Company executives need information in order to take decisions. The quality of the decision will depend on the quality and relevance of the information available.

The criteria for selection of a firm's performance indicators will depend on current management concerns. The list of indicators to be used by managers will not therefore be immutable and is bound to change over time, in accordance with their needs.

New indicators may be developed when it is thought necessary to identify certain problems or highlight certain aspects. Similarly, indicators may be modified or abandoned if they are found to be no longer relevant after a certain period of observation.

4 Indicators, ITU publication, other sources

There are a number of possible sources for the definition of indicators. One of the best sources for performance indicators at the international level is the ITU publication referred to above. Other external sources may be provided by other activities of the Sector or by regional and subregional organizations. At the internal level, the needs of the organization's various units will give rise to the establishment and definition of the indicators required for decision-making. The technical proposal mentioned above includes examples of the different indicators needed for technical network management, together with their sources.

5 Benchmarking concepts

Strategic planning is the basis for company strategy to face the challenges of the future. Exclusive reliance on "general framework programmes", with no real penetration of the enterprise, can be avoided. What is needed is a process capable of being applied by the managers of any organization in order to improve their respective areas of responsibility, thereby enhancing the quality - and possibly also the competitiveness - of the organization.

All levels of management must be involved in benchmarking and can benefit from the experience by learning how to devise improvements and implement them at a tactical level. As their name suggests, most strategic planning tools are designed for strategic purposes only. They take little account of implementation and do not really tell managers what to do. Benchmarking is not a strategic planning tool in itself, but fits into the strategic planning process at the interface between planning and execution.

In fact, benchmarking involves two aspects: proposing goals on the basis of external and objective standards, and learning from the experience of others. Learning how much, and perhaps even more importantly, learning how. In the field of business management, it is usually more valuable to understand **how** a given company has achieved its results than to come up with quantified measurements. Thus, the purpose of benchmarking is to **learn**. In practice, benchmarking is used to give organizations a competitive edge and to enable them to outperform their competitors. In short, whatever form of benchmarking is used, the aim is to encourage managers to look further afield, i.e. to observe their competitors or other companies at the top of their category, and to take advantage of the collective knowledge of those organizations in order to strengthen their own. Benchmarking therefore requires information, and the telecommunication indicators published by ITU are a valuable source of such information.

6 Setbacks in the use of indicators or in benchmarking

The use of indicators in the decision-making process, at the policy and operational levels in some cases and at the strategic level in others, possibly accompanied by benchmarking exercises, is of fundamental importance to company executives. It is necessary for them to learn the decision-making process on the basis of information, indicators and other more sophisticated processes such as benchmarking, for the sake of the efficient management and improvement of their organizations.

When indicators or benchmarking studies are used unsuccessfully, the failure in most cases is due not to the impossibility of gathering data, but rather to the fact that **the managers, having spent good money to obtain the information, DO NOT USE IT to introduce positive changes on the basis of what they have learned.**

The management information system as applied to quality of service (QOS) and network performance (NP).

One of the objectives of the Buenos Aires Action Plan (particularly Programme No. 7 concerning improvement of maintenance) is "to improve the maintenance organization, including the Management Information System (MIS) designed to monitor quality of service, handling of customers' complaints and fault repair, and to improve material and spare-parts management in developing countries, as required to reach the quality of service (e.g. call completion rates, fault repair time) presently achieved in developed countries". In the context of the implementation of this programme, many African administrations/enterprises have adopted a classification of indicators based on the following main fields of activity: **finance and management, marketing, production, traffic and quality of service, human resources, logistics**. The MIS applied to the management of quality of service (QOS) and network performance (NP) is that part of the system involving information and indicators classified under the heading of Traffic and Quality of Service.

1 Definition

Quality of service (QOS) is a very broad concept which covers a wide range of aspects and measurements concerning network performance. It is defined as follows:

"*The collective effect of service performances which determine the degree of satisfaction of a user of the service*".

Network performance (NP) is an element of quality of service. It provides a graduated definition of the "technical component" of quality of service measurements, and is defined as follows:

"*The ability of a network or network portion to provide the functions related to communications between users*".

A large number of measurements and parameters are common to both QOS and NP. It is frequently difficult or even impossible to determine whether a given measurement relates to QOS or NP unless the points of measurement, i.e. the customer component and the service provider component, are defined.

One of the tasks to be carried out concerns identification of the measurement values to which the user is most attuned and which are to constitute the QOS indicators. However, the most important problem is that of determining the value which satisfies the user, i.e. the value of the objective, while meeting the economic requirements of the administration.

As the perception of QOS may vary considerably from one country to another, it is important to have available and to apply international standards/recommendations such as those of ITU-T.

2 Approach to MIS implementation in Africa

Most African telecommunication administrations do not have the information they need for the efficient planning of their activities. Given the fact that the individual countries have not defined properly structured procedures for the virtually real-time collection of basic telecommunication data, it does not seem possible for them to take timely network management decisions based on factual information about the situation.

As long as managers and decision-makers are not given the benefit of established procedures for obtaining essential information on which to base their decisions, both investment and endeavours in other areas of telecommunications will be of only marginal value.

The approach proposed by ITU consists in implementing the MIS simultaneously at the national, subregional and regional levels, while giving higher priority to its establishment at the national level; efforts to standardize the definition of indicators, the measurement method and the method of calculation will facilitate gradual integration at the subregional and regional levels.

3 The ITU has completed or undertaken the following activities:

a) Preparation of a handbook on technical management of telecommunication networks and monitoring of the parameters of quality of service and network performance. The handbook was published by the Telecommunication Development Bureau (BDT) in July 1993 and circulated to all African administrations in 1994. In addition, two seminars have been organized by the BDT, in Yaoundé (June 1994) for French-speaking countries and Nairobi (April 1995) for English-speaking countries. Those two technical meetings provided a basis for harmonizing administrations' views on the important question of defining and standardizing procedures and practices relating to technical management of the network, which is a necessary precondition for MIS implementation at the national, subregional and regional levels.

b) Expert missions: support provided to a number of administrations in the region to help them establish their MIS. Mention may be made, *inter alia*, of action taken in Cape Verde, Burkina Faso, Chad, Congo, Uganda, Lesotho, Madagascar, etc.

c) Pilot project for MIS implementation

The establishment of national MISs in the context of individual assistance missions, without subregional or regional harmonization, may hamper communication and cooperation between the administrations themselves, on the one hand, and with international organizations (including ITU), on the other. Accordingly, with a view to harmonizing the MISs and facilitating the exchange of information, the BDT/Regional Bureau for Africa has included in its work programme, under the Buenos Aires Action Plan of the BDT, the implementation of a telecommunication MIS pilot project in Benin (SIGTEL), with the aim of preparing a framework document and implementing an MIS prototype.

Dissemination of the prototype will be preceded by a regional seminar (or several subregional seminars) for the purpose of explaining its use and harmonizing MIS implementation projects among the administrations of the region.

Conclusions and recommendations

Conclusions

- The ITU's activities in Africa have served to highlight the fundamental importance of a management information system within telecommunication enterprises.
- They have also served to underline how important it is to African telecommunication managers to be able to base their decisions on objective assessments of network performance, and have drawn attention to the major efforts made by the administrations of the region in respect of MIS implementation.

- Following in the wake of numerous specific assistance projects for the benefit of certain administrations in the region, the MIS pilot implementation project for Africa, which is now in progress, is aimed at providing all countries with an MIS prototype to help them in their efforts to implement plans for improving quality of service and network performance.

Recommendations

- It is recommended that managers learn to take decisions on the basis of indicators and to use a modern management information system. They will then be in a position to provide the input and undertake the work needed for the construction of an MIS, which should cover all aspects of management (technical and administrative). Management workshops or seminars should be organized for that purpose.
- It is further recommended:
  - at the national level, that each administration should introduce its own management information system;
  - at the subregional and regional level, that an MIS project which takes account of national systems should be devised with a view to:
    1) enhancing subregional and regional network performance;
    2) improving network utilization and efficiency;
    3) reducing operating and investment costs, which will result in lower tariffs and a consequent improvement in the competitiveness of regional operators.

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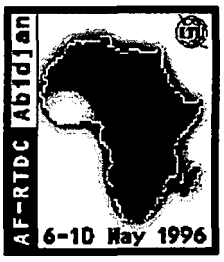

AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 32-E
16 April 1996
Original: English

For Action

Agenda item: 3.1 **PLENARY MEETING**

SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU

TITLE: AFRICA TELECOMMUNICATIONS FINANCE COLLOQUIUM

I Overview

II Working groups conclusions

III Recommendations

PART I: OVERVIEW

INTRODUCTION

1 The Africa Telecommunications Finance Colloquium was organized by the BDT in response to a request made by the preparatory meeting for the AF-RTDC/96 held in Tunis on 20-24 November 1995 "to address with all partners concerned the critical issue of financing telecommunications infrastructure in Africa".

2 The Colloquium took place in Abidjan, Côte d'Ivoire, from 25 to 29 March 1996 at the kind invitation of CITELCOM and the Government, and was inaugurated in the presence of His Excellency, Mr Akele EZAN, Minister of Economic Infrastructure. A considerable number of international organizations and companies participated, some also provided fellowships and hosted events.

3 More than 200 participants (not including ITU staff) came from 40 African countries, 20 multi/bilateral agencies, 25 international telecommunication companies, and 30 private sector enterprises including banks, local service providers, academic institutions and the media

participated in this important event. Twenty-seven experts from the areas of telecommunications, finance, economics and investment made excellent presentations, thus building a platform for the future of financing in Africa from multiple and varied sources through strategic partnerships.

4 This document highlights the purpose and conclusions of the Colloquium. **It includes recommendations to be considered by the AF-RTDC/96.**

5 The **final report** will synthesize and integrate all presentations, and will include the colloquium brochure "Africa needs telecommunications financing" highlighting major issues, the conclusions derived from 14 working group sessions, and the full list of participants. This report will be available in the second quarter of 1996. Various presentations are available upon request.

PURPOSE AND DYNAMICS

1 The Colloquium (as outlined in the Programme) has clearly achieved its stated objectives "to provide appropriate, well-consolidated and innovative recommendations and proposals on the critical issue of financing..., and to create the occasion for interested international telecommunication corporations and local enterprises to enter into and cultivate contacts with African finance executives and telecommunication decision makers towards joint schemes of partnership across the whole spectrum of financial possibilities" based on input from participants, to the African Regional Telecommunication Development Conference (AF-RTDC) to be held in Abidjan, from 6 to 10 May 1996.

The Colloquium also gave the opportunity to interested international telecommunication corporations and local enterprises to enter into and cultivate contacts with African finance executives and telecommunication decision-makers towards joint schemes of partnership across the whole spectrum of financial possibilities.

2 New sources and innovative modalities of financing were explored, stimulated and encouraged.

3 The day-to-day dynamics were organized along the following themes:

- Factors affecting the future of finance in Africa.
- Financial institutions, resources and strategies.
- Financial engineering: projects and prospects.
- Financing of regional projects and technical cooperation.

The working group subjects under the above day themes dealt specifically with:

- Practical steps and priorities to meet African funding needs.
- Financing of rural telecommunications.
- Problems encountered in negotiations with financing agencies: viability of projects; appraisal methods; risk management in various debt/equity schemes.
- Financing options: joining network operators; creating enterprises in the competitive sphere
- Financing of new regional projects.
- Financing of technical cooperation programmes.

4 A considerable degree of consensus was obtained in view of the complex nature of the subjects and the variety of interests and backgrounds of the participants, thanks to their collective and individual efforts at finding common ground in each day's concluding plenary sessions - an example of the prevailing partnership spirit during the Colloquium.

PART II: CONCLUSIONS OF WORKING GROUPS

During their working meetings, the participants in the Colloquium reached conclusions on the main issues raised by the financing of telecommunications, which have been consolidated and are summarized below under six main headings:

I Factors affecting the future of finance in Africa

Having studied all existing situations in Africa, from State monopoly to full liberalization of the sector, the participants concluded that it would be necessary to:

- redefine the roles of the different players in the telecommunication sector (State, operators, regional and financial bodies, etc...);
- guarantee sound management of public telecommunication operators by improving their in-house management capability;
- manage the impact of rapid technological development;
- limit all possible risks envisaged;
- mobilize local saving and mix with international funds;
- bring viable projects to the table and shorten the negotiation period.

2 Financing of rural telecommunications

The participants recognized the importance of bringing together universal service as the long-term goal and universal access as an intermediate goal, in order to bring telecommunications within easy reach of all Africans. Considering that the first step should be to promote development of the national economy by integrating rural telecommunication development, with the agreement of all the stakeholders, the participants recommend:

- Establishing regulations to attract investors with long-term views through granting of concessions.
- Developing rural-specific techniques which tend to reduce financing required.
- Linking the granting of licenses to rural development.
- Establishing rural telecommunication development funds for rural development.
- Emphasizing the financing of pilot projects and the introduction of new technologies therein (such as terrestrial and satellite cellular, LEO).

3 Financial institutions, their resources and strategies

Given the latest trends in institutional development bank policy as regards the telecommunication sector, the participants urge that these banks' role in the future be clarified (e.g. through guarantees, cooperation with ITU/BDT), as well as with the ever-increasing role of emerging telecommunication shareholders, such as international specialized agencies (BDT, PATU...) and international or private finance institutions (IFC, investment funds, WorldTel, private banks...).

After considering in detail all the issues which impact on opportunities for financing by financial institutions (within time-frames commensurate with rapid telecommunication development), the participants recommended a series of measures to alleviate the risks which financial institutions may

perceive as obstacles to their participation in investment plans, and to hasten the process of negotiation and of securing such participation, namely:

- State commitment to a clear policy for development of the telecommunication sector.
- Submit projects founded on detailed studies, taking into account the whole network and its future development, determined through credible demand forecast models and data, and recommending a judicious choice of technologies.
- Adopt, for the telecommunication companies a commercial management structure free from any political influences and interference, thus allowing them to: negotiate directly with sources of funding, freely utilize revenue for debt-servicing and reinvestment and manage liquidities in such a way as to limit the risks associated with exchange rate fluctuations. The participants pointed out that the introduction of this type of management structure means that particular attention needs to be given to training and human resources development programmes within the companies.

4 Financial engineering: projects and prospects

A Creation of companies in a competitive sphere

To attract the necessary capital, shareholders or investors, the participants reiterate the importance of:

- The national regulatory and legal framework (e.g. investment codes and competition laws). To this end, the national framework must be appropriately adapted to new national macroeconomic trends and promote a business - and investment - enhancing environment.
- The national political and policy acceptance of the business and competition environment in the country, and stress the importance of increasing national capital in the capital stock of companies in the private domain.
- Having a financially astute regulatory framework for the telecommunication sector, which will unambiguously define the areas and aspects of competition and conditions for entry (tariffs, interconnections), and the reinvestment incentives to be delivered.
- The positive impact of establishing a credible and reliable banking system.

B Joining national network operators in various debt/equity schemes

The participants agreed that the two main expected objectives of partnership agreements are:

- mobilization of new and existing resources, involving recourse to foreign or private national investment
- improvement of know-how, involving recourse to operators with proven experience in the sector.

The participants also analyzed the advantages and drawbacks of two types of partnership, namely 1) joint ventures and 2) BOT (build, operate and transfer) and derivatives thereof. They concluded that no given type of partnership association may be recommended as being the most suitable and that the choice would have to take account of the actual characteristics of each country.

The terms of any such partnership agreements should seek to ensure:

- Clearly defined objectives.
- Reasonable implementation period.

- As few constraints as possible for the associated operator so that it does not need to fear the possible risks.

5 Technical cooperation

The participants believe that technical cooperation should deal primarily with the following two items:

a) Training:

To help in developing local and regional training centres so that they can give training commensurate with the needs of the telecommunication sector in terms of technical and management expertise.

b) Consultancy:

To help in setting up consultancy services in Africa, so that they may advise on clear policies for the development of telecommunication sectors in Africa, having regard to national realities.

The participants recommend that objectives should be set for the planned technical cooperation before approaching cooperation agencies, so as to avoid accepting aid which is not suited to actual requirements.

6 Regional projects

Having received the various existing or planned regional projects, participants formulated the following recommendations:

- The coordination of all projects at three levels should be ensured, in order to avoid duplication and to take account of existing projects
  a) at the level of States, through ITU and technical, economic and financial regional organizations; to this end, the terms of reference and composition of the coordination structure established for the AFRICA ONE project are being updated;
  b) at the level of suppliers, a concertation and coordination mechanism is desirable in order to submit complementary projects;
  c) at the level of financing institutions, actions should be coordinated so as to achieve greater synergy in the implementation of projects selected according to priorities set in agreement with the countries concerned.
- The various financing mechanisms of such projects should be developed, together with the arrangements for financial participation of African States and/or operators, in such a way as to avoid adding to the debt-servicing burden in the countries concerned.
- Analysis of the different projects should take into consideration the interests of the various parties, particularly in the case of commercial ventures in which financial and economic considerations are paramount.
- The RASCOM organization should focus primarily on providing its members with the necessary space resources for development of their telecommunication networks; in so doing, it should remain alert to developments in all regional projects for the development and integration of African telecommunication networks, irrespective of the technology involved.

- Particular importance should be attached to training and development of the human resources required for future operation of regional systems. To this end, technical assistance is essential. Such assistance must develop rather than replace indigenous resources.

PART III: RECOMMENDATIONS

This summary of desirable actions to be submitted to the AF-RTDC integrates the conclusions derived from the Colloquium with the evolving BDT programming (resulting from the Buenos Aires Action Plan (BAAP), the Kyoto Plenipotentiary Conference and the ongoing work of the ITU-D Study Groups). Specific linkages have been developed between the "BAAP Programme 1.Finance"[1] and the Study Group 1 Question 4/1 "Policies and ways for financing telecommunication infrastructures in developing countries".

Three groups of recommended actions are distinguished hereunder, i.e., those concerning **development partners** already active or interested in being active in Africa, those addressed to the **countries** concerned and those to be considered by the **BDT** directly.

THE COLLOQUIUM PARTICIPANTS SUPPORT DEVELOPMENT PARTNERSHIPS AND ENCOURAGE THEM:

1 To make realistic assumptions on the strength and willingness of the many institutions that may be considered as potential sources of finance for Africa.

- To convince multilateral and bilateral institutions [amongst the large institutions, the World Bank (excluding the IFC) and the African Development Bank] not just to prefer merely giving policy advice with emphasis on privatisation, regulatory and tariff reforms, but also consider direct lending. The development partners should impress on those institutions that their impact through policy formulation and reform could be greatly enhanced by concurrent direct lending, as telecommunications, in the group of least developed countries, is expected to produce the largest multiplier effect for economic and social development
- To assist, with the BDT, **in attracting other interested financial institutions as well as intermediary agents** onto the African telecommunications scene; (some of which have already played an active and constructive part during the Abidjan Colloquium). Most of these institutions are established in the private sector and are entering the telecommunication sphere with a wealth of experience accumulated in other areas of the economy.
- To assist, with the BDT, in developing **new configurations of joint financing**, of management and revenue sharing schemes, and of temporary licensing arrangements for providing services which are being proposed and have been piloted, (examples have been drawn particularly from Asia and some of the more economically advanced African countries). The BDT is evaluating their comparative merits and demerits in the context of concrete country situations and preferences and will make the results available as financial policy formulation and assessment case studies to be used in various applications[2].
- To assist, with the BDT, regarding **regional projects** presented, in the various consortia such as those presented and reviewed at the Colloquium. These included Africa One, Afrilink, Flag, Safe and Worldtel as well as a brief presentation of Eutelsat's existing

[1] refer to Doc. AF-RTDC No.45: BAAP Programme F.1 - Financing

capacity for Africa, and to assist the BDT in cooperating with the African regional and sub-regional organizations to pursue efforts in promoting cooperation among these different initiatives from both a technical and economic point of view.

- To give top priority to the **financing of rural telecommunications** (as at the Colloquium where many projects and models were presented which would satisfy the criteria of affordable cost, robustness, and an acceptable rate of return on investment) and to assist with the BDT to compile the information in case studies, make use of these in various workshops and various fora, to concurrently discuss ways, and means with manufacturers, suppliers and procurement agents by reducing installation, operation and unit costs, with particular focus on determining unit costs in terms of the collective use made of the service by the rural community.

THE COLLOQUIUM PARTICIPANTS WISHED TO RECOMMEND TO GOVERNMENTS AND ADMINISTRATIONS:

2 To recognize the vast financial needs required to lift African telecommunication operations and services to more acceptable levels in the world-wide context and to encourage the AF-RTDC to take **ambitious and practical decisions** to stimulate the financial flows for the benefit of telecommunication investments in Africa.

- To recognize that **sound financial management structures and operations** are the precondition for attracting investment from the reallocation of existing resources and from new sources, both private and public, out of local savings and world wide.
- To encourage their PTT Administrations to adopt a business-like approach of financial policy and strategy-making and to have management that is open to public scrutiny. In the national context, to be seen as a well-performing user-oriented public service and as a productivity-conscious enterprise, the **image and reality of transparency, customer concern and productivity must be created in the public view**.
- To recognize that within the context of the global tendencies towards free capital flows and telecommunications liberalization, it is imperative for Africa not to remain on the sidelines of the combined technology, convergence and competition drive. **Africa has the potential to join the other continents in growth and trade expansion.**
- To incorporate in their financial strategies the GATS implications which are creating a **new international trade policy environment**. The financial and economic effects resulting from the removal of investment restrictions in telecommunications across borders are likely to be positive. The effects of the GATS within the telecommunication sector (given the pronounced backlog of unsatisfied demand) will have a multiplier effect on other economic sectors, judging by the decisive correlation between telecommunication penetration levels and economic growth.
- To coordinate in a coherent approach to the WTO and other critical negotiations with appropriate **ITU/BDT support and guidance especially for the benefit of the least developed countries as a group.**

AS THE COLLOQUIUM HAS HEIGHTENED THE APPRECIATION OF THE TELECOMMUNICATION DEVELOPMENT BUREAU'S ROLE IN RESOURCE MOBILIZATION AND MANAGEMENT TASKS IN AFRICA THE COLLOQUIUM PARTICIPANTS REQUEST:

3 That the BDT be responsive as demand is received from the countries:

- To take appropriate measures in order to be able to assist countries in the formulation of their financial strategies and policies, organizational reforms and technological development, with full respect for the specific telecommunication sector structure that countries wish to implement.
- To offer **financial and investment planning assistance** in particular via expert missions, country and inter-country workshops, case studies and guidance material, and counselling (by BDT staff in Geneva and in the region) and to respond with speed and competence to requests from telecommunication operators and service providers for guidance, information and contacts in a good "clearing house" fashion.
- To offer **expert meetings** that will **focus on the multiple practical new tasks confronting African financial telecommunication managers** in the current **transition period**. Keeping current awareness of competition, commercialization and collaboration with the private sector. Training will be offered to top-level managers in charge of cash flow, pricing policy, bill collection, marketing, costing, capital budgeting; negotiations with promoters, investors and banks as well as procurement managers and those in charge of ensuring profitability and good performance including the supervision of partners/private sector firms.
- To facilitate **partnerships with and among public and private entities**, in line with its objective to strengthen telecommunication development, including more business-oriented modes of operation in response to user needs and demand.

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TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 33-E
17 April 1996
Original: English

For Information/Support

Agenda item: 3.1 **PLENARY MEETING**

SOURCE: CANADA

TITLE: THE ROLE OF DEVELOPMENT LINES OF CONTRIBUTION (DLOCs) IN FINANCING RURAL TELECOMMUNICATIONS PROJECTS IN LATIN AMERICA

Abstract

The mandate of the bilateral program of the Canadian International Development Agency (CIDA) for financing international development assistance is generally restricted to providing funding for appropriate programs and projects to partner countries on a government-to-government basis only. It does not generally include funds directed to private or parastatal organizations, in which categories many international telecommunications organizations find themselves. In addition, in today's economic context, there is a tendency for international development agencies to move away from the funding of telecommunications infrastructure projects in developing countries on the basis that such ventures can be profitable, and therefore should rightly be within the purview of the private sector. The fact remains, however, that the development of the telecommunications sector, in the less economically attractive rural areas, remains socio-economically beneficial to developing countries, and many of them are interested in vigorously pursuing the development of telecommunications infrastructure. The use of Development Lines of Contribution (DLOCs) to generate counterpart funds is a mechanism whereby CIDA can provide funding for telecommunications projects while respecting its mandate that its efforts be directed toward poverty alleviation and that financing must be on a government-to-government basis. It is also demonstrated that funding projects in this manner confers a triple benefit on the recipient country. A fourth benefit may accrue to the donor country.

Background

CIDA first started using DLOCs in the telecommunications sector for generating counterpart funds to be used for local poverty alleviation in Latin America in 1987. Since then, this method has been used for further initiatives in Peru as well as in Ecuador, Bolivia and Costa Rica. A simplified description follows of how this mechanism functions:

– A recipient country telecommunications entity (parastatal or private firm) negotiates a contract with a Canadian supplier of telecommunications equipment and/or services on the understanding that Canada must approve the arrangement from a number of points of view, for example, developmental soundness, technical and financial soundness. If such is the case, Canada (via CIDA) will pay the Canadian supplier of the goods and/or services in Canadian funds on the condition that the recipient country telecommunications entity pays an equivalent amount of local currency into an in-country counterpart fund. This fund, which is sometimes managed jointly by the recipient country and Canada, sometimes by the recipient country alone, will be used to finance poverty-reducing socially oriented projects.

Beneficiaries - DLOCs have been directed principally at parastatals, but have also been done in conjunction with private sector companies, large and small. DLOCs have proven workable in both public and private sector conditions. Many parastatals have accessed DLOCs during the advanced stages of privatization.

Beneficiaries, or a procedure for their selection, are generally identified in MOU. The only important criteria for the selection of beneficiaries is ability to pay. In the case of parastatals, beneficiaries are typically monopoly actors in the sector chosen. Reviewing the beneficiary's ability to pay is critical before selecting the sector. For private sector DLOCs, the formal selection of beneficiaries is left up to the recipient government; however, under the standard terms of payment into counterpart funds (see below), companies incapable of coming up with a letter of credit cannot access the DLOC.

Equipment Selection - Under the Latin America DLOCs, the following criteria have been developed for approving the nomination of equipment or technology imports eligible for DLOC financing:

1) The equipment must be a priority off-shore purchase by the importer, from its approved annual procurement list.

2) The decision to purchase the equipment must be developmentally sound, meaning **technically** sound (it solves a technical problem, expands the purchaser's operations in a technically rational direction, and is technically compatible with the purchaser's existing systems) and **financially** sound (is a financially sustainable investment from the perspective of the purchaser).

3) The equipment must be available on the Canadian marketplace at internationally competitive prices. This justifies doing Canadian bidding rather than international bidding, ensuring CIDA that the DLOC is not distorting recipient country decision-making.

4) There is a suitable training component in equipment contract related to installation, operating and maintenance of the equipment as dictated by the particular conditions of each situation.

CIDA ensures that the above conditions are met by retaining the services of Technical Advisors. These advisors also help monitor the following aspects of the projects:

- that the received equipment is properly installed;
- that it is providing the required services;
- that it is maintained by properly trained staff; and,
- that it is in fact contributing to the sustainable development of the recipient country.

Latin America DLOCs retain the services of Canadian Technical Advisors to ensure that these conditions are met. With the help of the Canadian Technical Advisors, of the Canadian Embassy staff and in consultation with the recipient telecommunications operating entity, CIDA staff ensure throughout the entire project cycle that the received equipment is properly installed, is providing the required services, is maintained properly by trained staff and is in fact contributing to the sustainable development of the recipient country.

Contracting - Once equipment is selected, the Latin America approach is to allow standard commercial practice to govern the design of contracts between importers and Canadian suppliers. However, CIDA's authority is used to confirm each contract by a Purchase Order Confirmation (POC) to ensure that conditions are consistent with Canadian Contract Regulations, and, more importantly, that the procurement will be successful. To the extent possible, CIDA payments to the supplier are triggered by the importer (e.g. factory acceptances, provisional acceptance certificates, etc.). On larger and more technically complex contracts (major telecommunications systems, for example) CIDA insists on performance bonds, conditional holdbacks, and other terms and conditions that make the Canadian supplier fully responsible for delivering working, functioning, and fully installed systems. This gives CIDA a powerful role in enforcing supplier performance and ensuring that our DLOCs achieve successful technology transfer.

Conditionality - Conditionality attached to DLOCs is applied at three levels. At the macro level, on-going disbursements are conditional on the country making progress on IMF/IBRD reform programmes; a macro-economic monitor is retained by CIDA to track this. At the sectoral level, the recipient government is required to maintain sustainable sectoral policy frameworks. Finally, at the micro level, individual purchasers must maintain payment obligation to the counterpart fund; companies that fail to do so are excluded from further participation in the programme.

Types of telecommunications projects - Many, but not all, of the telecommunications projects using the DLOC/CF mechanism in Latin America have been in rural areas. Point-to-multipoint microwave radio systems have been installed in a number of rural areas in conjunction with small switching machines where required. At the same time though, some of the larger cities in areas away from the capital cities have also benefited from this mechanism for the installation of larger urban-sized switching machines coupled with satellite ground stations.

Counterpart Fund Generation - The local currency contributions generated by the types of telecommunications projects described have put substantial monies into counterpart funds. The experience of the Latin America Programme has been that DLOCs can consistently generate counterpart funds in amounts equivalent to CIDA disbursements in Canada. Furthermore, our experience is that counterpart funds can be protected from the negative effects of local currency and inflation before they are on-disbursed to local projects.

Use of funds generated by DLOCs - An example of the types of projects and the benefits resulting from counterpart funds associated with DLOCs can be taken from the Peru-Canada fund which was established in 1988.

Since its creation, the Fund has financed over 170 projects which have benefited directly 1.3 million poor people, by generating jobs, increasing agricultural production, creating small enterprises, and supporting commercialization of products. Projects are located in the poorest region of Peru, mostly in rural areas (85%) and marginal urban centres (15%).

The Fund's basic strategy is to work with those groups and communities which want to help themselves, using NGOs and community groups as catalysts and project managers. The estimated value of the work done by beneficiaries is twice the amount of the financing provided by the Fund.

Positive and lasting effects have been identified by independent evaluations:

- Basic needs are being met, community organizations are strengthened. Agricultural production in the areas of projects has increased by about 300 000 metric tons in 17 000 hectares, providing food security and reducing nutritional deficiency which, in the highlands, affects 75% of the children. Water and sanitation systems are being built (200 potable water systems and 1 200 latrines). About $10.0 M in local credit is being allocated to support the micro-enterprises of 300 000 poor families, 70 women's groups, 20 youth groups and 200 small entrepreneurs. Communities (350) are active in prioritizing planning and executing their projects and the Fund is involving over 100 NGOs and/or producer organizations in project delivery.
- The environment is rehabilitated and protected, natural resources are used in a sustainable manner in project areas. Five thousand hectares have been reforested, 4 000 hectares of agricultural soil recuperated, 10 000 hectares irrigated to secure an environment that supports long-term production.
- Production alone is not sufficient to attack the roots of poverty. The Fund also supports transformation through micro enterprises, and the commercialization of 100 000 metric tons of surpluses. Revenues are generated. The education, training and general capacity of the poor to do business is improved through specific projects. Special attention is given to women and the youth to incorporate them in the economic life and decision-making mechanisms of their community and regions.

Conclusion - The use of DLOCs and the counterpart fund mechanism has permitted CIDA to engage in international cooperation initiatives that simultaneously target two important sectors of activity in developing countries, a) telecommunications, and b) social institution building while respecting CIDA's mandate that international cooperation funding must be on a government-to-government basis. Four benefits of DLOC initiatives in the telecommunications sector carried out in the manner described are the following:

For the recipient country

1) Improvement of the revenue generating capability of a sector that is profitable, without requiring the recipient country to use hard currency;
2) improvement of the enabling environment in the recipient country for business activities and thus for attracting foreign direct investment as well as local investors;
3) generation of funds for the implementing of poverty-reducing socially oriented projects in the recipient country.

For the donor country

1) Stimulation of an important sector of domestic economic activity in the donor country.

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(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 34-E
17 April 1996
Original: English

For Information/Support

Agenda item: 2.4 **PLENARY MEETING**

SOURCE: ITU-D STUDY GROUP 2/QUESTION 6/2

TITLE: TELEMEDICINE AND DEVELOPING COUNTRIES - PROGRESS REPORT

Does telemedicine make sense for developing countries? Is it cost-effective? Can telecommunications help extend medical and health care to remote and rural areas? Who would pay for it? Should there be global standards for telemedicine?

These are just some of the questions being studied by the Rapporteurs Group for Question 6 which was adopted by the World Telecommunication Development Conference (WTDC), convened by the ITU, in Buenos Aires in March 1994. The WTDC established two new Study Groups in the ITU's Development Sector, each of which was tasked with a number of Questions. Question 6 concerns telemedicine and health care.

The Conference noted that "The widespread use of telemedicine services could allow universal health access and consequently facilitate the solution of the principal health problems connected with infectious diseases, paediatrics, cardiology, etc. particularly in areas where medical structures are inadequate or non-existing." It then assigned the following task:

"The Study Group shall:

1) Define the technologies most suitable for telemedicine's most efficient diffusion to developing countries;

2) Study the costs and benefits of different solutions taking into account the various solutions existing in the developing countries;

3) Analyse the results of pilot projects, surveys, sectoral studies, etc. carried out by the various entities involved in order to better identify the main trends in technologies used for telemedicine;

4) Foster the adoption of global standards required for systems and equipment in order to facilitate telemedicine and other social services;

5) Produce a telemedicine handbook."

Study Group 2 of the ITU's Development Sector met for the first met in Geneva in May 1995. The Rapporteurs Group for Question 6 comprises representatives from WHO and UNESCO, from the international satellite systems of Inmarsat, Iridium and PanAmSat and from the Governments of Bangladesh, Bhutan, Cambodia, Cameroon, France, Italy, Japan, Maldives, Malta, Uganda, the United States and Zambia.

In order to better understand the situation in developing countries, the ITU and Inmarsat sent a Telemedicine Questionnaire to their respective members in August 1995. The Questionnaire asks whether the country has any experience with telemedicine and, if so, what are the objectives and nature of its telemed programme, what applications and equipment are used, who operates or participates in the country's telemed programme, whether the service is commercial, public, experimental (or discontinued!), who funds the telemed service, who has access to it, whether there are policies or regulations affecting the provision of telemed services, etc.

As of March 1996, responses have been received from 58 countries, of which 39 are developing countries. In some cases, responses have been received from both a country's telecom organization and its ministry of health. The Questionnaire also encouraged respondents to include a short write-up of their telemedicine experience.

The responses have formed a valuable input to the study. The responses from developing countries show that about half have some telemedicine experience. By far the greatest amount of telemedicine experience has been accumulated in the developed countries, as one would expect, where there are a wide range of technologies and services of increasing sophistication and cost. There are nevertheless important instances of telemedicine experience in the developing countries and, as responses to the Questionnaire make clear, still others are interested in such services.

It appears that in most countries, the user does not pay for the telemedicine service, at least not directly. There are few instances of a **commercial** telemedicine service. In most countries, the telemedicine service is subsidized by the government and/or the telecom operator and/or a university and/or a hospital.

In most developing countries where there is some telemedicine activity, the experience is primarily confined to doctors. Only four countries (Croatia, Iran, Malta and Tanzania) replied that they have any policies or regulations affecting the provision of telemedicine.

A number of important issues related to the implementation and delivery of telemedicine services in developing countries have begun to bubble to the surface. For example, there is a bewildering array of different telemedicine services - telecardiology, teledermatology, tele-endoscopy, telefluoroscopy, telegynaecology, telehaematology, tele-obstetrics, tele-ophthamology, telepathology, telepharmacology, telepsychiatry, teleradiology, teletherapy, etc. among them.

From this far-from-complete list, it is possible to distinguish some broad categories of telemedicine, which might be a useful starting point for developing countries in order to assess what hardware and software they need (or can afford) for such services.

Teleconsultation - could involve a simple telephone exchange between a doctor and a patient or between two doctors. It could also involve more sophisticated computer-conferencing or videoconferencing for which the hardware and software requirements will be different and more costly. A teleconsultation could also take place over the Internet.

Image transfer - Different types of images, such as X-ray, ultrasound scans, electrocardiograms, etc. require equipment to record the image, capture, digitize and then transmit it from a remote area to centres of medical expertise. Some of the necessary equipment could be relatively simple and inexpensive, others will be much more expensive.

On-line access to databases - Here the user in the remote or rural area must have the equipment necessary to access and receive data from specialized databases which may be thousands of miles away. Such databases could be a Picture Archive and Communications System (PACS), Internet, MEDLINE, etc. The equipment necessary to interrogate such databases will generally be a suitably equipped computer (desk top or lap top), a modem and a communications device (e.g. a phone or satellite terminal). There may be subscription or access charges as well as telecom time to pay.

Telemetry - This form of telemedicine may require relatively simple monitors which might be worn by the patient and which can transmit warning signals should the monitor detect a change in vital signs. Except for the rich, this form of telemed service is not likely to be in much use in developing countries.

Telesurgery, including virtual reality - This form of telemedicine requires very sophisticated equipment indeed. Such high technology is far beyond the reach of developing countries.

Tele-education (medical, health-care training) - Several forms exist, for example, where medical students can watch on video monitors an operation as it takes place either in a different location in the same hospital or city or thousands of miles away. This would be at the high end of affordability, while lesser forms involving access to remote databases, computer conferencing with peers or professors need not involve much more than "shareware" software.

Emergency services - Ambulances, the coast guard and others may require emergency telemed services, whose requirements may vary significantly depending on the type of emergency. The European Commission is funding one such project, called MERMAID, involving about 20 European companies and institutes, which uses the Inmarsat system to provide emergency telemed services to ships at sea.

While some forms of telemedicine may be found in two or more of the above categories, the above categories capture most forms of telemedicine. And, apart from the telesurgery and telemetry applications, most of these categories are needed and are nominally available to developing countries.

Availability is one thing, affordability is another. The key for developing countries will be their own needs, what they can afford and the cost-effectiveness of the technology and services employed.

The Report of the task force is intended to help them come to grips with the most suitable, appropriate and affordable telemed services.

Developing countries with no or limited experience of telemedicine can review the experience of other countries. There are some very impressive telemedicine technologies being developed and used in North America, western Europe, Japan and elsewhere. Telepresence, telesurgery, real-time videoconferencing and virtual reality are undoubtedly technological marvels, but they are also expensive, too expensive except for the very privileged in developing countries - and most developed countries, for that matter! Most developing countries will require low-cost, relatively low-tech solutions.

From the responses to the Telemedicine Questionnaire and other research done by the Rapporteurs Group, there appear to be a number of important benefits from the application of telemedicine services, among which are the following:

Reduced travel

Telemedicine enables doctors or paramedics to consult quickly with specialists, without the cost and risk of transporting an ill or injured patient over long distances and rough terrain.

Improved consultations

Telemedicine can provide access to specialists from anywhere in the world. It allows scarce resources of knowledge and equipment to be shared by a much greater number of patients. Doctors are no longer restricted by geographical boundaries: specialists can spread their skills across continents, without leaving their own hospitals, thus saving time and costs.

Universal service

People denied medical care by virtue of their geographical isolation can begin to benefit from telemedicine as long as they have access to a satellite telephone. In the future, increasing numbers of people, especially patients in small clinics lacking the facilities of major hospitals, will be diagnosed and treated via telemedicine.

Cost savings

Telemedicine costs are falling. Countries with high health care expenditures are interested in telemedicine as a way to reduce costs and demands upon hospitals. In almost every country, more than half the cost of running hospitals goes on what are essentially hotel services. The more health care can be decentralized and administered efficiently in low-cost settings such as clinics, the less dependent patients will be on expensive sites such as hospitals.

Training and education

Telemedicine can be an important source of case study material from every part of the world. Students in one place can watch an operation being performed by a surgeon thousands of kilometres away. Operations can be recorded and played back for detailed examination. If telemedicine continues to grow, specialists will be able to track an increase in the incidence of a disease as it happens.

Reduced waiting lists

Telemedicine can help reduce hospital waiting lists if patients can be seen immediately via telecom systems.

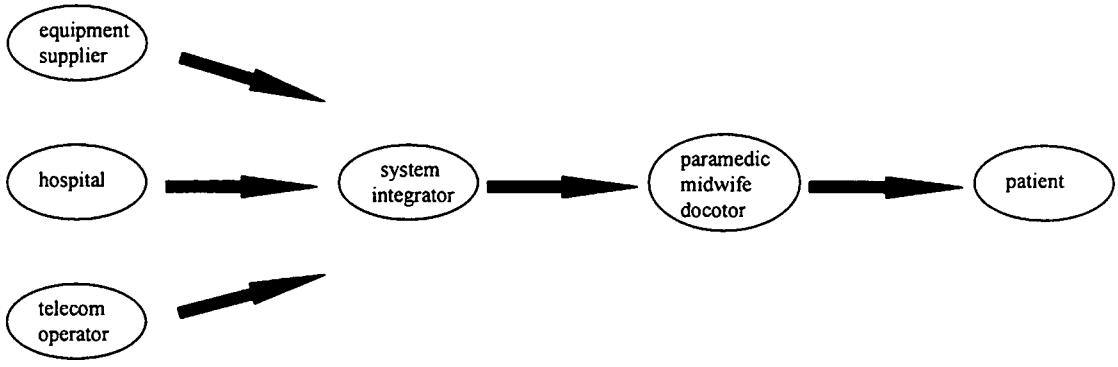
Revenues for telemedicine providers

Telemedicine is a high-tech industry, comprising equipment manufacturers and service providers, who can generate revenues from their products and services. Similarly, medical institutions, specialists and hospitals may be able to deliver services to a far wider group of people than ever before, leading to economies of scale.

Although telemedicine and telehealth have many socio-economic benefits, it is important to recognize that investing in a telemedicine and telehealth delivery system will cost something and that something will be competing for scarce resources in developing countries. External support and funding, i.e. outside the developing countries, can be contemplated, but the sustainability of the delivery system should be scrutinized carefully before committing significant capital.

In this regard, we put forward the notion of what is described as the "telemed value chain". How does the equipment supplier, telecom service provider, health care or medical service provider deliver their products or services to their client, who eventually is an end-user? How does or how should the value chain work? Is the value chain commercially viable or otherwise sustainable?

One could depict one simple configuration of the telemed value chain as follows:



Other, more complex configurations undoubtedly exist. Among the different players who could be in the value chain are the following:

- health care professionals, such as midwives, paramedics, nurses, general practitioners, physicians, medical specialists;
- other professionals involved in the broader provision of health care (managers, researchers, epidemiologists, technicians, information engineers, statisticians, etc.);
- end users (patients);
- telecom operators;
- service providers;
- equipment suppliers;
- informatics and computer suppliers;
- biomed equipment manufacturers;
- telecom and computer equipment manufacturers;
- professional associations;
- individual experts;
- universities or other academic research institutions;
- hospitals and telemed institutes;
- the Ministry of Health (or equivalent);
- regulators and licensing authorities.

Quite different value chain configurations are conceivable and how the value chain works will depend somewhat on the circumstances of each country. Nevertheless some value chain configurations will be more optimal, more cost-effective than others and what appears missing - at least from the research we have done so far - is some analysis of what could be an optimal, sustainable, cost-effective value chain configuration for developing countries.

Although there have been numerous demonstrations of telemedicine, there appear to have been few or no large scale projects to test the cost-effectiveness of telemedicine in developing countries.

Telehealth and telemed can be delivered to remote and rural areas in developing countries by at least two ways - one is via a paramedic, midwife or doctor who travels from village to village with his (or her) equipment which enables consultation and interaction with a distant hospital or service provider. The other is via installation of a telehealth or telemed service in a "telecentre" where the communications needs of several user groups could be aggregated in order to maximize the utility and lower the cost of providing a community telecom service. Both approaches (or indeed any other that seems viable, practical and pragmatic) need to be validated. The value chain for a real, commercial or subsidized telehealth/telemed service could look quite different when there are several hundred users or sites involved.

Some large scale trials of telemedicine delivery in a few developing countries (to start with) would provide valuable (and needed) experience to adequately test one or more value chain configurations with the objective of determining how developing countries can establish, operate and maintain a cost-effective and self-sustaining telemed service. Attachment 1 to this paper contains a proposed Resolution for consideration by the Abidjan Conference, the aim of which is to encourage the establishment of such large scale trials.

In addition to the technologies and economics of telemed delivery, the Rapporteurs Group is considering some other issues, including those involving confidentiality, security and liability. It is also examining the prospects for and complexities inherent in the development of global telemedicine and telehealth standards.

Based on research so far and the responses to the Questionnaire, it is clear that much of the telemedicine activity undertaken around the world depends upon government subsidies. The situation is changing, however, and a trend toward commercialization of telemedicine and telehealth care provision is clearly discernible.

From the research done so far, the prospects for collaboration between developed and developing countries appear favourable. There have been numerous instances - usually limited in scope and duration, however - of such collaboration. The European Commission sponsored the EpiAim project under its Third Framework Programme which focused on telemedicine and prospects in Africa and Latin America. Unfortunately, however, there has not as yet been any similar follow-on projects in the Fourth Framework.

The situation could change, in view of the G7 initiatives in regard to the Global Information Society (GIS). One of the 11 GIS themes of the G7, agreed in Brussels in February 1995, concerns telemedicine. A three-day, G7 meeting is scheduled to take place in South Africa in May 1996 and it is likely that there will be some discussions about broadening the health care theme of the Global Information Society to include developing countries.

There is no doubt that telemedicine and telehealth have the potential to improve both the quality of and access to health care regardless of geography. They enable medical and health care expertise to be accessed by under-served locations using telecommunications. They offer a number of important socio-economic benefits. They are also the core of a burgeoning industry.

Developing countries face particular problems in medical services which relate to the lack of capital, facilities and systems. Roads and transportation are inadequate and difficulties in properly moving or transporting patients are often encountered.

For countries with limited medical expertise or resources, telecommunications can provide a solution to some of these problems. Telemedicine offers an effective means to quickly improve the delivery of health care and medical service. Telemed applications should be of interest to telecom operators since they generate additional traffic over existing networks and offer the opportunity to extend limited networks. The telecom and health care "industries" can achieve synergies.

The Rapporteurs Group is working on the preparation of the Telemedicine Report, which is intended to serve as a handbook for administrations and operating agencies so that they can evaluate a range of possibilities and choices related to networks and applications, cost-benefit analysis and standards in order to identify the solutions appropriate to their needs and availability of resources.

The Report also makes clear that the rapidly growing interest in telemedicine challenges the leaders of the medical establishment to rethink the ways they provide their services and to address the medical needs of areas where such services are absent or in short supply.

ATTACHMENT 1

DRAFT RESOLUTION

TELEMEDICINE IN AFRICA

The African Regional Telecommunication Development Conference (AF-RTDC-96) (Abidjan, 6-10 May 1996),

recalling

a) Recommendation 1 from the World Telecommunication Development Conference (WTDC) in Buenos Aires, March 1994, which focused on the application of telecommunications to health and other social services;

b) that the WTDC approved the establishment of two new Study Groups in the ITU's Development Sector and agreed a set of Questions for study by each of the two Groups and that one of those Questions concerned telemedicine and health care;

c) that Question 6 tasks Study Group 2 with defining the technologies most suitable for telemedicine's efficient diffusion to developing countries, studying the costs and benefits of different solutions, fostering the adoption of global standards and producing a telemedicine handbook;

d) that the European Commission concluded a project under its Third Framework Programme in 1994 which was called EpiAim which analysed the use of health informatics and telematics in Africa and Latin America and which was carried out in cooperation with the World Health Organization;

e) that the G7 Information Society Ministerial Conference held in Brussels in February 1995 established 11 joint pilot projects, one of which is on health care, the aim of which is to help create direct communications networks based on common standards; that the health care project has six sub-projects, one of which is aimed at improving health care cooperation and another of which is aimed at a Global Emergency Telemedicine Service,

considering

a) that few African countries have any experience in the application of telemedicine;

b) that there is, nevertheless, an overwhelming need for the provision of medical and health care services, especially in areas outside the cities;

c) that the provision of health care consumes a large portion of national budgets;

d) that there is substantial experience and expertise with regard to telemedicine in developed countries such as those in Europe, Canada, the United States and Japan;

e) that global satellite networks such as those provided by Inmarsat and Intelsat have already been used for the delivery of telemedicine services to remote and rural areas;

f) that most African countries are members of these organizations and have in place earth stations which could be used for such delivery,

recognizing

a) that African countries cannot afford the **very** high tech telemedicine solutions involving ATM, virtual reality, etc. rather that their most pressing need is for relatively low tech, off-the-shelf, thin-route and low cost telemedicine applications;

b) that telemedicine services and delivery in Africa should be affordable, practical, cost-effective, self-sustaining and available to the greatest numbers of people in need as possible;

c) that telemedicine services could be a cost-effective means of achieving national health policy objectives with regard to extension of medical and health care to non-urban areas;

d) that there have been many demonstrations of telemedicine but virtually no projects or trials sufficiently large in scope to lead to a sustainable service;

e) that it would be desirable to see at least two large scale trials of telemedicine somewhere in Africa which would serve as "test beds" and, this Conference hopes, as models for the successful implementation of telemedicine elsewhere in Africa,

resolves

1 that telemedicine and telehealth care merit serious study by telecommunications and health administrations in Africa;

2 that African countries should support any initiatives which will help gain them practical experience in telemedicine and telehealth;

3 that African telecom organizations should discuss the utility, logistics and feasibility of telemedicine delivery especially in remote and rural areas of their country;

4 that there should be at least one expert on telemedicine in each of the telecom and health ministries,

invites

the G7 participants to ensure that the needs and economic realities of African countries are taken into account in planning global health care projects,

requests

1 the Secretary-General of the ITU to ask the European Commission and other appropriate funding bodies to support and fund two large scale telemedicine trials, involving say 500 "sites" (especially including doctors and paramedics who travel from village to village) in two different countries in Africa,

2 the ITU to collaborate with the European Commission and other partners in organizing, monitoring and analysing the results of such large scale trials,

further requests

the ITU to organize a workshop or seminar on telemedicine to which representatives from African ministries of health as well as telecom organizations, the Organization of African Unity and the UN Economic Commission for Africa should be invited to consider and review the telemedicine report being prepared in the context of Question 6 and to consider the modalities for implementing the large scale telemedicine trials referred to above and that such a workshop be convened before the end of 1996 if at all possible,

appeals

to the European Commission and other funding agencies to respond favourably to this Resolution.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 35-E
17 April 1996
Original: English

For Information/Support

Agenda item: 1.1

PLENARY MEETING

SOURCE: INMARSAT

TITLE: POLICY AND REGULATORY FRAMEWORK FOR THE MOBILE-SATELLITE SERVICES

In today's telecom environment, there is an increasing need for mobile communications. Many types of users - international business travellers, disaster relief agencies, journalists, government officials, trucks, trains, aircraft, ships, yachts, fishing boats, etc. - require communications while they are on the move. There are many forms of mobile communications - cellular radio, public mobile radio (PMR), telepoint or DECT, pagers, mobile-satellite services - to serve them. The mobile-satellite services (MSS), such as those offered by Inmarsat or other domestic or regional systems, and the global mobile personal communications services (GMPCS), such as those proposed to be offered by ICO, Iridium, Globalstar, Odyssey, etc., are different from other forms of communications because the user can travel from country to country and still use the same mobile terminal. Although GSM users can also use their cellular phones in different countries, there is an important difference between GSM and the MSS. The GSM user must interconnect at some point with the domestic network wherever he travels. This is not necessarily so for the MSS user.

The MSS and GMPCS raise a number of important policy and regulatory issues which must be considered and resolved in each country if the international traveller is going to be able to go from country to country and expect to use his or her own terminal. The following identifies some of the key issues.

Licensing

RR 2020 from the ITU Radio Regulations states that "No transmitting station may be established or operated by a private person or by any enterprise without a licence issued ... by the government of the country to which the station in question is subject".

User terminals can be subject to different types of licensing arrangements:

1) Individual licence whereby every terminal must be individually licensed. This is the case now in most countries around the world.

2) Class or general licence whereby terminals of a particular type are exempt from the requirement for individual licences.

In the case of CEPT countries[1], specified terminals can be distinguished and exempted from licence requirements by a CEPT mark on the terminal itself and/or by the user carrying a "circulation card" which lists the countries into which the terminal can be taken without additional licensing requirements.

Licence fees can be set at levels:

i) to recover the administrative costs of issuing the licences; or

ii) to earn new revenues for governments;

iii) which are nominal or non-existent.

The level of licence fees (and customs duties) may also depend on the time a visitor is in a country.

Licence fees and licensing requirements vary significantly around the world today. Some countries charge no licence fees, while others charge several thousand dollars annually. In some cases, the annual licence fee is two or three times higher than the actual cost of the equipment.

At the request of several of its member countries, Inmarsat has suggested a licence fee structure for terminals meeting the different types of Inmarsat standards, which roughly approximates about 5 per cent of the value of the equipment. However, the GMPCS operators have, for the most part, begun to urge countries to waive licence fees altogether.

When policy-makers and regulators in each country review their licensing requirements, they should take into account the socio-economic benefits of the mobile-satellite services. The new global MSS and GMPCS systems offer what might be described as "instant infrastructure". Their ubiquity is not tied to the installation of expensive microwave towers, cables or copper wire, which must be maintained and are subject to damage (man-made and natural). The average cost of extending one telephone line in sub-Saharan Africa is about $ 8 000, which is more than twice the cost of some mobile earth stations available today.

In the large part through the efforts of the ITU, many studies over the years have emphasized the importance of extending communications to remote and rural areas. The benefits are numerous: adequate communications support economic development. Good communications help farmers who want to get the best price for their produce and who need to know what to produce. They help slow migration to the cities. They help industrial development such as mineral exploration, road and rail construction. They support education, medicine, government administration, environmental protection, civil security and much else. These benefits are well understood and increasingly the provision of basic communications to remote and rural areas has become a political priority in many countries.

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[1] As of April 1996, 43 countries are represented in the Conference of European Post and Telecommunications administrations.

The instant infrastructure of satellite communications provides a way of meeting those political, economic and social priorities. Even if it is still not possible - from a cost and resource point of view - for every person to afford their own personal mobile earth station, the cost of such communications is declining to the point where every village may soon be able to afford one.

A number of initiatives at the regional and global levels have also helped to draw attention to the benefits of MSS. For example, Resolutions 7 and 35 from the World Telecommunication Development Conference (WTDC) in Buenos Aires in March 1994 and the Plenipotentiary Conference in Kyoto in September 1994 respectively called upon countries to remove or reduce regulatory barriers to the use of equipment for disaster relief.

More recently, there has been an important initiative in Europe to encourage mutual recognition between CEPT and non-CEPT countries in regard to the free (unrestricted) circulation and use of mobile earth stations. The European Radiocommunications Committee has agreed a Recommendation on the Free Circulation and Use of Land Mobile-Satellite Service (LMSS) terminals which provides a mechanism for mutual recognition between CEPT and non-CEPT countries of terminals either individually licensed or covered by a class or general licence. Countries who agree to mutual recognition need to inform the European Radiocommunications Office (ERO) in Copenhagen which will then update the annex to the Recommendation which lists all countries adopting the Recommendation. The ERO will send copies of this annex to regulators who in turn are expected to send it to their customs officials. Users will also be able to get a copy of this annex which they can present at border points if necessary to indicate to customs officials (who should have a copy of exactly the same annex) that their terminals are exempt from national licensing requirements.

Customs duties

Like licence fees, customs duties on mobile earth stations vary significantly around the world. They range from zero to more than 100 per cent of the value of the equipment. Of particular interest to travellers and visitors is whether customs duties are lower if the users are in the country for only a short period of time. Some countries charge the user the same level of customs duties no matter whether he or she is in the country for only a few days or permanently. Other countries charge a percentage of the normal customs duties based on how long the user is in the country. Still, other countries require a deposit from the user which is returned (in whole or in part) when he or she leaves the country.

Customs duties are a matter of concern to users for several reasons:

- If the traveller goes from one country to another, especially with some frequency, he or she may be required to pay customs duties several times during a single trip. Even if the customs duties in a given country are low, the cumulative amount from all countries visited during a single trip could significantly raise the cost of taking a mobile earth station from one country to another.
- Because mobile earth stations are becoming relatively small - some mobile earth stations, for example, are not much bigger than a laptop computer - the user may be tempted not to declare the terminal to customs officials at border points. In theory, the user could be breaking the law by not doing so. If the terminal does not look much different than a cellular phone or a laptop computer, the temptation to break the law must surely be all the greater, especially when balanced against a requirement to pay customs duties of say 10 per cent of the cost of a $ 5 000 terminal (i.e., $ 500), which will seem onerous to most users, especially if they are in the given country for only a few days or even hours!

There appears to be a clear need for the ITU, on behalf of users of mobile-satellite services, including the global mobile personal communications services, to examine more closely this issue and to discuss the matter with the World Trade Organization (WTO). Mobile earth stations are not specifically referenced in the World Trade Organization agreements (GATS and GATT). The aim of such discussions should be to eliminate or reduce customs duties to a reasonable amount.

The rationale for such elimination of or reduction in customs duties is that such terminals will provide a means of communications in the country where no other means exists, that such terminals will help the country to develop, that such terminals can be used for humanitarian applications such as disaster relief, emergency communications, telemedicine and environmental protection.

Meanwhile, there remains an urgent need to ensure that customs officials are able to recognize the terminals and to waive any licensing or customs fees or requirements wherever possible.

Type approval

Many countries around the world require radio equipment to be type approved before it can be used in the country. Some countries have established their own type approval regimes while others accept the type approval given by some other recognized authority. Still, other countries have made no provision for type approval.

Many countries accept Inmarsat's type approval of the mobile earth stations operating within its system without further testing of the terminals. Inmarsat actively encourages all countries to accept its type approval and to waive any additional requirements. In Europe, most countries accept the type approval given by other countries so long as the type approval conforms to the standards of the European Telecommunications Standardization Institute (ETSI).

Some form of mutual recognition of type approval is needed in order for countries to allow national use of equipment type approved in another country. In Europe, the European Radiocommunications Office (ERO) in Copenhagen maintains a register of countries which have agreed to mutual recognition of type approvals for radio equipment. At the global level, the ITU could maintain a register of countries who agree to mutual recognition of type approval.

National regulators will need to inform customs officials of which equipments coming into a country do not require additional type approval. Such equipment can be marked in some way (as is done within the CEPT and Inmarsat) or the user could carry a free circulation card. Whatever mechanism is used, it will be necessary for customs officials and visitors to be privy (separately) to the same information.

As new types of MSS and GMPCS terminals are developed, there will be increased pressure on bodies such as the ITU and ETSI to speed up agreement of standards covering broad classes of MSS terminals with the standards covering only essential requirements.

Accounting Authority

As mobile satellite users, especially those in the maritime environment, have been able to travel from country to country and to use their terminals wherever they are, a mechanism has been necessary to ensure payment of bills, especially as the user may enter domestic telecom networks far removed from his country of origin. Until recently, this payment mechanism has been the Accounting Authority.

The concept of the Accounting Authority has its origins in the maritime world. The Accounting Authority has served a number of purposes, but in particular it allows a ship earth station user to make calls through a global network of shore-based stations (satellites, VHF, etc.), with a mechanism enabling payment for such traffic without the user having to make separate individual agreements and payments with each shore station. There are ITU Regulations and Recommendations (such as D.90) governing the charging and accounting for maritime radiocommunications in the maritime mobile-satellite service. In particular, Article 66 from the Radio Regulations says that in principle charges for maritime radiocommunications are to be collected from the user by an Accounting Authority subject to national law and practice.

The Accounting Authority is not only a maritime phenomenon. Inmarsat adopted the AA concept when it began providing land mobile-satellite services.

Accounting Authorities must be approved first by the government (typically, the Ministry of Communications or equivalent) and then by the ITU, which assigns a four-digit alphanumeric code (the AAIC) to each Accounting Authority. For example, US01 is the AAIC for the US Federal Communications Commission (FCC). The ITU has set a limit of 25 Accounting Authorities per country. Most countries have only one or two Accounting Authorities. In some cases, the Accounting Authority is located in another country.

Regulatory authorities need to decide some criteria for who should be an Accounting Authority and whether the Accounting Authority must be located in the country. Above all, the regulatory authority must ensure that the Accounting Authority is reputable and reliable.

In most cases, Accounting Authorities charge a percentage (typically between 5 and 15 per cent) of the user's communications charges for the services it renders to the user, primarily in collecting and assembling the bills from land earth stations or other coast stations and presenting the user with a single, integrated statement. The user pays this bill and the AA in turn reimburses all of those stations which the user has used.

The Ministry of Communications (or equivalent regulator or licensing authority) can make it a condition of licensing that all mobile earth stations of national registry and/or all mobile earth stations used in the country must use a specified Accounting Authority.

The AA concept has not always worked well. In some cases, users have not been able to find a suitable Accounting Authority (some countries have no Accounting Authority). In other cases, users have sought to bypass the specified Accounting Authority because the user feels the AA charges are exorbitant.

The AA has not been a big issue while there have been only a few thousand mobile earth station users, but in the emerging quasi-mass market for MSS and GMPCS, the AA issue is being seriously scrutinized. Many users do not understand the AA concept and, in any event, they do not want to deal with a situation where they buy a terminal from one agent and then need to get it commissioned, licensed, type approved by other entities and pay their bills to still some other entity. Most users prefer a one-stop-shop service.

The Service Provider concept

To meet the demands of customers, most MSS operators have introduced the concept of the Service Provider who would provide such one-stop-shop services. The Service Provider would act as an alternative to the Accounting Authority under contract with one or more land earth station operators. The decision to permit Service Providers as an alternative to the Accounting Authority would, of course, need to be taken by each country's policy-maker or regulator. The Service Provider would, in any event, be subject to national laws and regulations.

The Service Provider could offer a range of services to the mobile earth station user, such as billing and accounting. The user or the Service Provider acting on his behalf would probably still need to bring the mobile earth station or GMPCS terminal into service through the Routing Organization, who could also be a Service Provider.

The new Service Provider concept may offer advantages to smaller countries. The existing Accounting Authority and Routing Organization could become a Service Provider offering not just accounting and billing services (as now) but in future act as a one-stop shop and derive additional revenues from the traffic they bring under an agreement with one or more land earth station operators.

Participation versus bypass

Telecom operators in many countries are concerned that mobile earth stations and GMPCS terminals will bypass local networks and they will derive no revenue from the use of such terminals, especially when the gateway between the satellite and the terrestrial networks is located outside their country. Often telecom operators have this concern even where there are no local networks to bypass, such as in remote and rural areas.

The issue of bypass has been somewhat contentious. Inmarsat has argued that bypass should not be regarded as a serious problem, at least for users of its system, for several reasons:

- First, the mobile earth stations are generally used where there are no local facilities to bypass or when existing facilities are inadequate to meet the user's needs.
- Second, users will tend to use the cheapest solution, so that if local facilities are available, they will tend to use those local facilities.
- Third, there are alternative means of generating revenues from the mobile earth stations, notably through the active participation of national service providers in the systems.
- Fourth, calls to or from mobile earth stations will usually involve a user in the fixed network. To the extent calls use the fixed network, new revenues can be generated from traffic which might never have taken place otherwise.

Instead of trying to prevent the use of mobile-satellite services, policy-makers and regulatory authorities should consider the socio-economic benefits of such use, especially in areas where there are no alternative means of communications. The real challenge for policy-makers and regulatory authorities is not trying to prevent bypass, but rather creating an environment conducive to the availability of such services, one from which their country can extract the maximum possible benefits.

In any event, there are a number of ways in which new revenues can be generated for the country as an alternative to any perceived losses due to bypass of domestic networks. These revenue sources include the following:

- Licence fees.

- Fees charged by accounting authorities, billing organizations, etc.
- Rental of mobile earth station or GMPCS equipment.
- Revenues from traffic which would not otherwise take place. At least, in the fixed-to-mobile direction, there is no bypass and such routing arrangements will enable them to earn additional revenues. Even in the mobile-to-fixed direction, the PTO should be able to earn some revenues when the mobile user places a call to a fixed subscriber of the PTO - i.e., through settlement of international accounting rates.
- Investment in the MSS or GMPCS operator.
- One-stop-shop service provision.

The impacts of globalization

The globalization of telecoms, as a phenomenon, is likely to have many impacts, not all of which are well recognized. Thus, the ITU plays an important role in providing fora, such as the World Telecommunications Policy Forum and various Study Groups, to examine globalization impacts and, as necessary or appropriate, reach agreements to ensure the benefits of globalization, new technologies and services to all countries, system operators, service providers and especially consumers.

All big M and small m members should take an active role in ITU activities in order to encourage and facilitate the global availability of telecommunications and maximize the benefits therefrom.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 36-E
17 April 1996
Original: English

For Information/Support

Agenda item: 2.4

PLENARY MEETING

SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU

TITLE: SPACECOM PROJECT: A NEW MODEL OF PARTNERSHIP TO PROMOTE THE INTRODUCTION OF PILOT PROJECTS IN DEVELOPING COUNTRIES BASED ON APPLICATIONS OF MODERN SATELLITE COMMUNICATIONS IN COMBINATION WITH TERRESTRIAL WIRELESS TECHNOLOGIES

Project description

- SPACECOM is one of the many projects being implemented by the ITU Development Sector over the period 1994-1998 within the framework of the Action Plan established on the occasion of the last World Telecommunication Development Conference (WTDC) held in Buenos Aires in March 1994.
- The SPACECOM project has been designed to promote the widest application of space communications technology in developing countries with primary emphasis to increase the accessibility of telecommunication services in rural and remote areas.
- The basic concept of the project is to build a strong partnership between the space communication industry and the telecommunication operators/users community in developing countries with BDT serving as catalytic coordinator.
- The SPACECOM project represents a model of partnership for bringing space technology to rural development as well as pace-setting to future cooperation for telecommunication enhancement in the developing world.
- The space industry is called to support the project as sponsors and to participate in it by providing financial and technical contributions.

Main objectives

- To enhance knowledge of the evolving space communications technology, of its potential benefits and applications in developing countries.

- To provide the industry with a realistic assessment of the requirements in the various regions, and in particular of the telecommunications needs in remote and sparsely populated areas.
- To identify major technical, financial, regulatory and other constraints hampering a wide-spread exploitation of the space communications technology.
- To identify appropriate solutions and to elaborate concrete pilot projects to be presented to the space industry and financing institutions for proper consideration and possible implementation.

Background considerations

- In most developing countries, the vast majority of populations live in rural areas (according to the World Bank, 71% of the total population).
- Typically, more than 75% of rural localities have no access at all to even basic telephone services.
- Among the priority listed in the Buenos Aires Action Plan is the need to increase the accessibility of telecommunication services to rural and remote areas using appropriate technologies and regulatory structures.
- New technologies available today look attractive and very promising to make rural telecommunications more cost-effective and sustainably viable.
- New structural arrangements are also emerging in the context of a changing regulatory environment as a means of encouraging the extension of modern telecommunication services to support integrated rural development.
- Presently, it seems that a realistic and cost-effective approach for providing basic and more advanced telecommunication services in geographically wide-spread and sparsely populated areas is by concentrating such services to a focal point in the community.
- Community telecentres are being introduced in a few developing countries but the feasibility and suitability of this concept in countries at different levels of development still need to be demonstrated in practice.
- It is, however, widely recognized that modern satellite communications technology in conjunction, not in competition, with modern terrestrial systems, including wireless systems, can play a significant role for a successful implementation of such innovative approaches.

Modern satellite communications technology for rural development

- The expanding use of satellite technology to provide telecommunication services in unserved, or underserved regions, derives both from technical-economical advantages and intrinsic characteristics of the satellite.
  - Circuit cost independent of distance.
  - High availability and high quality of service.
  - Easy to install at any location in the satellite coverage.
  - High degree of flexibility to cater for traffic expansion and re-routing.
  - Easy to operate and maintain.

- Easy to relocate.
- Broadcasting characteristics well suited for dissemination of data and information (tele-education, telemedicine, environmental monitoring, etc.).

– The availability of higher power satellites permits today the use of very small and cost effective earth stations to support various types of telecommunication services in any part of the world.

– Small mobile satellite earth stations, such as those operating in the INMARSAT system, may allow to establish immediate services in areas that presently have no access to telecommunication infrastructures.

– Reductions in ground segment size and cost alone, however, are not sufficient to facilitate the rapid and widespread use of satellite communications technologies in developing countries.

– The objective must be to reduce the dominance of the space segment costs in the overall cost of the service.

– This may require a balancing of the overall cost package between ground and space segment charges to obtain a net improvement.

– Digital modulation techniques, coupled with advanced Demand Assignment Multiple Access (DAMA) techniques, allow today more efficient use of the space segment resources.

– Modern digital services with centralized control, monitoring and billing facilities are presently offered by various satellite operators/service providers, where the space segment resources are assigned on demand and charged to the user on "cost-per-minute of usage" basis.

– This approach appears well suited to introduce basic telecommunication services (voice, fax, low speed data) in rural territory of developing countries where the initial traffic is certainly low, difficult to be predicted and do not justify the full time leasing of satellite capacity.

– Bandwidth-on-demand services are also emerging as an ideal solution for users that require advanced telecommunication networks, but who may have less than full time requirements.

– This approach appears particularly attractive to extend more advanced applications (such as electronic mail, high-speed data transfer, teleradiology, interactive distance learning, disaster recovery, digital radio, videoconferencing, etc.), also to remote and sparsely populated areas through community telecentres.

– New proposed personal satellite communication systems, based on the use of non-geostationary orbit satellites, bring a new dimension to communications and also offer potential benefits to the developing world.

– Owing to their essentially regional and global nature, they require however, the development of new regulatory frameworks and agreements among the various countries involved.

– It is also clear that this first generation of satellite personal communication systems will be limited in capacity and services offered.

– The evolution of satellite technology will continue in the near future at an extremely fast pace, providing access to more services at cheaper prices.

- Without a clear appreciation of the evolving technologies and of their potential benefits and drawbacks, many developing countries may however stand little or no chance of reaping the benefits of these new technologies.
- In response to the above and as a part of its own contribution to the telecommunication advancement in the developing world, the BDT, in association with the space industry, has formulated the SPACECOM programme to address the problems highlighted above.

Needs for pilot project

- A great disparity still exists in the quality and availability of telecommunications between the World's richest and poorest countries.
- Historically, telecommunication development has not been successful to recover the existing gap and rural telecommunication services have been considered inherently uneconomic as costs usually exceed revenues.
- New technologies and innovative ideas, such as the concept of "Community Telecentres", now seem to offer new opportunities for a sustainable development of telecommunications, also in rural areas.
- The term "Community Telecentres" is commonly used to denominate a shared multipurpose facility that, besides providing a public telephony, may be gradually expanded to also provide more advanced services and to be used as:
  - shared (remote) office facilities, including fax, email, word processing, photocopying, services etc.;
  - access point to database including, for example, libraries, trade information, government information and registers, environment monitoring, community information services, etc.;
  - distance health care centre;
  - distance learning centre for education;
  - centre for cultural events and entertainment.
- A community telecentre would be located in a strategic place of the area to be served.
- It could also be a "virtual" centre linking and providing a common infrastructure for specialized centres for different applications distributed in physically separate buildings in the community.
- The provision of shared multipurpose services through a community telecentre is more likely to become financially viable than if separate facilities are developed for different applications.
- Modern satellite communication technologies, in combination with terrestrial wireless systems, will play a decisive role for the implementation of such innovative approaches that still need to be tested in countries at different levels of development.

– Different models of "Community Telecentres" can be envisaged according to local needs, the number and distribution of users, the type of applications to be supported, etc. In its most general configuration, a typical "Community Telecentre", and the associated local (wireless) access network, designed to serve 1 000 or more people, may include:

  • small/medium capacity satellite earth station and/or terrestrial link (microwave or fibre optic) to provide the interconnection with the existing national and/or international network through appropriate "gateway" facilities;

  • baseband equipment (such as DAMA interface equipment, multiplexers, terrestrial interface equipment, etc.);

  • local telephone exchange (PABX or small PSTN switch), with local operator position;

  • digital multi-access radio system and/or wireless cellular system designed to allow the interconnection of local business and private subscribers, remote pay-phones and, possibly, mobile users (unless a local distribution network is already in place);

  • TV and/or radio rebroadcasting facilities;

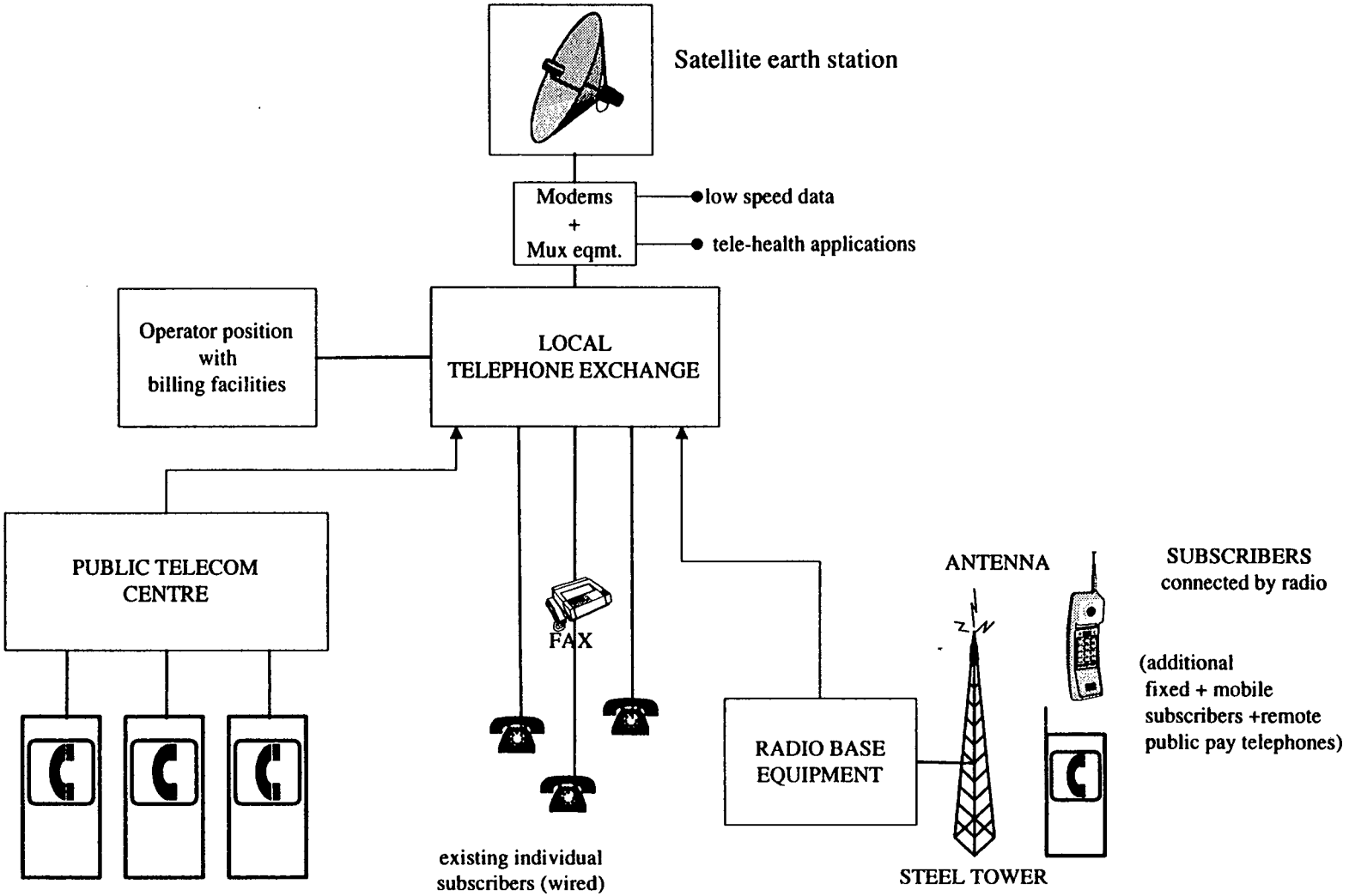
  • terminal equipment and office equipment (such as public telephone sets, faxes, computers, printers, modems, photocopiers, TV and radio sets, video recorders, telemedicine and multimedia stations for tele-education, etc.);

  • electrical power generating system. Where commercial power is not available, autonomous energy supplies should be used. The use of renewable energy sources (in particular solar energy) should be duly considered;

  • buildings (air-conditioned as required) to accommodate equipment, meeting rooms, office and the various applications suggested above.

  Where adequate buildings are not available and expensive to construct, the use of prefabricated buildings or mobile units could provide a solution. Air-conditioning should also be carefully considered, particularly in tropical areas where the temperature can be so high that it could irreversibly damage insufficiently protected equipment. An attractive approach to reduce the high power consumption associated with the use of traditional compressor-type conditioners could be, in some cases, the adoption of passive-type conditioned shelters or purpose designed containers.

– At the other end of the scale, a "Community Telecentre" could of course also be just a public office or "kiosk", provided with, say, two public telephones, one fax, a computer with modem, a printer and a photocopier and connected to an existing network. In this case the cost is drastically reduced but so are the potential revenues and benefits of provision of such services.



Typical configuration of "Community Telecentre" with associated local wireless access network

- An essential task being developed in the framework of the SPACECOM programme, in cooperation and synergy with other ITU/BDT programmes, is the definition of pilot projects to be implemented in some developing countries of different regions as part of concerted efforts to enhance integrated rural development.
- A sufficient number of pilot projects will be selected to cover different technologies, different types of satellite communications (fixed, mobile, broadcasting) and different types of applications (basic telephony, business services for small and medium size local enterprises, telemedicine, tele-education, environmental monitoring, community information services, etc.).
- Pilot projects would provide practical demonstration of appropriate satellite communications technologies, tariff structures and innovative regulatory and financing options.
- They would also offer the opportunity to evaluate the suitability of different partnership arrangements to support the social, cultural and economic development in rural communities.
- The envisaged pilot projects are much more likely to be successful if they are carried out as a concerned cross-sectoral, multidisciplinary effort of community development. Participation of the national telecommunication operator, together with other government sectors (such as health, education, information, energy, agriculture, trade, transport, tourism, etc.) is therefore considered essential.
- Other partners may be, for example, non-governmental organizations, local user groups, private enterprises, universities, other educational institutions and hospitals.
- The implementation of selected pilot projects will depend heavily on the willingness of other financing institutions, development agencies and partners to provide the required resources.
- Contributions from international partners may include:
  - specialists for telecom system design and engineering;
  - telecommunication equipment, computers, printers, etc. and software, free, on loan during pilot project or at reduced cost;
  - training of technical staff and transfer of know-how related to their products and services;
  - free space segment or reduced tariffs during pilot project.
- In certain cases, the project may be carried out as a joint venture, including revenue sharing or under a build, operate and transfer scheme. ITU and other concerned international organizations and development agencies are also expected to contribute to the projects.
- International support for implementation of the pilot project (e.g. contributions to cover part of the initial investment, training, communication costs and project management), would reduce the cost to the national/local partners and, possibly, make it financially viable from their point of view. However, it is very likely that, if the service is to be financially sustainable in the long run, the benefiting ministries and government departments (e.g. education, health, environment protection, trade, transport, etc.) must be prepared to pay for the service they get, unless the growing community of commercial users are prepared to subsidize poor users of public services.

- This means that the government should be prepared to pay the consortium that operates the telecentre(s) for the public telecommunication services they provide, at commercial rates.

  The concerned government departments may of course also be partners in the consortium and share the profit which possibly will be generated some years ahead when the purchasing power and the demand of the population has increased.

On-going activities for pilot projects definition/selection

- Cooperation has been established with other on-going programmes inside the ITU Development Sector (in particular BAAP-Programme 9 - Integrated Rural Development and BAAP-Programme 12 - Development of Telematics and Computer Networks) to create synergy and to avoid duplication of efforts.

  The activities where such cooperation appears of mutual benefit include the identification and definition of pilot projects where the support of satellite communications technology is envisaged.

- In this context is should be mentioned that BAAP-P9 and SPACECOM project are primarily focused on pilot projects in rural and isolated areas however the concept of "Community Telecentre" could also be applied to serve deprived urban areas or as a shared facility for telematics applications (such as environment monitoring tele-education, telemedicine, trade and business communication support, etc.).

- A call for pilot project proposal document, prepared in cooperation with BAAP-P9 and P12, has been circulated since October 1995 to various telecommunication organizations of developing countries. This document includes the list of information to be provided as well as guidelines for the preparation of proposals and criteria that will be applied for selection of eligible projects.

- A considerable number of proposals have been received, however many telecommunication organizations, in spite of having expressed their interest to participate in the ITU/BDT initiative, have not yet submitted concrete proposals.

- Furthermore some of the proposals received are formulated for relatively large scale rural telecommunication development projects which are beyond the scope of the small demonstration pilot projects envisaged in the call for proposals.

  In other cases the proposals did not provide sufficient information to enable us to assess their suitability for participation in the relevant BDT programmes.

- To facilitate the preparation of proposals in line with the established guidelines, the call for proposals and associated guidelines have been again circulated during March-April 1996, more widely in English as well as in a French and Spanish version.

- For the time being proposals have been received from:
  - Benin, Cameroon, Gambia, Kenya, Tanzania, Zambia
  - Somalia
  - Guyana, Suriname
  - Buthan, Mongolia, Sri Lanka, Indonesia.

- Announced proposals are expected to come shortly from: Angola, Burkina Faso, Ghana, Mozambique, South Africa, Uganda, Zimbabwe, Haiti, Peru, Thailand, Viet Nam, Ukraine, etc.

- Meanwhile, in order to identify a first lot of eligible pilot projects, preliminary summaries of proposals already received have been prepared and submitted to potential partners for proper consideration.
- In accordance with the criteria highlighted in the call for proposals, preference has been given to quick-impact pilot projects that, while constituting an integral part of a long-term rural telecommunication development plan, are conceived to remain confined to a limited area.

  They would provide a test bed for new technologies and would demonstrate the cost-effectiveness of rapidly deployable solutions to link remote regions to existing telephone switching centres.
- In most of the cases analysed, the combination of modern satellite communication and terrestrial wireless technologies appears to offer cost-effective solutions to improving access to basic telecommunications and telematics services in rural areas of developing countries by means of shared, multi-purpose facilities combined with a local access network.
- A working group has been created, with the participation of SPACECOM sponsors and other members of the ITU Development Sector (suppliers of rural terrestrial telecommunication systems) to review the proposals received and to prepare a priority list of projects considered as eligible for further definition and possible implementation.
- It is expected that this working group, in view of the next SPACECOM Steering Committee meeting (scheduled to take place in Geneva during the second half of May 1996) will complete the following major tasks:
  - analysis of proposals received and identification of aspects to be further clarified in consultation with the concerned national administrations;
  - preparation of a priority list of projects and evaluation of the required resources;
  - preliminary identification of possible international and local partners;
  - elaboration of a proposed scheme for the participation of various sponsors and partners in the further specification and possible implementation of selected projects;
  - preparation of a summary report to be presented at the next SPACECOM Steering Committee meeting, including proposals for partnership arrangements and preliminary work plan.

Cooperation with other international and/or regional organizations

- Contacts undertaken with other development agencies, financing institutions, international and regional organizations (such as World Bank, UNESCO, UNEP, UN/OOSA, WHO, RASCOM, SADCC, etc.) will be pursued by ITU to establish possible cooperation agreements with the view of storing resources and expertise for the identification and definition of joint application projects.
- In particular contacts with UNEP are in an advanced stage to explore the potential of joining resources and to integrate pilot projects in the new UNEP satellite-based network (Mercure) under implementation worldwide.

  The need to also coordinate actions with FAO and other sponsors participating in the SPACECOM project (such as ESA, Nuova Telesfazio and Marconi/Alenis Communications has been recognized in order to identify the appropriate solution for:

- the upgrading and possible redeployment of three existing DIANA earth stations already operating in Africa (Ghana, Kenya, Zimbabwe);
- their integration into the Mercure operating scenario;
- their possible use not only to ensure the distribution of environmental satellite data in the concerned region, but also to support other applications of public interest (such as telemedicine and tele-education).

Project scheme for a pilot "Telehealth" network in Africa, based on the shared use of UNEP/DIANA earth stations

– Provision of telemedicine equipment and associated telecommunication facilities needed is foreseen for the interconnection of:

- Two regional hospitals in Africa (Nairobi - Harare) to specialized medical centres in Italy (Rome and/or Milan) to enable remote consultation and diagnosis in most major medical practices (i.e. surgery, internal medicine, paediatrics, gynaecology, trauma, neuro surgery, ophthalmology, as well as ear, nose and throat problems).
- Two regional hospitals in Africa (Tunis - Accra, or Abidjan or Niamey) to specialized medical centres in France (Paris and/or Toulouse) to enable remote consultation and diagnosis in most major medical practices.
- Two mobile medical units to specialized hospitals in Africa and/or Europe.

– The primary purpose of the telemedicine system would be to enable remote consultation with specialists on specific cases so that patients would not have to be transported or referred.

– The proposed mobile units would be used to improve the diagnostic capability of peripheral hospitals or to serve rural communities that do not have a local hospital. A mobile unit would consist of a vehicle containing the required diagnostic equipment and associated telecommunication facilities (such as an Inmarsat terminal). It should be staffed with a doctor and one or more medical assistants.

In situations where the opinion of a specialist would be needed, the doctor would communicate with a distant hospital (in Africa or in Europe) where requested specialists can be made available.

– For the definition and implementation of the pilot demonstration, the following participation is foreseen:

- **Politecnico di Milano/UATI** (International Union of Technical Associations and Organizations) and the "Ministère du travail et des affaires sociales" (Direction des Hôpitaux)
  - assistance on the definition of aspects concerning specific medical practices;
  - identification of appropriate telemedicine applications and of required medical infrastrucures/equipment;
  - definition of the organizational structure for exploitation of the service.
- **ITU/BDT**
  - assistance in defining the telecom network configuration and integration of telemedicine equipment;
  - definition of technical/operational requirements;

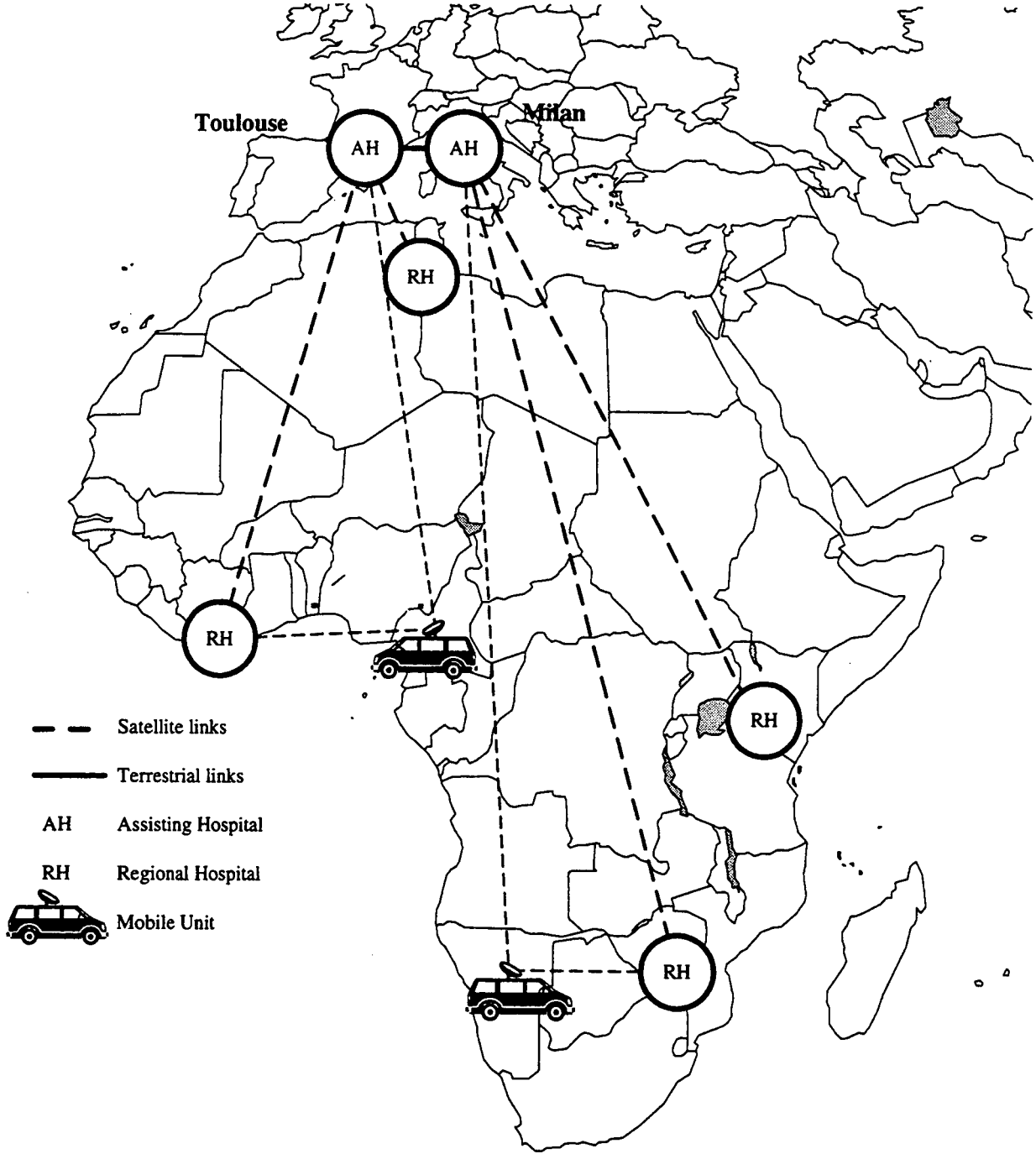
- assistance in defining the locations of the new earth stations in Africa and their interconnection with the concerned hospitals/medical centres;
- coordination with the local administrations of the hosting countries, with particular reference to regulatory and operational aspects;
- local assistance (through the ITU Regional Offices) during the implementation phase;
- monitoring of the service during the pilot period;
- identification of appropriate procedures and charge-back mechanism that could be applicable after the pilot period of operation.

• **Telecom Italia and France Telecom**

- supply of the telemedicine equipment;
- technical assistance in Italy and France to integrate telemedicine equipment in the concerned hospitals and for implementing the pilot demonstration;
- setting-up of the required terrestrial links for the interconnection of the corresponding earth stations with the concerned hospitals in Italy and France;
- exploitation of the service after the pilot period.

• **Inmarsat**

- supply of transportable satellite terminals and assistance for their integration with telemedicine equipment;
- provision of the required space segment capacity, (free or at reduced rate) for the duration of the pilot demonstration or during a pre-determined period.



Envisaged Pilot Project for tele-health applications in Africa

Institutional framework

- ITU will provide the framework for the execution of the SPACECOM programme.
- A project coordinator, assigned by the BDT, will be responsible to ensure the overall coordination and to establish the required interaction between the participating countries and the space communication industry.
- The participation in the project is foreseen as wide as possible and will include, among others:
  - Members of the ITU Development Sector;
  - Sponsors who commit resources to the project;
  - Telecommunication operators and users communities of developing countries;
  - Intergovernmental institutions;
  - Space segments service providers;
  - Earth station equipment manufacturers and vendors.
- The policy, regulatory operating authorities in developing countries have been invited to participate in the project and to designate a national coordinator.
- The sponsors of the project will constitute the decision-making body. A Steering Committee has been created to determine policies, to review budgets and allocation of resources for the conduct of the project.

Present participation

For the time being:

- 29 sponsors have offered cash and/or in-kind contributions.
- 65 telecom organizations of developing countries have confirmed their interest to participate, and have designated a national coordinator.
- Steering Committee Members (constituted by sponsors having committed or delivered at least $US 20 000):

  ALCATEL/Telspace, COMSAT World Systems, ECCO-Telebras, ESL (TRW Co.), European Commission, European Space Agency, INMARSAT, INTELSAT, IRIDIUM, NEC Corp., PACIFIC Century Group, PANAMSAT, TIW Systems, US Department of the States, TELE Greenland International, TELECOM Italia.
- The project is still open to additional partners and there is a strong indication that other space companies will become co-sponsors and that other telecom organizations will join us in the project development.
- For any further information or clarification, please contact:

Mr. Domenico Stagliano
Chief of Development Policy Department
Telecommunication Bureau (BDT)
1211 Geneva 20

Tel: +41 22 730 5094
Fax: +41 22 730 5484 or 730 6449
Tlx: 421 000 UIT CH
Internet: stagliano@itu.ch
X.400: S=stagliano; A=arcom; C=ch

Mr. Claudio Girard
Coordinator a.i., SPACECOM Project
Telecommunication Development Bureau
1211 Geneva 20

Tel: +41 22 730 5259
Fax: +41 22 730 5484
Tlx: 421 000 UIT CH
Internet: claudio.girard@itu.ch
X.400: G=claudio; S=girard; A=acrom; C=ch

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 37-E
19 April 1996
English only

Agenda item: 1.1 **PLENARY MEETING**

SOURCE: UNECA

TITLE: AFRICA'S INFORMATION SOCIETY INITIATIVE (AISI)
AN ACTION FRAMEWORK TO BUILD AFRICA'S INFORMATION AND COMMUNICATION INFRASTRUCTURE*

Preface

1 Resolution 795, "Building Africa's Information Highway", of the thirtieth session of the ECA Conference of Ministers responsible for economic and social development and planning, held in Addis Ababa in May 1995, requested the Executive Secretary to set up a high level working group on information and communication technologies in Africa, made up of African technical experts, to prepare a plan of action in this field for presentation to the thirty-first session of the Conference of Ministers. To accomplish this, funds were mobilized, the group has been constituted (a list of its members appears in Annex 1), and has worked, both in meetings in Cairo, Dakar and Addis Ababa, and electronically, through a *listserv*[1]. This document is the product of the Working Group.

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* Subject to the approval of the twenty-second meeting of the Conference of Ministers of the Economic Commission for Africa, meeting in Addis Ababa, 6-8 May 1996.

[1] An electronic mailing list on a particular topic by which all messages posted to the list are sent automatically to all subscribers. The group was provided with institutional support by the Egyptian Cabinet Information and Decision Support Centre (IDSC), as well as a large number of individuals who participated in face-to-face and on-line meetings, providing encouraging and valuable feedback. The financial and substantive contributions of the International Telecommunication Union, the United Nations Educational, Scientific and Cultural Organization, the World Bank and the International Development Research Centre to the High Level Working Group are gratefully acknowledged.

2 This document is about African's development: its challenges and opportunities in an information age. It addresses specifically the role of information, communication and knowledge in shaping African Information Society to accelerate socio-economic development.

3 This document attempts to address the issues related to information and communications for development. It targets decision-makers and leaders in all sectors, including, in particular those responsible for planning, information, telecommunications, economic development, laws and regulations, health, education, trade, tourism, environment and transport. It aims to support the development of Africa's role and policies in a future where information is a crucial economic and social resource, and where electronic networks and information technology present a new venue for socio-economic and cultural activity, at both local and global levels.

4 The proposed initiative calls for the formulation and development of a National Information and Communication Infrastructure (NICI) plan in every African country. This plan should be driven by national development challenges such as debt management, food security, health, education, population, unemployment, job creation, industrialization, land reclamation, water, tourism, trade, etc. The emphasis is on the need to support decision-making at all levels and to provide information and communication infrastructure for government, business and society to enlighten the process of development. Secondly, the initiative proposes cooperation, linkage and partnership between African countries to share the success of accumulated implementation experiences and stimulate regional development in various information and communication field.

5 Thirdly, the initiative calls for bilateral and regional mechanisms to stimulate cooperation between African countries. Fourthly, the Initiative calls for support and partnership with the friends of Africa including bilaterals, multilateral development agencies, regional economic organizations and the private sector. Collectively the Experts believe that Africa can make such a transformation towards an information society, with tangible economic and social returns:

- if we adopt an action oriented approach;
- if we work hard to implement such action;
- if we cooperate and form partnerships to face the developmental challenges;
- if we believe that we can and we will make it;
- if we compete in time;
- if we mobilize international support to help speed up its implementation;
- if we keep perspective;
- if we believe in our African people, the engine of growth, and the means to reach the African Information Society.

I INTRODUCTION

6 Three major development goals that have been articulated by African leaders in recent times include:

a) improvement of the quality of life for every African;

b) economic integration of the region;

c) improved trade and other linkages with the global community.

Utilization of information technology can help Africa reach all these goals.

7 The emerging global information infrastructure (GII), the process of making connectivity available to everyone on the planet, is making the following possible:

a) students study and research using computers, multimedia and networks;

b) doctors diagnose, aided by information accessed through global networks;

c) decision support systems for debt management help cut external debt by up to 50 per cent; drought and famine warnings arrive in time to change planting times;

d) businesses compete more effectively with timely and accurate market information;

e) transport costs are reduced, also resulting in less pollution;

f) cultural heritage is captured electronically, documented and globally disseminated.

8 The global movement to an information age and the worldwide technological innovations of recent years, along with other structural and economic developments, have led to rapidly falling costs for information and communication technologies. These have combined with changes facing global and national telecommunications regimes to present a clear window of opportunity for appropriate "leapfrog" strategies to accelerate the development of the continent. The creation of african information infrastructure (AII) is both a necessity and an opportunity to accelerate development in all spheres of African economic and social activity.

9 The development of the AISI will enable African leaders, decision-makers and planners to position Africa in the world's rapidly expanding global economic system and accelerate the pursuit of Africa's development goals. The new technologies offer the potential to create jobs at much lower levels of capital investment and exploit Africa's information resources without the need for corresponding financial wealth. The cost of entry into global markets is becoming virtually insignificant and exploiting the information economy consumes minimal resources other than the effort and ingenuity of its members.

10 Africa has great potential to "leapfrog" development stages. The current investment in older communications equipment in Africa is relatively small, and the vested interests in existing infrastructure in the information area much lower than in the developed world. With the will and the vision to build upon the accumulated lessons both inside and outside Africa, there is an excellent opportunity for a real jump-start. A high level commitment from leaders of African nations is a starting point. A strategy to share this vision by the people of Africa, including its politicians, engineers, business community and youth, is essential to bring about the desired change. Africa's young population is an asset in adapting to new ideas and ways of working with new information and communication tools.

11 The development of the African information infrastructure will provide the seedbed for numerous benefits. Aside from the clearly apparent advantages for economic integration, and for all forms of commerce and education, global information infrastructure will provide African countries

with many new low-cost opportunities to disseminate alternative cultural, news and entertainment programming and help counter the flood of information from the industrialized countries. With minimal communications costs, there is also the opportunity to develop information technology products for markets in the developed countries.

12 Information and communication technologies also offer the potential to reduce the need for migration to the cities. The information age can break the link between jobs and urbanization - some 70-80% of the African population live in rural areas. The challenge is to create the conditions that enable them to make a living where they are.

13 Information and communication technologies can no longer be seen as a luxury for the elite but as an absolute necessity for the masses. Even although non-literate and rural populations may not be able to make direct use of the African information infrastructure in the near future, the positive spin-offs to the country as a whole will still result in benefits for all sectors of society. And while the immediate returns of investment in information and communication technologies may not be readily apparent to hard pressed administrations concerned with squeezing the most from limited resources, the long-term positive impacts of a proactive strategy cannot be ignored.

14 While the press has recently highlighted some of the potential negative impacts of the Internet through, for example, its capacity to distribute pornography and undermine data security, these problems are generally recognized as transitory. Addressing these issues requires society to develop a better understanding of the new means of interaction offered by the global information infrastructure. Nevertheless, the disadvantages are far outweighed by the potential benefits of a pervasive information infrastructure. While effective controls must of course be put in place, some have likened these concerns to those over the ability of high speed transport systems to carry criminals quickly away from the scene of a crime.

15 Success in all these areas depends on decision makers taking quick action to eliminate the barriers and create the enabling environment which will allow the development of Africa's information society - a term used to refer to the pervasive benefits to all Africans of proactive policies on information and communication technologies.

16 This document outlines a vision and an action plan for an African Information Society Initiative (AISI) which proposes a framework for societal transformation to be used by decision-makers in African governments responsible for socio-economic planning. It is also complementary to the telecommunications policy guidelines developed for the African ministers of transport and communications, known as the "African Green Paper"[2].

A Vision

17 The African Information Society Initiative aims at supporting and accelerating socioeconomic development across the region. Driven by critical development imperatives, it focuses on priority strategies, programmes and projects which can assist in the sustainable build-up of an information society in African countries in accordance with the regional integration goals of the Treaty establishing the African Economic Community which foresaw the necessity of information networks and of regional databases, information sources and skills capacities.

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[2] International Telecommunication Union, The African Green Paper: Telecommunication Policies for Africa (Geneva, 1995).

18 By the year 2010, the initiative is intended to realize a sustainable information society in Africa where:

a) Information and decision support systems are used to support decision-making in all the major sectors of the economy in line with each country's national development priorities.

b) Every man and woman, school child, village, government office and business can access information and knowledge resources through computers and telecommunications.

c) Access is available to international, regional and national "information highways", providing "off-ramps" in the villages and in the information area catering specifically to grassroots society.

d) A vibrant business sector exhibits strong leadership capable of forging the build-up of the information society.

e) African information resources are available which reflect the needs of government, business, culture, education, tourism, energy, health, transport and natural resource management.

f) Information and knowledge are disseminated and used by business, the public at large and disenfranchised groups such as women and the poor, in particular, to make rational choices in the economy (free markets) and for all groups to exercise democratic and human rights, (freedom of speech, and freedom of cultural and religious expression).

B Strategic objectives

19 To achieve the vision outlined above, African member States will need to:

a) Ensure the continuous flow of information within the society by supporting initiatives to improve and create new information and communication services in different sectors of the society - education, health, employment, culture, environment, trade, finance, tourism, transport and commerce.

b) Create a continent-wide information and telecommunication network that allows low-cost and reliable communication with other users in Africa and across the globe.

c) Achieve maximum benefits from available information by encouraging the development of systems that allow wide dissemination to individuals, business communities, NGOs and the public sector.

d) Foster a new generation of men and women in Africa that uses information and communication technologies to leverage the development of their nations.

e) Link Africa with the rest of the world by improving the flow of new technologies in both directions and exporting intellectual products and services to the rest of the world.

C Related goals

20 To achieve the strategic objectives of the African Information Society Initiative, each member State will need to consider ways of making the following actions an integral part of national plans and programmes:

a) Develop a master plan for building national information and telecommunication infrastructures and a 2-5 year plan for the implementation of the basic infrastructure[3].

b) Establish a strong regulatory body, independent from telecommunications operators and their ministries, to stimulate and regulate public/private sector partnerships, with a view to safeguarding the goal of "universal service" and to review fiscal policies (such as tariffs, duties and license fees).

c) Eliminate or drastically reduce import tariffs, taxes and other legal barriers to the use of information and communication technologies.

d) Establish an enabling environment to foster the development of information and communication in society, including measures which energize the private sector to play a leading market role in the provision of services, and in the human resource development needed to effectively use them.

e) Implement a policy for using information and communication technology in government services and develop national databases in all key sectors of the economy and national administration.

f) Conduct needs' analysis to determine requirements and set up information and communication services in key sectors of national priority, especially education, health, employment, culture, environment, trade, finance, tourism and transport.

g) Identify and develop information technology applications in areas with highest impact on socio-economic development at the national level.

h) Take immediate steps to facilitate the establishment of locally-based, low-cost and widely accessible Internet services and indigenous African information content.

i) Prepare and adopt plans to develop human resources in information and communication technologies.

j) Adopt policies and strategies to increase access to information and communications facilities, with priorities in serving the rural areas, grassroots society[4] and other disenfranchised groups, in particular, women and youth.

k) Make special efforts to create awareness among those unfamiliar with the potential benefits of the African information infrastructure with particular attention to gender equity.

21 Together, member States will need to develop a coordinating mechanism to ensure successful implementation of the African Initiative to maximize complementarity, share lessons learned and reduce duplication of activities.

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[3] In accordance with the relevant Resolutions of the first African Regional Telecommunication Development Conference (Harare, 1992) and the World Telecommunication Development Conference (WTDC-94, Buenos Aires, 1994).

[4] In accordance with the Buenos Aires Declaration and Buenos Aires Action Plan adopted by the WTDC-94.

II AFRICA'S INFORMATION SOCIETY: CHALLENGES AND OPPORTUNITIES

22 The global spread of the information revolution has moved slowly in Africa. For example, despite rapid progress in the last year, no more than 15 African countries have full access to the Internet, and some remain without any electronic connectivity at all. In 1994, the average "teledensity" (number of main lines per 100 inhabitants) in Africa was only 1.6 as compared with 45 in Europe (for example), and the average teledensity outside large cities in Africa only 1.2 according to the ITU's World Telecommunication Development Report[5]. In Sub-Saharan Africa, excluding South Africa, these figures are much lower, and there are more telephones in New York or Tokyo than in the whole of Africa.

23 This is partly an indication of the general low level of socio-economic development on the continent. The recent ECA report (Serving Africa Better: Strategic Directions for the Economic Commission for Africa) describes Africa's development as "a classic glass half empty and half full".[6] Bearing in mind the challenges which reflect ECA's new strategic directions, the following section highlights the opportunities which the global information and communication revolution offers Africa if the right policies can be promptly and properly initiated.

24 The impact from new information and communication technologies is no longer confined to the communications and information sectors. It has become a pervasive mass technology with a much wider scope of influence, affecting virtually all sectors of society. The telephone, television and computer are merging into single multipurpose devices. Computers and appliances with silicon chips as well as network connections are spreading into every business and home. By the year 2020 it has been predicted that 12 billion devices will be connected to the global information infrastructure, including such ubiquitous items as light bulbs, heart pacemakers and fridges. At the same time the low-cost of communications and accessibility of the global networks means that it is as easy for an individual to reach one person as it is to reach 10 million.

25 Outlined below are some of the priority challenges which hinder African development and some of the opportunities that the information and communication revolution offer African nations in combating these problems.

a) Job creation

26 The main challenges are:

i) What jobs to create?

ii) Where to create such jobs?

iii) Who will create them?

iv) How will they be created?

v) What resources will be used to attain a given level of unemployment?

27 The opportunities include:

i) The use of new information and communication technologies which offer substantial possibilities for creating new jobs in the emerging information-based economy. These technologies also offer the possibility to manage the existing job market more efficiently.

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[5] ITU, World Telecommunications Development Report, 1995.

[6] ECA, Addis Ababa, 1996.

ii) Data and information can be made available on employment and unemployment by sector, gender and geographic location.

iii) New job opportunities, including "teleworking" opportunities, and on-line job market/matching.

iv) Decision Support Systems to help manage human resource development.

v) New types of jobs and new fields of work through access to the information economies of the world providing potential for: information services, software development, translation services, data entry, data housing, data conversion, system maintenance, training and other information technology related areas.

b) Health

28 The main challenges are:

i) Epidemics, spread of infectious diseases, AIDS, etc..

ii) Highest levels of infant and maternal mortality rate in the world.

iii) Lowest levels of life expectancy in the world.

iv) Lowest world ratio of doctors per capita.

29 The opportunities include:

i) Enhancement of health administration and management through Medical Information Systems.

ii) Establishment of Information "Health Profiles" and decision support systems on regional, national, rural and district levels.

iii) Linking health centres, delivery services and medical transport to patients.

iv) Improving access to skilled diagnosis through tele-medicine.

v) Improving distribution and reducing costs of medical supplies.

c) Education and research

30 The main challenges are:

i) Africa has the world's highest illiteracy rate, especially among women.

ii) Low numbers of teachers and large numbers of students per class.

iii) Few schools and universities.

iv) Few libraries and very limited access to international journals.

v) Lack of educational materials.

vi) Lack of researchers and research facilities

31 The opportunities include:

i) Providing equitable remote access to resources in support of both distance education and the strengthening of local educational capacity.

ii) Connecting schools, universities and research centres to national and international distance education facilities, national and international databases, libraries, research laboratories and computing facilities.

iii) Reducing communications and administrative costs by building communications networks linking all educational establishments.

iv) Promoting and supporting collaboration among teachers and researchers.

v) Extending the reach of educational facilities in informal learning, especially to community level.

d) Culture

32 The main challenges are:

i) Deteriorating resources for preservation of cultural heritage (monuments, manuscripts, artifacts, music, etc.).

ii) Lack of regional or local access to national cultural sites.

iii) Lack of awareness and knowledge about different African cultures.

33 The opportunities include:

i) Making Africa's museums accessible to all parts of the region as well as to the rest of the world.

ii) Electronic preservation and documentation of manuscripts and artifacts.

iii) Increasing accessibility of rare manuscripts and artifacts to researchers and the general public through the development of cultural CD ROM products.

e) Trade and commerce

34 The main challenges include:

i) Intra-African trade is less than 5% of total trade.

ii) Internal and external trade is hindered by poor transport and communication systems.

iii) Lack of information on procedures, import/export opportunities, markets, prices.

35 The main opportunities are:

i) Linking Chambers of Commerce, trade associations and the business sector to help small and medium enterprises and increase both regional and global trade.

ii) Reduced commercial transaction costs.

iii) On-line trade related information and import/export opportunities.

iv) Development and marketing of new products through electronic networks.

f) Tourism

36 The main challenges are:

i) Lack of information on untapped tourist resources which remain unexploited sources of wealth generation from international and national visitors.

ii) Lack of information on tourism destinations, services and facilities.

37 The opportunities include:

i) Attracting more tourists and other visitors by offering high quality information and telecommunication services in tourist resorts.

ii) Reducing the costs of international promotions for attracting tourists.

iii) Improving the image of Africa through on-line promotional campaigns.

iv) Building national and regional tourism related databases for destinations and facilities.

v) Providing a mechanism for virtual travel and information gathering utilizing the Internet.

vi) Provision of tourism related information and indicators that encourage and facilitate investment in tourism projects.

g) Food security

38 The main challenges are:

i) Limited national food production to satisfy market needs because of under-utilization of available resources.

ii) Lack of information on importing from best markets on the best terms.

iii) Lack of information on agricultural exports with the most competitive advantages.

iv) Lack of guidance for planning of crop planting and knowledge of new methods and technologies.

v) Lack of access to food market information and pricing.

39 The opportunities include:

i) Establishment of information systems for monitoring market performance and measuring market failures.

ii) Development of information systems to address food security issues such as agricultural production, government subsidies for food security, monitoring of water and land resources, disease problems, food transportation and storage.

iii) Efficient marketing of agricultural products through information and telecommunication networks.

iv) Provision of equitable access to new techniques for improving agricultural production.

v) Reduced food storage losses through more efficient distribution.

h) Gender and development

40 The main challenges are:

i) Gender equity: women constitute 50% of the population but do 60% of work, earn 1/10 of the income and own 1/100 of the assets.

ii) Women generally have more limited access than men to technology in general, to information, the media and communications facilities.

iii) Lack of readily available information on women in society, culture and economy.

41 The opportunities include:

i) Improve the rights of women through access to information and indicators which may be used for tracking gender issues and elimination of stereotypes.

ii) Ensure the equitable access of women to information, technology and technological education.

iii) Enhance the role of modern communications media to promote awareness of equality between women and men.

i) Manmade crises and natural disasters

42 The main challenges are:

i) Environmental degradation, civil strife, earthquakes, floods and other natural disasters often cause chaos in unprepared African countries, especially on the local and village levels.

ii) Ineffective emergency communication systems limit the effectiveness of responses by the state and international assistance organizations.

43 The opportunities include:

i) Implementing networks which, as far as possible, provide access to telecommunications in areas threatened by environmental degradation and natural disasters;

ii) Facilitating the use of low-cost terrestrial and satellite radio communication systems in emergency situations where there is no access to adequate telecommunications;

iii) Establishing problem monitoring information systems using geographic information system (GIS) technologies, remote sensing and satellite early warning systems which provide tools to anticipate such problems in advance and enable governments and international organizations to be more proactive and to respond more effectively when the need arises.

III COMPONENTS OF AN AFRICAN INFORMATION SOCIETY FRAMEWORK

44 Building Africa's information and communication sector requires developing and improving four major components:

a) Institutional framework and legal, regulatory and management mechanisms.

b) Human resources.

c) Information resources (infostructure).

d) Technological resources (infrastructure).

INSTITUTIONAL framework

45 The African Information Society Initiative cannot be realized without the appropriate institutional, legal and regulatory framework and mechanisms at the national level as well as at the regional level. It is essential to address the legal, regulatory and institutional practices in African countries which inhibit the development of national information services and connectivity to the global information infrastructure.

46 Within an institutional framework, some of the major obstacles which inhibit the development of national information services and connectivity to the global information infrastructure are identified below.

a) Financial

i) the high cost of telecommunication services which constitute the major obstacle preventing the establishment and use of value-added services;

ii) high levels of taxation for value-added service providers, which are particularly harmful for businesses which are in a start-up phase or are not yet profitable;

iii) high levels of import duties on information technology and communication equipment.

b) Regulatory

i) lack of adequate regimes for type approval certification of equipment;

ii) prohibitions on the creation of private telecommunication networks (whether based on user-owned or leased facilities) and/or on obtaining the required interconnection with the public networks;

iii) difficulty in obtaining licenses to access international telecommunication carriers.

c) Business environment

i) lack of appropriate legal framework for the creation of enterprises or associations providing value-added services;

ii) lack of needed services for prospective and established value-added services, such as information technology consultancy, training, information strategy planning, support services, etc.;

iii) difficulty in obtaining capital for start-up and expansion.

d) Other obstacles

i) lack of appropriate enabling environments for the creation of African information products;

ii) under-developed intellectual property rights provisions;

iii) restrictions on freedom of expression, including measures to ensure law and order or national security, which may be inappropriately applied to electronic information services;

iv) lack of adequate management and coordinating mechanisms for the implementation of the AISI at the national, subregional and regional levels;

v) lack of understanding of the importance of the development of information and telecommunications infrastructure and insufficient commitment to the use of information and communication technologies.

Addressing the obstacles:

Role of Government

47 The role of government is to provide a vision, a strategy and an enabling environment to develop national information and communication infrastructure and to ensure that all sectors of society can benefit from it. To fulfill its role in achieving these objectives, it is recommended that each African government establish or assign a lead national agency to be responsible for broad based coordination and collaboration within government as well as with other sectors. As part of this process government should be:

a) Promoting the use of information and communication technologies in government in particular and society in general to improve the effectiveness of government service delivery and stimulate the information and communication industries. Special support should also be given to the less well resourced sectors of public concern such as the academic and research organizations.

b) Developing national policies and plans for adopting information and communication technologies within the government or public agencies and follow up their implementation.

c) Establishing a framework and mechanisms that ensure the participation of all sectors in implementing the national information and communication infrastructure and coordinating and harmonizing the multiple efforts of the different players, including the private sector,

non-governmental organizations and the media. Especially important is to encourage the participation of all the major government ministries. This may involve the formation of joint boards (government, industry, labour and consumer associations).

d) Liaising with other countries, international organizations and regional bodies to ensure coordinated and harmonious development at regional and international levels.

e) Developing the legislative/regulatory framework to address issues of cost and accessibility of telecommunications, universal service objectives, intellectual property, privacy, free-flow of information and the convergence of broadcasting with telecommunications.

f) To ensure smooth implementation of the national information and communication Infrastructure in African countries, governments need to address the legal and regulatory issues which currently constrain the use of these new technologies. This may require modification in laws and regulations in different areas such as communication, intellectual property, privacy and the free-flow of information as described above.

48 The urgency of these issues is likely to require the immediate establishment of mechanisms for adopting ad hoc regulations to allow experimental networks and pilot projects to feed in to the institutional reform process.

49 The major tasks of government in this respect include (but are not limited to):

– Telecommunication

To facilitate the implementation of AISI, African governments will need to ensure the establishment of adequate communication infrastructure through encouraging the liberalization of national telecommunications and public broadcasting services. This can be done by providing enabling legislation and incentives for private sector collaboration in the development of this infrastructure, and by setting up a strong, independent regulatory body to regulate public/private sector partnerships, including the involvement of the international private sector. In particular it will be necessary to safeguard the goal of "universal service" and to review fiscal policies (such as tariffs, duties and license fees), in accordance with the "African Green Paper" which also aims at providing guidelines for telecommunication policy development).

– Intellectual property

50 Intellectual property is becoming a major factor influencing the development of information use and its protection. African countries therefore need to adopt a legislative framework that strikes a balance between the commitment to intellectual property as an international necessity and the provision of basic intellectual needs to the poor. Governments should establish and enforce copyright laws, as well as spread awareness to the public about intellectual property rights and at the same time provide schemes for reducing the negative effects of these laws on society. These activities should be carried out in cooperation with the two existing African intellectual property organizations - OAPI and AIPO who can also be assisted in contributing to the global debate on intellectual property rights issues.

– Privacy

51 The government has an important role to play in securing citizens' privacy through adopting laws to protect its people against invasion of their lives through the new technologies. African governments should therefore formulate clear policies regarding electronic recording of personal data and means for controlling its use. It is recommended that a working group of representatives from African countries develop appropriate policies for privacy protection.

– Free flow of information

52 African governments should encourage the free flow of information within their countries and to/from the rest of the world by ensuring that laws and regulations protect the freedom of speech and ensure easy access to information and the provision of value-added services.

– Role of the private sector

53 In developed countries, the private sector has assumed a vital role in establishing the Information Society. It is crucial in Africa that a critical mass of local business ventures arise, capable of supporting and using the information infrastructure. Public policy, in concert with private initiatives must collaborate in achieving an African information society. The private sector in Africa has to play a major role in realizing the African Information Society by:

a) Stimulating growth and assuming market leadership in developing national information and communication infrastructures through investment in relevant areas;

b) Seizing the new business opportunities that arise from the implementation of the AISI.

54 To achieve this, the private sector can contribute, through the appropriate mechanisms, to empowering the four main private sector components:

a) Entrepreneurs and business managers: support for managers of small and medium size enterprises (SMEs) in information and communication fields.

b) The Environment: establishment of a legislative and organizational framework that eliminates constraints and supports business development in this area.

c) Investment promotion agencies: encouragement of agencies that can provide finance, marketing and promotional activities to entrepreneurs.

d) The Market: enlargement of the consumer base through provision of improved and greater ranges of information related services.

Role of Non-Governmental Organizations (NGOs)

55 Voluntary organizations and consumer and labour groups should play a catalytic and coordinating role with government and private sector, providing a balance to a market oriented service industry and helping to ensure that universal service objectives are realized. Specific support for participation in the AISI should be given for:

a) Voluntary organizations which can provide a vital voice in making known the needs of poor and disenfranchised groups such as the rural communities, the homeless, the aged and the sick, and contribute to developing their capacity to make use of the services offered;

b) Consumer associations, which voice public concerns and needs and national associations of information and communication technology user groups which will be a particularly important force for defining priorities in developing the African Information Society.

c) Labour associations, which are responsible for promoting the concerns of the workforce to employers and government.

56 All of the above associations should work actively with the government in the formulation of its vision, strategies and plans for information infrastructure development, for example, through the joint boards proposed above. A Pan African meeting of NGOs may need to take place to formulate the vision and strategies for their participation in the development and use of an African informatics infrastructure.

Role of the media

57 In addition to being an essential means for information dissemination, the mass media plays a critical role in spreading awareness in Africa of the importance and benefits of the information revolution. Newspapers, radio, and television provide an easy, accessible, and cheap means of carrying information to the end user. Communities in Africa do not have to wait for the Internet to receive much of the information it carries. The mass media can access many of the existing sources of information and provide broad channels of communications to the poor and to remote areas. Media organizations should therefore contribute to the AISI by:

a) Creating awareness about an AISI for the community at large.

b) Providing ways and means for disseminating information resulting from an AISI.

c) Opening channels for communication which reach out to all citizens.

Proposed Regional Programme: ECA to initiate and coordinate the AISI

58 The African Information Society Initiative needs to be well-coordinated and monitored at regional and subregional levels to ensure that all related activities taking place in Africa within its framework complement each other.

59 To successfully implement the African Information and Society Initiative on a regional basis it is recommended that ECA take the lead in coordinating with other related regional initiatives, organizations such as The United Nations System-Wide Special Initiative for Africa, the Organization of African Unity, the African Development Bank and with existing subregional groupings and projects such as SADC, COMESA, IGADD, ECOWAS, UDEAC, ECCAS, UEMOA, PATU, RASCOM, UMA and URTNA. This will also be particularly important in making sure that international support is given to those countries in most need.

60 To carry out its task the ECA would:

a) Act as the regional executing agency for the AISI in charge of following up and monitoring its implementation and coordinating the implementation of the regional AISI activities.

b) Handle the fund-raising activities for financial support of the implementation of AISI projects in conjunction with the various regional and subregional bodies listed above.

61 Implementation of the "African Information Society Initiative" would envision the following process for achieving the programme:

a) Adoption of this report by the ECA Conference of Ministers.

b) Mobilization at regional and global levels of government and generation of commitment by Heads of State for AISI at regional and global levels through:

Referral of this Action Plan to the United Nations General Assembly, the OAU Council of Ministers, the ECA/OAU/ADB Joint Secretariat, the Africa Regional Telecommunication Development Conference (Abidjan, 6-10 May 1996), and the Ministerial Conference on the Global Information Society, sponsored by the Government of the Republic of South Africa (13-15 May 1996).

Facilitation of cooperation between African states and between Africa and the rest of the world through member states adopting regional and subregional programmes and by calling on intergovernmental bodies, such as the OAU and the ADB, to establish inter-organizational committees to promote and coordinate activities.

Facilitation of cooperation within African states through establishment of high-level multiministerial coordination committees and active cross-sectoral associations of users and service providers.

Requesting the ECA to set up a mechanism for monitoring progress, linking in to other initiatives and involving all potential partners from the government, the private sector, labour, academia, civil society, international organizations, NGOs and the media.

62 It is recommended that an African Technical Advisory Committee be established within the institutional framework required for implementing the AISI. The committee would be constituted of a number of experts from the region who would meet yearly under the auspices of the ECA. They would be in charge of:

a) Advising ECA on regional programmes and projects

b) Monitoring implementation of AISI

c) Evaluating results

d) Recommending and initiating regional projects

Proposed national programmes

Programme 1: Development of national infrastructure plans

63 One of the most important steps for each African country to take in joining the "African Information Society" is to develop a National Information and Communication Infrastructure (NICI) plan as outlined in Annex 2. This should subsequently be followed by development, management, marketing and funding of five year plans - (1997-2002); (2002-2007); and (2007-2012).

Programme 2: National sectoral "infostructure" development

64 Great efforts will also be needed in building the information resources - "infostructure" - in each of the member countries. Taking into consideration the major problems and challenges African countries are facing, a number of specific projects in the areas outlined above under "Challenges and Opportunities", are proposed for implementation. These projects will contribute to building the information base needed for planning, decision-making, business development, exchange of information, providing value-added information services, and finally building Africa's information society. Other projects could be identified to meet the specific requirements of each country. Brief descriptions including objectives and goals of potential projects are attached in Annex 2.

B Human resources

65 Africa's social and economic development is to a large extent determined by the size and quality of its work force - its human and intellectual capital. The success of economies of the future will be more than ever determined by the quality of their human resources as the importance of natural resources steadily diminishes. Preparing Africa for the information age primarily necessitates appropriate investment in its human resources - training, education and promotion will be the cornerstones of Africa's new society.

66 Development of human resources also requires having a new profile of management/labour forces; the ability to adapt, adopt and exploit new technologies and to manage the change; and creating new job markets where skills and knowledge learned can be applied.

a) Needs within the information society at large

67 Decision-makers need to have a good understanding of the ways to use new information technologies in decision-making; they need access to a wide scope of national information sources covering different sectors as well as access to regional and international information resources. They need knowledge on how to search, extract and use available information resources; and awareness of the need for equitable access to technology.

68 Businesses need to have access to national regional and international market information, to value-added information services; they need knowledge of how to best use the available information resources to improve and develop their businesses and knowledge of how to conduct secure low-cost transactions through the information and communication networks.

69 Students need access to national, regional and international electronic information networks, including electronic libraries; knowledge of how to use the new communication and networking technologies; access to appropriate labs, facilities and resources to best utilize the new technologies which amplify the learning process in a wide range of subject matters; and access to self teaching and training packages and tools, including distance learning resources, in different subjects. They also need to be able to share knowledge and experience with students of the same level in other African countries and elsewhere.

70 Skilled workers need easy and simple instructional tools, including distance learning resources, to help them learn individually and jointly with other workers; they need knowledge of new techniques and developments in their areas of specialization and the possibility of sharing their experiences and building links with other workers in other agencies in their own country or in other African countries.

71 The general public needs to upgrade its level of computer literacy to be aware of the importance of information availability and usage; and be able to use new technologies to communicate as easily and cheaply across town as across countries. They also need to know how to exploit information to enhance their well-being.

b) Needs within the information and telecommunication industry

72 Information systems specialists need to learn how to design and implement information systems in different applications and national sectoral databases; to capture data, build and administer databases and decision support systems; and to build World Wide Web (WWW) based information servers on the Internet.

73 Information service providers need to know how to analyse user needs and identify what information services their users require; to access information available from national, regional and international sources; and to establish systems for updating data on a regular basis.

74 Telecommunication and networking specialists need to learn how to plan, design, install, operate and maintain communication and information networks.

c) Proposed programme for information society readiness

75 The following proposed programmes aim at building readiness for the information society among decision-makers, the private sector and the public as well as among skilled students and professionals. A major goal of the programme will be to encourage the adoption of new educational paradigms involving the concepts of "lifelong learning" and "lifetime entrepreneurship", "learning while doing", "just in time open learning" and the constant exploitation of information for problem solving and analysis.

i) Programme 1: Stakeholder awareness programme

76 The stakeholder awareness programme should aim at building informed decision-makers in the private sector and the public sector through increasing their knowledge of information, and information and decision support systems; of national and international information resources, methods of searching and retrieving on-line information through Internet and other international information networks, electronic mail and "knowledge networks"; the potential social, economic and cultural impacts of the new information and communication systems; and the need for training to adapt organizational structures and work process to make efficient use of the electronic resources and electronic venues.

77 Such awareness programmes should be designed and implemented at the level of Africa at large, at subregional level for a group of countries and at national levels in each of the member States. Such seminars and workshops should be modular in nature, capable of being scaled up to subregional and national levels, and adapted for use down to the school, neighbourhood and village. They should contribute to sustained capacity for awareness promotion. They should also be conducted frequently to take account of rapid developments in information and communication technologies.

ii) Programme 2: Educational programme

78 The educational programme should aim at preparing students in schools and universities to deal with the new information and communication technologies. As with the stakeholder awareness programme, it should be modular in nature and capable of being scaled upwards or downwards. This programme should include developing frameworks for academic qualifications in information and communications technology studies; developing the technology based training (TBT)/learning packages required in different subject areas and adapting available packages to the needs and context of African countries; and training the teachers and students in how to use the software.

79 The regional programme should be made up of a series of national programmes tailored to each country, based on national needs and resources available. Exchanging and sharing experiences among African countries should be done through distance learning and virtual education projects. New educational tools and techniques, adapted to the African context, should be developed and utilized.

iii) Programme 3: Competence development programme for professionals and skilled workers

80 The competence development programme should aim at improving the performance of professionals and skilled workers in all occupational sectors. Particular attention should be given to the training of information and telecommunication specialists.

81 The general programme should focus on training professionals and skilled workers in different areas, such as health, industry, tourism, trade, transport, etc., in using the new technological tools and techniques in their areas of expertise to better perform their jobs.

82 The information specialists programme should focus on training telecommunication and networking specialists, information systems specialists as well as information services providers and specialists.

83 The programme should comprise the following activities: building the infrastructure required, including "centres of excellence" in information and telecommunications technologies, training centres, labs, and associated communication and networking facilities; development of

technology-based learning packages; training the trainers and teachers; training the professionals and specialists in information and telecommunication technology.

84 The professional development programme should have regional components and national components. The regional components should provide (sub)regional centralized training facilities for more advanced training and for training of trainers. National programmes for each country should address the broader needs of competence development in the country. Distance learning and computer (multimedia) based training methods should be used to accelerate the process and to maximize the utilization of the educational and training resources available regionally and internationally, including those developed within the framework of the ITU's "Global Telecommunications University" and other similar initiatives, for the benefit of African countries.

C Information resources - "infostructure"

85 Communications infrastructure supports both access to content and access to an electronic venue (space) where real social and economic activity occur. The quality of the data and information, knowledge resources (databases, archives and libraries) which are made available via this "infostructure" ranging from indigenous to global information sources, and how they are used, will ultimately be the yardstick by which the benefits of the AISI will be judged.

86 The opportunities for building a wealth of information sources could have substantial positive impact on Africa, allowing it to:

a) Enable African decision-makers to make much more informed socio-economic planning decisions.

b) Make African people producers of indigenous information and knowledge and not simply passive consumers of imported information.

c) Export information and knowledge and to participate pro-actively in the development of the global information infrastructure.

d) Provide African researchers and scientists with access to information on Africa generated from within the continent.

e) Enable African researchers and scientists to collaborate on an equal footing with their peers around the world irrespective of distance.

f) Promote Africa's cultural heritage, including the modern cultural sector of its rich and growing film and music industries.

Recommended actions

87 To build this content, decision-makers, planners and information specialists will need to:

a) Identify the priority information and communication technology application areas with the highest impact on socio-economic development at national and regional levels;

b) Make special efforts to capture data which is difficult to obtain or is unreliable and ensure timely and accurate provision of information for decision support systems;

c) Develop and use software and data that addresses the variety of languages used in African countries and its oral traditions;

d) Encourage the development of value-added information services including electronic publishing and networking facilities;

e) Support initiatives which build local content.

f) Develop a range of methods for information dissemination, including printed materials developed from on-line resources such as flash reports and indicator bulletins.

g) Encourage the development of the "information brokerage" sector which can act as an intermediary between the knowledge bases and the users.

Proposed programmes for developing national information and knowledge resources

88 In order to establish, develop and improve the information resources required for building the African information society the following programmes are suggested:

Programme 1: Building national information resources

89 This programme aims at building the national information sources of data and information on the African continent and ensuring their coverage of all sectors of the economy. The programme should include:

a) Building issue-based local and sectoral databases in accordance with national priorities.

b) Establishing mechanisms for the continuous gathering, up-dating and processing of data.

c) Maintaining national databases and information resources.

Programme 2: Provision of value-added information services

90 This programme aims at providing imperative value-added information services to ensure information availability to the public sector and enhance the competitive advantage of the private sector in Africa. The programme should include:

a) Providing an enabling environment for the growth and sustainability of African information service providers.

b) Ensuring Internet connectivity and African participation in the information content of the Internet.

c) Providing value-added information services in key areas of the economy such as trade and commerce, employment opportunities, tourism services, legislation, etc.

Programme 3: Development of electronic libraries

91 This programme aims at providing empirical information sources and helping to close the resource gap by making textbooks and periodicals electronically available, especially for schools, universities and research centres. This can be provided through building national electronic (on-line) libraries and providing access to international on-line resources. It would require:

a) Automating national libraries and making them accessible on-line;

b) Providing mechanisms for the exchange of information among existing libraries in ministries, municipalities, universities and schools.

D Technological resources "infrastructure"

92 Effective information and communication systems require reliable, low-cost and widespread technological resources such as computers, software, and all the components of the telecommunications infrastructure for processing data and information. Developing these underlying support systems upon which to build the African information infrastructure will require great changes in the technology resources currently available to most Africans.

93 It will be necessary to upgrade and develop the physical and logical telecommunication infrastructure and network at the national level, in addition to improving continental interconnectivity and providing gateways to international telecommunication networks. However it is here where technological advancements offer Africa cost-effective and appropriate technologies to "leap-frog" over several generations of intermediate technologies still in use in the industrial world.

Recommended actions

Infrastructure requirements

94 In line with the relevant resolutions of the Regional African Telecommunication Development Conference (Harare, 1992) and the Buenos Aires Declaration (WD-94, Buenos Aires, 1994) it is recommended that African countries greatly increase accessibility to telecommunication networks and services and to the GII, in particular for people in rural and isolated areas, using affordable telecommunication systems, matched to the low level of financial resources in Africa. This involves, *inter alia*:

a) Using new low-cost terrestrial wireless and satellite communication systems to provide access for rural and isolated areas.

b) Ensuring national, regional and international interconnectivity and interoperability of telecommunication networks.

c) Building reliable access networks to the global information infrastructure, including the Internet.

d) Installing cheap, simple and robust technologies using flexible, modular, and scalable network designs for coping with increasing users and traffic.

e) Establishing low-cost access from every major town, or distance independent tariffs for calls to the nearest access point.

f) Using simple interfaces for the non-literate and those unfamiliar with computers.

g) Developing broad band services and bandwidth-on-demand facilities for low-cost multimedia applications.

h) Improving network reliability and flexibility by providing redundant links and duplicate equipment.

i) Using modern network management systems to optimize and monitor the use of the networks.

j) Establishing a clear set of standards and criteria by which to evaluate any national information and communication initiative project.

k) Using hardware, software and applications that take into account training and maintenance requirements for durability and ease of use.

l) Using voice based systems where possible to provide for the low literacy levels, oral traditions and diversity of languages in Africa.

m) Using software that supports multiple languages and translation systems to allow on-line dialogue between people using different languages.

n) Installing access systems in public places (kiosks and community tele-centres) and mobile or easily transportable systems to bring the information infrastructure closer to the general population.

o) Providing hard-copy output capabilities so that users can take away the results of their information queries or commercial transactions.

p) Exploiting broadcast data systems to provide low-cost information dissemination in areas without adequate telecommunication infrastructure.

Improving the reliability of electricity supply to maintain reliable communications networks by using low-cost integrated solar power and battery recharge systems.

Proposed programmes

95 In order to develop and upgrade present communication facilities on the African continent the following programmes are suggested:

Programme 1: Developing and upgrading national telecommunication infrastructure

96 This programme aims at developing and upgrading the national telecommunication infrastructure in member countries through:

a) Upgrading the physical telecommunication infrastructure in countries that lack the facilities required.

b) Extending the geographical coverage of the physical infrastructure and adding new capabilities and services.

c) Adapting and adopting new technologies to satisfy current demand within the context of individual country circumstances.

d) Creating basic national networking services such as e-mail, FTP, WWW, etc.

Programme 2: Continental interconnectivity

97 This programme aims at interconnecting the African countries through:

a) Developing national data communication hubs so as to improve regional and continental connectivity.

b) Adopting a regional strategy and plan for the further development of the Pan African Telecommunication Network (PANAFTEL).

c) Providing easy and direct dial-in and dial-out facilities between African countries.

d) Establishing the necessary interconnectivity between the telephone and data networks in the African region.

e) Providing data communication gateways and bridging facilities between Africa and the rest of the world;

Programme 3: Pilot projects

98 This programme aims at creating a test bed for new technologies, innovative partnership arrangements and tariff and charging mechanisms through the implementation of a number of small, quick impact pilot demonstration projects in some African countries, as proposed in the Buenos Aires Action Plan.

Programme 4: Integrated rural development

99 Shared rural public access telecentres, kiosks, mobile computing and telecommunications resources will be established at selected locations with support from international donors.

100 The tasks laid out are formidable. However the information revolution is one that Africa cannot afford to miss. The economic and social costs are less than any other preceding structural change, while the price of being left out is an insurmountable development gap between "information rich" and "information poor" nations. If a swift response is not made the opportunities lost will see Africa's people relegated to second class status in the new world order. Finally the group of experts believe that Africa can make it: all that is needed is hard work with vision, strategy, determination and cooperation.

ANNEX 1

Members of the high level working group on information and communication technologies in Africa

Members:

Experts:

Dr. Hisham El Sherif (Chairman)
Organization: Chairman of the Advisory Board, Information and Decision Support Center
Address: 1 Magles El Shaab St.,
Cairo, Egypt
Tel: +202 3551551
Fax: +202 3541222
E-mail: hsherif@idsc.gov.eg

Mr. Michael Jensen (Rapporteur)
Organization: Information and communication consultant
Address: Box 18866, Hillbrow 2038
Johannesburg, South Africa
Tel: +27 116148231
Fax: +27 114921058
E-mail: mikej@wn.apc.org

Prof. Raymond U. Akwule
Organization: George Mason University
Address: Thompson Hall, Room 111c,
Fairfax, Virginia USA
Tel: +703 9931091
Fax: +703 9931096
E-mail: rakwule@gmu.edu

Ms. Karima Bounemra
Organization: Director, IRSIT
Address: 2 Rue Ibn Nadim,
Tunis, Tunisia
Tel: +216 1800122
Fax: +216 1787827
E-mail: karima.bounemra@irsit.tn

Dr. Ben Fouche
Organization: Director, Information Services
Council for Scientific and Industrial Research
Address: P.O Box 395
Pretoria 0001, South Africa
Tel: +27 128412852
Fax: +27 128413365
E-mail: bfouche@csir.co.za

Mr. Richard Maga
Organization: Advisor to the Minister of Posts and Telecommunications, CETCAM
Address: B.P. 8311
Yaounde, Cameroon
Tel: +237 223944
Fax: +237 221000
E-mail: richard.maga@ties.itu.ch

Mr. Muriuki Mureithi
Organization: Telecommunications Foundation of Africa
Address: P.O. Box 59948
Nairobi, Kenya
Tel: +254 2 567 381
Fax: +254 2 567 383
Email: tfa@arcc.permanet.org

Mr. Momar Aly Ndiaye
Organization: Délégué à l'informatique
Address: 2 rue Emile Zola
Dakar, Senegal
Tel: +221 239668
Fax: +221 229764
E-mail: ndiayem@mmet.mmet.sn

Mr. Dawit Yohannis
Organization: Speaker, the People's Assembly
Address: P.O. Box 80013
Addis Ababa, Ethiopia
Tel: +251 1 55 40 75
Fax: +251 1 55 09 00
E-mail: dawit_yohannis@padis.gn.apc.org

Associated experts:

Mr. Derrick Cogburn
Organization: CSIR/Global Information Infrastructure Commission
Address: P.O. Box 395
Pretoria, South Africa
Tel: + 27 12 841 3608
Fax: + 27 12 841 4403
E-mail: dcogburn@infoline.csir.co.za

Dr. Ernest Wilson
Organization: Deputy Director, Global Information Infrastructure Commission
Address: 0145 Tyding Hall
University of Maryland
College Park, MD, USA
Tel: +1 301 314 7711
Fax: +1 301 314 9256
E-mail: ewilson@bss2.umd.edu

ANNEX 2

Guidelines for developing national information and communication infrastructure (NICI)

1 Define vision, mission, strategic objectives, scope.

2 Define the institutional framework.

3 Define the regulatory framework.

4 Define the information technology business sector.

5 Define the development priorities (five-year plan, cabinet directions, etc.).

6 Define the economic and business sectors as well as the market trends.

7 Define education and science and technology infrastructure.

8 Define needs and priorities for information, decision support, networking, information services, etc.

9 Define the data/information and decision support agencies, actors, etc., at the different levels: national, local.

10 Define the technology infrastructure.

11 Identify, formulate and develop programmes and projects.

12 Formulate strategies for development of NICIs.

13 Develop a detailed action plan, time schedule, priorities and budget.

14 Determine the implementation agencies in charge.

15 Solicit the commitment of policy-makers, industry leaders, etc.

16 Formulate the public awareness campaign.

17 Implementation.

ANNEX 3

Proposed projects

1 The programmes proposed within part III above to develop the components of the information resources will include different projects. Each programme will be designed to achieve its objectives and will be based on the design and implementation of a set of projects that will help in achieving its objectives in different aspects.

2 Following are a set of projects that are recommended for African countries to be implemented within the framework of this initiative and within the regional programmes previously recommended:

a) **Debt management objective**: Support economic development through better debt management.

i) beneficiaries: society, top-level government decision-makers;

ii) goals:

a) establish/enhance loan databases and guarantee integrity and validity of loan databases;

b) reduce the national debts of African countries (by 25 per cent by the year 2005);

c) secure dynamic tracking components for crisis avoidance and debt management.

b) **Education and training objective**: Improve basic education and work force skills.

i) beneficiaries: teachers and students in public schools, employees of SMEs (upgrading their skills and improving their productivity), local libraries (will have access to national and international libraries and archives), people tied to their homes and in remote areas;

ii) goals:

a) linking public schools and the main public libraries to the national communication backbone (all African public schools should be linked by the year 2010);

b) establishing distance learning centres in major cities to support on-the-job training for workers and to promote interaction between researchers, academia and industry.

c) **Higher education and research objective**: To act as a vehicle for pooling national and regional intellectual and human resource to help contribute to research and development efforts in the continent.

i) beneficiaries: researchers at universities (have easy access to current research and publications elsewhere), industrial and private research centres, and society (from the diffusion of research);

ii) goals:

a) building communication network infrastructure at every university;

b) connecting universities and research centres to the national communication backbone (all African universities should be linked by the year 2000);

c) promoting and supporting collaboration among professionals;

d) providing remote access to national and international databases, libraries, research laboratories and computing facilities.

d) **Trade and commerce objective**: Providing value-added network information services to business people and organizations in order to leverage the continent's competitiveness in trade and investments.

i) beneficiaries: small- and medium-size enterprises, manufacturers, traders, investors, importers, exporters, bankers, and capital investors;

ii) goals:

a) link chambers of commerce and trade associations to the national communication backbone (all chambers of commerce should be linked by the year 2000);

b) provide the business community with timely and accurate economic and financial indicators;

c) provide channels for the promotion of products and services;

d) improve access to stock market and commodity information;

e) improve access to capital markets.

e) **Employment and job creation objective**: Reducing the unemployment rate in Africa by increasing accessibility to job openings nationally and internationally.

i) beneficiaries: work force, employers, placement offices;

ii) goals:

a) provide on-line job matching on national, regional and international levels (reduce unemployment by 25 per cent by the year 2005);

b) create/enhance databases on human resources to support education planning at the national level;

c) provide access to national and international teleworking opportunities.

f) **Environmental monitoring and natural resource management objective**: Provide the essential infostructure for coordinated environmental management.

i) beneficiaries: society, governmental and non-governmental environmental agencies;

ii) goals:

a) improve the management and monitoring of the implementation of environment related projects;

b) creating/enhancing national and regional databases on all major areas related to the environment: fresh water, seas, air, land, natural resources, etc.;

c) assisting and supporting environment-related decision-making at the national and regional levels;

d) disseminating environment-related indicators to governments, NGOs, research centres, and international bodies.

g) **Tourism objective**: Support international and local tourism in Africa.

i) beneficiaries: society, tourists, local businesses;

ii) goals:

a) provide international promotion of tourist attractions (increase tourism revenues in Africa by 25 per cent by the year 2000);

b) assist travellers and tourists in travel planning and booking reservations;

c) create/enhance on-line regional databases of facilities, up-to-date transport schedules, and tourism service providers.

h) **Cultural preservation objective**: Assist in protecting the African cultural heritage.

i) beneficiaries: society, museums, cultural organizations, research institutes;

ii) goals:

a) putting Africa's museums on-line (all museums should be on-line by the year 2010);

b) preservation and documentation of manuscripts and artifacts;

c) increasing accessibility of rare manuscripts and artifacts to the general public and to researchers.

i) **Health care objective**: Achieve more efficient and affordable health care.

i) beneficiaries: society, health care providers;

ii) goals:

a) establish and maintain databases on public and private medical centres, physicians and health care providers;

b) provide on-line access to national and international medical databases and expertise (telemedicine);

c) link health administration for improving distribution of drugs and medical supplies;

d) link health care systems with centres for disease control for early warnings of plagues and infectious diseases;

e) link health care systems with insurance companies, medical practitioners, and the public.

j) **Food security and agricultural production objective**: Improve the production and distribution of food and agricultural products in Africa.

i) beneficiaries: society, farmers, food producers and distributors;

ii) goals:

a) link meteorological centres with agricultural advisory services;

b) provide access to international networks on food production technology and databases on food stock;

c) provide access to databases of national food storage facilities.

k) **Public administration objective**: Facilitate government management and improve public service.

i) beneficiaries: governments, public;

ii) goals:

a) improve internal revenue management;

b) improve social security administration;

c) facilitate electronic tendering systems;

d) improve accessibility to national public administration networks, especially to citizens who live in rural areas.

l) **Legislation and legal services objective**: Support national and regional coordination, cooperation and standardization of regulations and legislation.

i) beneficiaries: organizations, businesses, lawyers, legislative bodies, regional cooperation bodies;

ii) goals:

a) creating/enhancing national legislation databases which will be accessed on-line by end-users;

b) linking the databases in a regional forum that allows the exchange of legislation necessary for economic integration and business development among countries;

c) avoiding duplication of efforts in setting up standards, protocols, procedures, guidelines, systems and tools for establishing national databases.

m) **Transportation of goods and people objective**: Improve the quality of life by electronically managed roads and airways.

i) beneficiaries: passengers, air transport industry, transportation companies;

ii) goals:

a) link road traffic control centres for better road traffic management, thus reducing the fuel consumption, air pollution, wasted productivity;

b) create an African air traffic communication system providing ground-to-ground connections between African air traffic control (ATC) centres and air-to-ground connections between aircraft and ATC's across Africa.

n) **Business development and administration objective**: Support national and regional business development.

i) beneficiaries: SMEs, business and banking communities;

ii) goals:

a) provide international access points for SMEs;

b) establish links to public authorities;

c) facilitate on-line business transactions;

d) link the business community to the banking systems.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 38-E
23 April 1996
Original: English

For Information/Support

Agenda items: 0.2, 1.1, 1.2 and 1.3

PLENARY MEETING

SOURCE: KENYA

TITLE: PART I - TELECOMMUNICATIONS NETWORK GROWTH IN KENYA SINCE AF-RTDC 90
PART II - POLICY AND REGULATORY DEVELOPMENT IN KENYA SINCE AF-RTDC 90
PART III - STRONGER REGIONAL ORGANIZATIONS FOR AFRICA
PART IV - INDUSTRIALIZATION AND TECHNOLOGY TRANSFER

PART I - TELECOMMUNICATIONS NETWORK GROWTH IN KENYA SINCE AF-RTDC 90

INTRODUCTION

The Kenyan Telecommunications network has experienced significant growth since the last African Regional Development Conference held in Harare in 1990.

The Kenya Posts and Telecommunications Corporation has implemented a development programme which has increased the percentage of automatic switching capacity from 58% in 1990 to 96% in 1995.

The digitalization programme which began in 1986 has resulted in a digitalized switching capacity of 56% of the total network capacity.

NETWORK DEVELOPMENT

Switching Systems

The switching capacity of the Kenyan network has grown from 214,800 lines in 1990 to 357,008 at the end of 1995. This was achieved by the installation of over 100 digital exchanges in both rural and urban centres. In the rural areas small stand alone switching systems of 600 and 300 line capacities, and 60 telephone line concentrators have been deployed to replace manual exchanges. This has resulted in the steady decline of manual exchange capacity from 28,690 lines in 1990 to 19,940 lines in 1995.

A second international gateway switching system with a capacity of 2000 ports was commissioned in 1995.

A 2000 line capacity mobile telephone exchange was installed and commissioned in 1993. The system, which is based on the E-TACS standard proved very popular, with the capacity being exhausted within one year. Coverage of the service is concentrated in the major towns.

The Kenyan packet switching service, KENPAC was introduced in 1992 on commissioning of the 1200 port packet switching system. KENPAC service is available in major towns.

Transmission Systems

During the period 1990-1995 digitalization of various transmission systems has taken place.

The 140 Mbit/s digital microwave link between Nairobi and Mombasa was commissioned in 1993. Implementation of a 140 Mbit/s link between Nairobi and Western Kenya is underway and is expected to be completed by the end of 1996.

A total of 21 optical fibre cable systems have been deployed in Nairobi and Mombasa to provide digital connectivity between digital exchanges.

In rural areas over 1000 Km of PCM junction cables and 5 small capacity digital radio systems have been installed to interconnect the rural exchanges and the telephone line concentrators.

A new standard A earth station, facing the 63°E Intelsat satellite was commissioned in 1995 bringing the total of earth stations to three.

In order to serve clusters of customers in remote areas a project to install and commission multi-access radio systems has been implemented. The project involved installation of 7 systems with total capacity of 3,166 lines.

Towards the end of 1995 a 64 Kbps Leased Line service was introduced in the two major cities of Nairobi and Mombasa. The service is available from Kenya to USA, Canada, UK, Germany, France, Sweden and Switzerland.

GROWTH IN SERVICES

With the network development outlined above, the customer base has shown a significant growth. The exchange line connection increased from 183,240 lines in 1990 to 249,604 lines in 1995, representing 44% growth in 5 years.

The number of international voice circuits has grown from 562 in 1990 to 755 in 1996. Incoming traffic has grown from 26,115,204 paid minutes in 1990 to 47,614,782 paid minutes in 1995 while outgoing traffic has grown from 21,062,627 to 25,602,589 during the same period.

NETWORK DEVELOPMENT STATISTICS

CATEGORY	DEC. 1990	DEC. 1995	VARIATION	% GROWTH
EXCHANGE CAPACITY				
Auto	214,800	357,008	142,208	66
Manual	28,690	19,940	-8,750	-31
% Automation	88	95		
EXCHANGE CONNECTION				
Auto	168,621	242,638	74,017	44
Manual	14,619	6,966	-7,653	-48

Transmission

Optical fibre junction routes

565 Mbit/s - 4 routes

140 Mbit/s - 10 routes

34 Mbit/s - 7 routes

Radio

140 Mbit/s	-	2 routes
34 Mbit/s	-	5 routes

Value Added Services

* Mobile Telephone Service - 2,000 lines (serving major centres)
* Public Data Service (KENPAC) - 1,200 ports

REPORT ON POLICY STUDY OF FIVE AFRICAN COUNTRIES AND NEGOTIATIONS AND CONCESSIONS UNDER GENERAL AGREEMENT ON TRADE IN SERVICES (GATS)

Introduction

The Report was prepared by two ITU contracted experts and covered Ghana, Guinea, Senegal, Tanzania and Uganda.

The main objective of the study was to identify ways and means by which development and regional integration of Benin, Burundi, Ghana, Guinea, Kenya, Nigeria, Senegal, Tanzania, Uganda and Zimbabwe participating in the Coordinated African Programme of Assistance on Services (CAPAS) could be facilitated via multilateral liberalization under GATS. The focus on the five countries centred on reviewing their experience with a view to formulating proposals for further reforms, expediting regional integration and making market offers/requests under GATS with respect to the five and all CAPAS countries.

In general, the consultants complied with the terms of reference for the study.

Advantages and Disadvantages

There is need to upgrade the study or engage new consultancy so as to clearly identify the advantages and disadvantages of GATS for various countries. It would be desirable to quantify some of the benefits and disbenefits, if any as well as assist the countries concerned in the development and application of an appropriate model in the quantification process.

Skills Development

The WTO has training opportunities (e.g Technical Cooperation, Trade Policy Training Courses, International Trade Centre) that could be beneficial to personnel involved in telecommunications and other services in the various countries. Participation in some of these courses should be facilitated with a view to developing skilled personnel in trade in services.

The proposal in the Report that ITU could provide co-ordination support in this area should be highly acceptable.

Role of ITU

Due to resource constraints many developing countries were unable to participate in GATS negotiations including the on-going negotiations on basic telephony expected to be finalized in April 1996.

It is true as suggested in the Report that ITU has an important role to play by providing support to developing countries in such areas as:

i) information on schedules of commitments on telecommunication services and products from both developed and developing countries.

ii) progress reports on on-going negotiations.

iii) provision of resources (e.g funding, research support) to enable African countries prepare adequately and participate effectively in future negotiations.

PART II - POLICY AND REGULATORY DEVELOPMENT IN KENYA SINCE AF-RTDC 90

INTRODUCTION

The Kenyan telecommunications sector regulatory environment has experienced some significant changes since the AF-RTDC 90 held in Harare, Zimbabwe.

As at AF-RTDC 90 the sector had only one player, the Kenya Posts and Telecommunications Corporation (KPTC) which is a government owned parastatal. KPTC enjoyed full monopoly in the provision of all telecommunications services and was responsible for Frequency Spectrum Management.

PRIVATE SECTOR PARTICIPATION

In 1991, private sector participation in telecommunications was introduced through the liberalization of telecommunications wiring and terminal equipment. At this time KPTC assumed the dual role of operator/regulator.

To date over 200 telecommunications companies have been licensed to sell, install and maintain terminal equipment and internal wiring.

In order to prepare for the inevitable separation of the operation and regulation functions of KPTC, the Telecommunications Services Department was restructured, to consolidate all sections involved in regulatory activities into one Division. Thus the Communications Regulatory Affairs Division was created in December, 1994.

TELECOMMUNICATIONS SECTOR POLICY

Resulting from numerous consultations and studies undertaken in the period 1994 to 1995 the Government has issued a communications sector policy, whose objective is to optimize the contribution of the sector to the development of the Kenyan economy by ensuring the availability of efficient, reliable and affordable communications services throughout the country.

In order to achieve this objective the following strategies will be adopted:-

1 Legislation will be presented to parliament during 1996 seeking to split the Kenya Posts and Telecommunications Corporation (KPTC) into three separate entities:-

- Posts
- Telecommunications
- Regulatory Affairs

If approved the three entities will be established by December 1996.

2 The Government will open to investors at least 30 per cent of the capital of the new telecommunications entity through the participation of a strategic investor and through public floatation.

3 KPTC will divest its non-essential services including workshops and buildings by September 1996.

4 The Regulatory Authority once established will undertake all regulatory functions. Once enacted the new legislation will provide for the rights and obligations of operators, licensing, interconnection, fair competition and public service obligations and will ensure the protection of the interests of customers and investors.

5 Competition in the sector within a defined market structure will be fostered by the licensing of new players to increase customer choice.

The market will be divided into 6 major segments:-

(i) Customer Premises Equipment;
(ii) Local Telephone Service;
(iii) National and International Long Distance Telephone Service;
(iv) Mobile Radio Services;
(v) Enhanced Data Services;
(vi) Telecommunications Infrastructure.

PART III - STRONGER REGIONAL ORGANIZATIONS FOR AFRICA

1. **BACKGROUND**

Many organizations addressing regional or sub-regional issues on telecommunication been established in Africa. Participation in the organizations is at various levels namely:- Intergovernmental, Telecom Operator, private or have either permanent secretariat or adhoc status.

2. Below is a list of some of the organizations:-

Organization	Frequency of Meetings	Status	Levels of Participation
ARTC	Annual	Adhoc	Operator
TRIPARTITE	Annual	Adhoc	Operator
PATU	Continuous	Permanent	Govt/operator
RASCOM		Permanent	Govt/Operator
SATCC		Permanent	Govt/Operator
ITU REGIONAL OFFICE		Permanent	Operator

3. Although the above is by no means exhaustive it is an indication of proliferation of multi-country initiatives aimed at solving problems in the telecommunication sector.

4. The inter-governmental bodies have policy organs that meet at ministerial level with telecommunication operators as technical advisors and generally promulgate broad policy guidelines on telecommunications development. On the other hand organizations such as ARTC which involve Telecom Operators deal with operational and managerial issues.

5. RASCOM is expected to be a satellite service provider.

6. All the organizations are non-commercial and rely on annual financial contributions. In addition governments and telecommunication corporation dedicate senior staff to participate in high level meetings periodically.

MISSION

7. The mission of all the regional and sub-regional organizations is to provide a forum for addressing multi-lateral issues on telecommunications development. Specifically on matters such as charging principles, interconnection, sub-regional networks, operation, maintenance and important policy issues have been considered by the various organizations. The OAU leaders when creating PATU intended that the organization would spearhead enhanced intra-regional connectivity, harmonization of tariffs, technology transfer and create a forum for articulation of African views to the world telecommunications fora.

8. With dramatic evolution of the telecommunication industry, governments in Africa are liberalizing and encouraging private sector players. These are profit making oriented and need to justify any contribution to any organization. Could the mission of these organizations created in the days of monopoly satisfy the new operator? The consumer demands are also changing.

STATUS

9. Almost all regional and sub-regional organizations are suffering from various problems notably:-

- Cashflow	- payment of contributions are slow
- Inactivity	- due to low finances some organizations can barely pay for staff maintenance.
- Legal capacity	- resolutions and decision adopted by organizations are at times not implemented with adverse effect on expected benefits.
- Non-commercial	- The world-wide trend is that the private sector is increasingly becoming a prime mover of telecommunications policy and development. In Africa the Private sector is yet to be brought in the fold.
- Mission	- the original mission may need a review to address the 21st century and beyond and evolving communication industry.

ISSUES FOR CONSIDERATION

10. The recent and continuing dramatic changes in telecommunication sector and technology have important implications for requirements of the nature and type of telecommunication organisations.Perhaps it is now time to undertake a review of all telecommunication organisations in Africa with a view to enhancing their effectiveness and relevance in solving African telecommunication problems,meeting the needs and improving the capacity to achieve respective missions.

11. The mission should be reviewed as a matter of priority, e.g PATU with the present structure would be handicapped in the evolving scenario. We therefore take note of the active efforts to restructure and re-orient it to the future realities.

12. Role of private sector should be reconsidered.

KEY

ARTC - Africa Regional Telecommunication Conference
PATU - Pan-African Telecommunication Union
RASCOM - Regional African Satellite Communication
SATCC - South Africa Telecommunications Coordination Conference.
ITU - International Telecommunication Union.

PART IV - INDUSTRIALIZATION AND TECHNOLOGY TRANSFER

Introduction

1. The economies of most developing countries are largely dominated by primary sector activities including primary exports in the international trade regime. As a consequence these countries have continued to face unique problems emanating from deteriorating terms of trade, price fluctuations including exchange rate instability, limited dynamic effects accruing from development initiatives, unemployment and underemployment, and rapid technological changes.

2. Kenya recognizes that the agricultural and industrial sectors have important linkages. The agricultural sector provides food, raw materials, jobs, and market for manufacturers whereas the industrial sector plays important role in the provision of market for agricultural products, employment, and intermediate inputs used in the agricultural sector. It is therefore the case that for industrial development to succeed the agricultural and other sectors must be developed optimally.

3. At independence Kenya's industrial strategy was based on the import substitution strategy that laid emphasis on protectionism and subsidization of local industries. Over time these industries became very inefficient. Sessional paper No 1 of 1986 came up with a new theme on "Economic Management for Renewed Growth" in which the focus shifted towards export promotion.

4. In the telecommunication sector the gap in the extent and quality of telecommunication services between the developed and developing countries has continued to be aggravated by difficulties associated with importation of telecommunication plant, equipment and materials by developing countries. Kenya has attempted to address this problem by setting up a local telecommunication manufacturing concern, Gilgil Telecommunications Industries (GTI).

Role of industry and technology

5. Time series studies have shown that there is positive correlation between Gross Domestic Product per capita and the share of manufacturing and tertiary sectors in Gross Domestic Product. For instance according to information provided by Kenya's Ministry of Planning and National Development, the respective contribution of Kenya's agriculture, manufacturing and services to Gross Domestic Product was 28 per cent, 14 per cent and 52 per cent in 1994 compared with 35 per cent, 10 per and 47 per cent in 1972.

6. Industrial development in and transfer of appropriate technology to developing countries remains an indispensable focus for achieving rapid economic development, alleviating problems of over-reliance on the primary sector and transforming these economies with the ultimate goal of self-reliance and self-sustenance. It is in recognition of this that Kenya is committed to becoming a newly industrialized country (NIC) before 2020 and the theme for the next national Development Plan (1997 - 2001) is "Rapid Industrialization for Sustainable Development". Telecommunication sector has a direct and indirect role to play in the development of the primary, industrial and tertiary sectors.

7. The Missing Link

The continued existence of the missing link in the extent and quality of telecommunication services between the developed and developing countries must be addressed for the mutual benefit of both economies. Some of the problems developing countries face in their endeavor to bridge the link include:-

* the high cost of imported telecommunication equipment, plant and materials including spare parts in the face of shortage of resources which adversely affects telecommunication development, operation, maintenance, management and capacity utilization. The imports are normally supplied by developed countries and most of the equipment is not designed for developing countries' environment.

* short product cycles leading to problems of spare parts supply for installed plant and equipment that still has economic life.

* the design and dimensioning of telecommunication systems largely rely on foreign advice and the equipment available is either imported or even if locally assembled (hence increasing knowledge in operation and maintenance) does not necessary provide access to engineering design and manufacturing know-how and know-why which is essential for enhancing local industrialization and technological development.

* low or non-existent R&D capability in the developing countries whereas R&D activities in the developed countries are normally geared towards meeting the latter's needs. This constitutes a major bottleneck to technology development and transfer.

Bridging the Missing Link

8. Although industrial development and technology development/transfer are a natural concomitant to economic development such factors as economic/commercial, legal and political environment continue to inhibit the attainment of this goal amongst the developing countries. Kenya is committed to bridging the missing link, developing local manufacturing and R&D capabilities, and promoting technology development and transfer. In pursuit of this goal Kenya, inter alia:

* is committed to a mixed economy where the private sector (foreign and domestic) is expected to play an increasing role for stable and sustained development of the economy.

* has guarantees against expropriation (spelt out in the constitution) and for repatriation of capital and profits (Foreign Investment Protection Act).

* provides incentives (e.g Manufacturing Under Bond, Export Processing Zones, Investment Promotion Centre to provide one-stop-shop facilities for both domestic and foreign investors.

* established Kenya Industrial Property Office (KIPO) in 1989 to examine application for and grant industrial property rights; screen, vet and register transfer agreements and licenses; promote inventiveness in Kenya. Prior to the setting up of KIPO,

Kenyan innovators had to file an application in the United Kingdom for patenting. Its establishment reflects a recognition that protection of intellectual property rights is essential for rapid economic development especially inventions, innovations, technology development and transfer.

* continues to evolve a democratic system of Government where due weight is accorded to good governance, rule of law, accountability and transparency.

* is committed to the development of local capital market for both domestic and foreign investors e.g Nairobi Stock Exchange.

Manufacturing Concerns and Associated R&D Activities

9. A number of developing countries have established telecommunication manufacturing/assembly plants as well as associated R&D activities. These activities should ultimately encompass as may be feasible all forms of technological change (e.g research on problems of service provision, search for and development of new products/processes, adaptation/improvement of products/services, and basic research) as well as modes of technology acquisition (e.g direct foreign investment) publications; human mobility;machinery and equipment imports; technical cooperation programmes including agreements in such areas as licensing, patents and training; local R&D activities. Such ventures should generate substantial benefits in terms of their contribution towards GDP; saving/generating foreign exchange earnings; job creation; development of local skills including R&D capabilities; technology development and transfer; market diversification; and telecommunication development, maintenance, management, and optimal network utilization.

Gilgil Telecommunications Industries (GTI)

10. Kenya commenced telecommunication manufacturing activities in 1985 with an assembly of switchboards mainly for use in rural areas. These activities were upgraded when the GTI was established in 1988 as a wholly-owned subsidiary of Kenya Posts and Telecommunication Corporation (KPTC) principally aimed at achieving:_

* self-sufficiency
* harmonization of equipment design and technical standards

* technology transfer and development
* repair of telecommunication equipment
* export promotion and growth
* research into factors that affect telecommunication network
* diversification as well as development of an industrial base

11. The GTI currently has the following product lines geared towards serving domestic and external market:-

* Telephones
* AXE 10 (telephone) exchanges. This is a joint venture with Ericsson Fatme, Italy - AXE 10 is a modern digital exchange which utilizes modern telecommunication technology. It has operational advantages which inlude compatibility with both analogue and digitial exchanges, it is economical in terms of its multiplexing capability and it can also work under all levels of networking i.e as a local exchange. a transit exchange, an international exchange or a mobile telephone exchange.
* Small Business Systems (currently PABXs are assembled)
* Pole Treatment
* Printing Press (printing various forms and documents)
* Wood Workshop (fabrication of furniture and fittings for office, domestic and industrial uses)
* Metal Workshop (fabrication of various types of metal products)
* Automated Repair Centre (repair of high technology digital electronic equipment including provision of repair facilities for the newly introduced multi-access radio, after sales maintenance support for all GTI products)

12. Since inception the GTI has manufactured various products and undertaken associated R&D activities. The nature of training of the production staff has resulted in a highly trained specialized and quality conscious staff who have made it possible to produce high quality and reliable products. The company also employs state of the art equipment e.g computer aided manufacture for the population of the printed circuit boards. The production layout is such that the handling of materials from goods-in (raw materials) to goods-out (finished products) takes minimum time. To ensure reliability on the electronic components all the electronic stores are protected against electrostatic discharge (ESD). GTI is also committed to continuous quality improvement with a corresponding reduction in costs. This is enhanced by the organization's commitment to the implementation of ISO 9002 Quality Standards and Total Quality Management (TQM).

13. Some of the problems that have affected GTI's operations include:-

* inadequate investment capital
* lack of industrial skills
* turnover of staff who have been trained on industrial production techniques mainly due to inability to provide adequate staff incentives because of Government controls.

14. It is envisaged that the solution to these drawbacks lies in at least:-

* recognition that the private sector has a great potential in bridging the capital gap
* making the best use of training opportunities offered by technology suppliers
* provision of financial and management autonomy (The Government has already exempted KPTC from the requirements of State Corporations Act).

Industrialization and technology transfer policies and strategies

15. It is evident that the establishment and sustenance of an appropriate economic/commercial environment, legal and regulatory framework, as well as political environment is a pre-requisite for enhancing industrialization, and technology development and transfer amongst developing countries. Furthermore, the need for effective collaboration between the developed and developing countries and within or amongst the latter cannot be over-emphasized for mobilizing and sharing available resources e.g funding and skills, exploiting market size, avoiding unnecessary duplication, and maximizing economies of scope and scale.

16. Additional emphasis could be laid on such areas as:

(a) identification and appraisal of industrialization and technology development and transfer options with a view to ensuring that implemented options are technically, financially and economically viable.
(b) allocation of adequate resources for R&D activities.
(c) monitoring on a continuous basis the implementation process of industrialization, technology development and transfer.
(d) transfer of appropriate technologies adaptable to local environment in developing countries.

(e) development of practical-oriented educational curricula in the developing countries' educational systems (e.g. a re-orientation of engineering and other physical science oriented courses at univertisities with a view to enhancing utilization of specialized manpower from these institutions).

(f) formulation of sustainable economic integration amongst developing countries which could facilitate mobility of labour, technology, market and skills development as well as the development of local R&D activities. Kenya is committed to the establishment and strengthening of economic integration amongst African countries. In this regard, Kenya has actively supported the revival of the East African Community and the formation of COMESA which are geared towards the establishment of an African Economic Community.

(g) provision of adequate funding and staff remuneration system that would attract, retain, develop and motivate requisite competencies.

(h) intensive level of interfacing and collaboration between industry, institutions of higher learning especially universities and polytechnics.

(i) adherence to relevant standards such as ITU, European Telecomms Standards Institute and ISO.

(J) improvement, engineering re-design and adaptation of the products to deal with the problems of short product cycles and enhance the effectiveness of technology development and transfer.

Product Mix and Research Priorities

17. The product mix could largely depend on the strategies adopted for industrialization and technology transfer (e.g import substitution, export promotion, assembly/full manufacturing) and future changes in technology. It is important that vertical integration be strengthened where feasible through assembly or manufacture of final products (e.g telephones) and intermediate products (e.g PCBs, diodes, resistors, capacitors, integrated circuits e.t.c)

18. Possible areas of collaborative reach include:-

* antennas and microwave propagation
* stored programme controlled and TDM based telecomms equipment
* power for rural telecomms such as solar and wind power supplies

* data communication terminal equipments including non-switched equipment for telephone communications
* PCM and related products
* single channel and multichannel radio products for rural telecommunications
* radio communication terminal equipment

19. The attainment of products which can be of commercial value hinges on the production process which may encompass:
* testing the prototype to verify compliance to specification
* quality control, surface finish and product acceptability
* assembling and manufacturing capabilities
* product demand assessment and market research

Conclusion

20. Industrialization in the telecommunication sector which must be customer-driven needs requisite economic, legal, political and commercial environment; technological know-how and know-why; and adequate market size for optimal production levels. There is need for effective co-operation between the developed and developing countries for the attainment of industrialization policies and development/transfer of technology. This should include consolidation and upgrading of existing telecommunication manufacturing/assembly plants with a view to enhancing the economies of scope and scale. The developing countries should additionally be prepared to produce and sustain high quality products, provide effective local participation, and be able and willing to provide adequate funding for technology development and transfer.

21. It is, therefore desirable that priority be accorded to the:-
* establishment of requisite environment within African countries that will expedite telecommunication industrialization as well as in technology transfer and development mainly through private sector participation.
* consolidation or setting up of viable assembly or manufacturing plants on a sub-regional or regional basis not later than the year 2000.
* development of local R&D capabilities in association with the manufacturing efforts.

The ITU could be requested to provide the necessary co-ordination and support to ensure that these objectives are achieved.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 39-E
23 April 1996
Original: French

For Information/Support

Agenda item: 2.3 **PLENARY MEETING**

SOURCE: FRANCE TELECOM

TITLE: THE MIGRATION OF TELECOMS SYSTEMS AND NETWORKS TO INFORMATION HIGHWAYS

THE MIGRATION OF TELECOMMUNICATIONS SYSTEMS AND NETWORKS TO INFORMATION HIGHWAYS

Dr. Anasser Ag Rhissa
France Telecom INT
Tel 33-1 60 76 47 78
E-mail: Anasser.Ag-rhissa@int-evry.fr

Summary

Most of today's telecommunication and information networks provide:

- inadequate service support to cater for the quality of service requirements of certain applications such as multimedia (videoconference, high-definition television, etc.) and high-speed network interconnection;
- specific services, like telephone or television, for which they were dimensioned and are independent and multi-access.

To effectively support various services, including multimedia services, in a distributed environment, there is a need for migration of today's information and telecommunication systems and networks to high-speed networks. The pace of migration must be determined by the needs of enterprises and users of such systems and networks.

The migration will pave the way for multimedia telecommunications and networks integrating voice, data and moving pictures, and hence for information highways.

Great care must be exercised in preparing and effecting the changeover to these information highways, if some people are not to be left in the slow lane and on the fringes of the information society.

Key words

Telecommunication networks, information networks, information highways, migration, information society.

1. Introduction

Today's technological revolution is spurring far-reaching changes in information technology, electronics, telecommunications (including switching, transmission and signal processing techniques) and media, leading, among other things, to more extensive R&D in the area of digital services and systems. Digital solutions are becoming ubiquitous, while information and communications technologies continue to evolve. Effective application of these advances can have a number of positive consequences:

- improved quality of service delivered by networks (telecommunications, IT and media);
- integration of different types of signals (voice, data and video) in a single circuit or network;
- better compatibility and interoperability between systems and networks;
- greater flexibility, with the emergence of new high-speed services;
- enhanced network and system performance;
- better management and optimized operation of systems and networks (affecting both quality and the ability to rapidly respond to demand);
- lower costs.

The transition to high-speed services and the growing need for such services (led by multimedia applications, systems and infrastructures) will only be possible if the underlying high-speed infrastructures are available. These infrastructures must be able to carry and process multimedia data. They must be flexible and respond to the need for integration of bursty traffic on corporate LANs. These infrastructures are commonly referred to as "multimedia networks" or "information highways".

The advent of multimedia and the revolution in information and communications technologies is spurring deep cultural, economic and social changes on a global scale. As UN Secretary General Javier Perez de Cuellar noted in an interview with Le Monde (January 25, 1994):

"The technological and economic revolution calls into question one of the cardinal foundations of industrial society: work. The massive use of information technologies and the rise in productivity which characterize contemporary societies are ushering in unprecedented changes which require a radical revision of conventional policies towards development, culture, education and training."

The shift of current information systems and networks (telecommunications, IT and media) towards these information highways must be carefully planned and implemented if one is not to be left by the wayside and be excluded from the Information Society.

This transition has become an international phenomenon, and it raises a number of compelling questions. Why is this direction being pursued, and what are the stakes and risks? What are the prerequisites and what is the best strategy for building and managing an information highway in Africa? How can this African information highway best be integrated with the global information infrastructure to avoid isolation? And, lastly, how should this migration be carried out?

The following article addresses these issues:

- a review of the characteristics of current networks (section 2);

- the challenges and stakes of information highways (section 3);

- integration and migration towards information highways (section 4);

- a strategy for the design and management of an information highway in Africa (section 5);

- the risks and problems raised by information highways (section 6);

- a look at key success factors (section 7).

2. Characteristics of current networks and telecommunications systems

2.1. CATEGORIES OF NETWORKS AND SWITCHING SYSTEMS

There are three categories of networks: Local Area Networks (LANs), Metropolitan Area Networks (MANs) and Wide Area Networks (WANs).

- Local Area Networks typically cover a company's building or campus. Common examples include Ethernet, Token Ring, Map, etc. The speeds on these networks are generally several megabits per second (Mbps).

- Metropolitan Area Networks serve a city or urban area. Examples are DQDB (Distributed Queue Dual Bus) and FDDI (Fiber Distributed Data Interface). The speeds of these networks range from a few Mbps to several Gigabits per second.

- Wide Area Networks cover an extended geographic area, such as a country or several countries. The public switched telephone network and public X.25 data network are examples of WANs. Their speeds range from several kilobits per second to several Mbps.

LANs and MANs generally use digital baseband signaling, while WANs usually analog frequency conversion.

Depending upon the throughput requirements of applications, networks implement various switching techniques: circuit switching (from a few Kbps to several Mbps), message switching (several Kbps), packet switching (several Kbps to several Mbps), frame switching (several Kbps to several Mbps) or cell switching (several Mbps to several Gbps).

To efficiently accommodate and transport multimedia information -- i.e. voice, data, text and full-motion video -- on a single network, only the asynchronous cell switched technology (53-byte cells) known as ATM (Asynchronous Transfer Mode) is powerful enough. In this transfer mode, the information is not synchronous at the sending and receiving ends, which does not pose a problem since the network must be synchronous.

The 1990s saw the introduction of high-speed networks and the first information highways.

The evolution of Wide Area telecommunications Networks is particularly instructive. These WANs have remained analog for too long and suffer from this handicap in trying to migrate towards information highways and multimedia telecommunications networks.

2.2. THE EVOLUTION OF TELECOMMUNICATIONS NETWORKS

There are three main "ages" in the historical development of telecommunications networks. The telecommunications networks in Africa today belong to the first two ages.

2.1. FIRST AGE: SINGLE-SERVICE TELECOMMUNICATIONS NETWORKS

The First Age concerns the period before 1970, when telecommunications were dedicated to a single service, such as telegraph, telephone, telex, radio or TV.

2.2.2. SECOND AGE: MULTISERVICE, MULTIPLE ACCESS NETWORKS

The Second Age was marked by the introduction of digital technologies by professional users and by the development of new telecommunications services (such as videotex or fax) on existing networks. In addition, new networks dedicated to data transmission (like the X.25 network) were developed during this period, which is characterized by the existence of several different services and independent networks, often incompatible. Each network implements its own proprietary connection specifications and signaling.

2.2.3. THIRD AGE: INTEGRATED SERVICES DIGITAL NETWORK

The Third Age is marked by the arrival of ISDN, the Integrated Services Digital Network. This single network offers both professional users and consumers access to all telecommunications services via a single, "universal" interface.

Information is standardized because it is encoded in digital format, unlike analog transmission. Service integration is based on this digital coding and on end-to-

end digital connection, enabling all the telecommunications offered to be implemented on a single network.

End-to-end digital connection is possible because the communications network itself is digitized (switching and transmission) and because the subscriber access to the network employs digital technology (digitization of the local distribution network and the subscriber terminal). This digitization enables perfect synchronization of network components. Enriched network signaling is carried separately from the information on a special signaling channel, a technique known as "out-of-band" signaling.

Two levels of integration have been defined: narrowband ISDN (N-ISDN), integrating voice, data, text and fixed images (or low-level animation) and Broadband ISDN (B-ISDN), integrating voice, data, text and full-motion video in the future. B-ISDN will constitute multimedia telecommunications networks or information highways.

3. Information highways: Challenges and Stakes

3.1. THE GLOBALIZATION OF INFORMATION

With the globalization of information, we have moved from the information technology era to the era of information and communication networks.

Information increasingly consists of multimedia forms, integrating voice, data and video, transported on information networks and then processed and managed by the information systems connected to these networks.

Examples of such networks are the Internet, the networks of telecommunications carriers, Refer (the Francophone information highway) and Rinaf (the African

network for the exchange and processing of information). These networks will increasingly integrate high speeds and transport multimedia information, unifying the information and telecommunications networks of businesses and connecting users across the world.

These networks will thus become information highways, providing "democratic" access to the vast storehouse of information available on servers at the local, regional, continental and global level. They will link people within a company, including its branches and subsidiaries via the company's information system, as well as with other outside information systems.

They will thus help to eliminate isolation -- whether scientific, technical, cultural or economic -- for individual users as well as businesses, universities, research centers, countries and indeed entire continents.

3.2. THE CHALLENGES AND STAKES OF INFORMATION HIGHWAYS

The primary objective of an information highway is to create a global information infrastructure.

An information highway must be multimedia, open, flexible and secure. The principal challenges in building these information highways are:

- Connect "everything": computers, wireless terminals, consumer electronics equipment, etc.;

- Provide access to, and the capacity to process and manage, "all information" (multimedia) around the world;

- Enable "everyone" to communicate and work on a shared platform (infrastructure);

- Create a global market of ideas and innovations;

- Create a global economy.

Information highways will drive technological, economic, cultural, social and strategic changes and must therefore be adequately managed at all these levels:

- **Technical**: the fusion and convergence of different technologies towards digital, multimedia and high-speed solutions, which requires changes or adaptation of current systems and networks and is encouraging the trend towards standardization;

- **Economic:** redefinition of economic sectors, creation of new synergies, new partnership and new markets. This has created new services and "hybrid" systems which employ several technologies (IT, telecommunications, electronics), such as digital phones with voice mail, integration of microprocessors in virtually all types of equipment, including household goods (video compact disc players, photo CD, etc.) and automobiles;

- **Cultural:** a knew type of knowledge has been created, with new means of expression. This in turn has led to new behaviors, new ways of thinking, a new "multimedia generation" and a entirely new social phenomenon.

- **Social:** technological, economic and cultural changes call into question the current concept of work and the structure of professional activities. New types of jobs are being created, leading to a change in the very essence of society.

Strategic: development, cultural, training and educational policies are all being called into question.

In short, all these changes are supporting the emergence of an information society within which every entity (equipment, application, system, network, etc.) can be connected to the information highway in order to access, process and manage any type of information, with increasingly multimedia content. The result is a full-fledged information revolution.

4. Integration and migration towards information highways

The migration of LANs and MANs will be carried out by implementing ATM technology on these networks. The interconnection of LANs and MANs with one another and with extended telecommunications networks will require interconnection equipment (bridges, routers, gateways, concentrators, switches, etc.).

In view of the latency time of such interconnection equipment, preference will increasingly be given to hub switches and subsequently ATM switches as the basis for the unified network.

The integration of applications requires that the type of application be taken into account (synchronous, asynchronous, isosynchronous), along with their requirements in terms of quality of service (throughputs, error rates, etc.) and their interaction with other application and the communications service. Figure 1 shows several examples of the typical data rates which a future high-speed network must offer for certain applications.

DATA RATES FOR COMMON APPLICATIONS
TO BE PROVIDED ON FUTURE NETWORKS

High-speed interconnection	50-100 Mbps
Telephony	32-64 Kbps
Hi-fi audio	700 Kbps
Videoconferencing	34-70 Mbps
Broadband videotex	34-70 Mbps
High Definition TV	140-565 Mbps

FIGURE 1: APPLICATION DATA RATE REQUIREMENTS

For migration of current telecommunications networks to information highways and the integration of the services available on these networks (see figure 2), end-to-end digital connections must be provided between two given entities over a digital network, which remains to be created. This digital connection allows integration. For technical and historical reasons, the ITU recommends that this network itself include the switched telephone network.

This integrated services digital network will progress gradually towards broadband or multimedia telecommunications, integrating ATM technology.

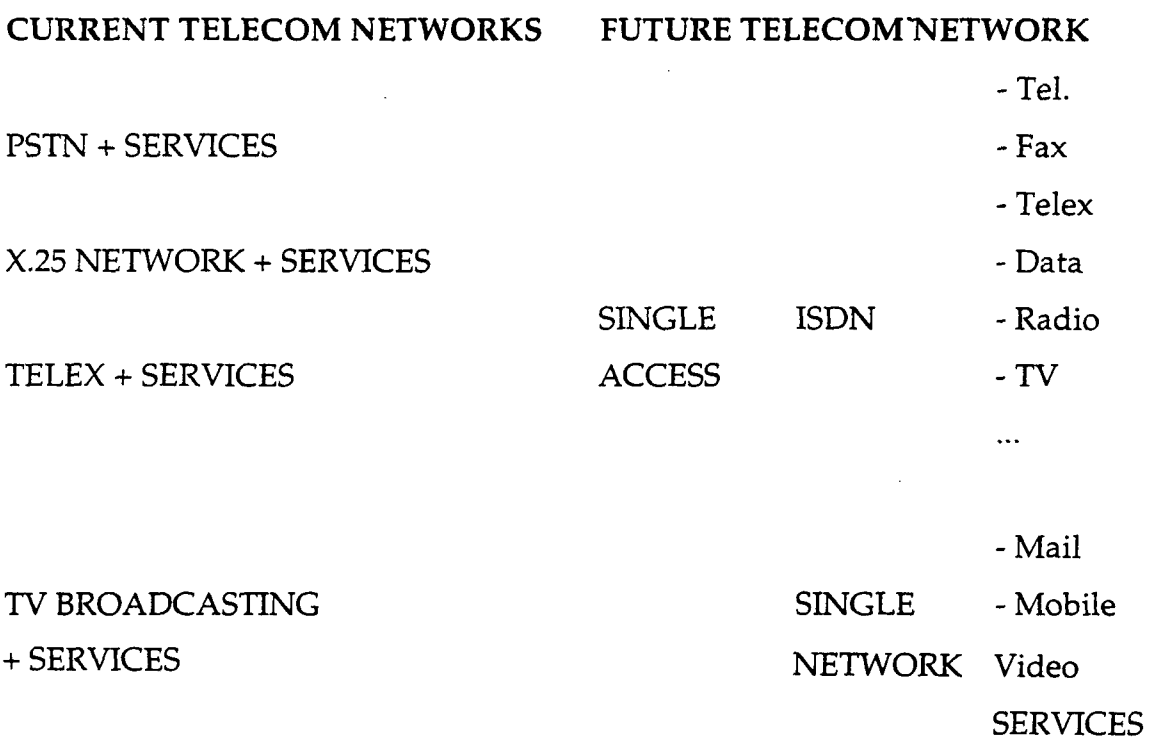


FIGURE 2: INTEGRATION OF TELECOMMUNICATIONS SERVICES

5. A strategy for the design and management of an information highway in Africa

5.1 APPROACH

Only close cooperation among the different players and members of society, based on training, education, research and the utilization of information and communications technologies, will make it possible to harness the information revolution and integrate these technologies in a process of unified, sustainable development.

The challenge facing the governments of Africa is organizing such cooperation in order to generate concrete results while ensuring continuity (i.e., no sudden break with the current situation) and consistency in managing these changes.

By enhancing the added value, or more precisely, the productivity, of resources, information and communications technologies will drive growth. Implementing these technologies influences the way individuals act, think and organize their activities.

The key therefore to launching an information highway in Africa is to ensure continuity while implementing change -- at every level and in every sector concerned.

The strategy we propose for designing, managing and establishing an information highway in Africa, along with the projects which are a prerequisite to building this highway, represents a solid foundation for development in Africa and international cooperation.

An example of this type of project was initiated in Niamey, in Niger, August 21 - 25, 1995, by the NGO Tilwat International, in partnership with AUPELF-UREF (France Telecom International), Cote d'Ivoire-Telecommunication (CI-TELECOM) and the Niger Ministries of Communication, Youth and Sport and Planning and Information Technology.

Following is an assessment of the current situation, needs and acceptability criteria, before detailing the architecture of the African information highway and the prerequisites.

5.2 THE CURRENT SITUATION

Africa has been one of the slowest continents to develop information highways. Its current needs are greatest in the areas of e-mail, access to, and dissemination of, scientific and technical information, and data transmission.

The African network for the exchange and processing of information, dubbed Rinaf, was launched in April 1992.

There are access nodes (centers or points) to the Syfed (Francophone Publishing and Broadcasting System) for Scientific and Technical Information (IST), in French, in Senegal, Ivory Coast, Cameroon, Benin, Gabon, Burkina Faso, Madagascar, Egypt, Morocco, Tunisia, Togo and in the regional agricultural training centers (Cresa) of Abidjan, Ouagadougou, Niamey and Rabat.

The "Refer" information highway (Francophone information highway for education and research) is based on the Syfed network: "on ramps" (access points) to the Refer network are located at the Syfed centers.

Over 55 databases can currently be accessed from "on ramps" with data access and editing workstations, including:

- Redosi (theses on the South)
- Sud (development in the South)
- Ref (higher education)
- Rev (scientific reviews)

5.3 NEEDS, SERVICES AND RESTRICTIONS

Within the scope of an African information highway, the following common needs and services have been identified:

- Ensure bandwidth fluidity
- E-mail
- Consultation and dissemination of scientific information (IST)
- File transfer (downloading).

Specialized needs and services, which certain people, groups, businesses or countries in Africa could require, include:

- Consultation of services and forums
- Teleworking
- Presentation of company services and products

- Service hosting
- Virtual private network
- Service management
(this list is not exhaustive).

To build an information highway to meet the needs of Africa, it is necessary to:

- Accurately identify needs: these may differ between users, groups, businesses, countries and between sub-regions.

- Draw up a detailed inventory of the services proposed by each group or institution (e-mail, databases, etc.), their shortcomings (in terms of data rate, availability, etc.) and migration possibilities (current host networks and migration policy) in order to make them accessible via the network.

5.4 ACCEPTABILITY CRITERIA

To make this information highway acceptable to Africa, it is essential that:

- it be integrated within the development projects of the different countries,
- access points be available close to the service providers,
- it be easy to access and use,
- the connection software be supplied by the service provider or made available locally at a low price,
- the service provider or local companies provide expert advice for the purchase of network access equipment,
- support be provided for connection and navigation,
- network access and usage costs be kept low,
- services provided be efficient (bandwidth quality, etc.),
- there be sufficient flexibility (services must reflect local needs),
- electronic commerce can be developed by ensuring transactions security,
- productivity gains be possible thanks to the highway.

To ensure the long-term success of the information highway, a simple, efficient and coordinated management approach must be pursued.

5.5 ARCHITECTURE OF THE AFRICAN INFORMATION HIGHWAY

On the basis of these needs, required services, restrictions (in terms of performance and migration) and acceptability criteria, it is possible to define a processing architecture and an architecture to manage migration, following a technical and economic study. The African information highway must be built at several levels:

- REGIONAL LEVEL

This level must unify the institutions within a given region, on the basis of five sub-regions: West, East, North, South and Center.

Technological choices will depend on distance, needs and required services, identified through a technical and economic study. The choice is between an X.25 WAN frame switching network, a DQDB or FDDI MAN, or an extended ATM network capable of supporting broadband digital telecommunications and integrated services (B-ISDN).

- NATIONAL LEVEL

This level will interconnect the sub-networks of institutions within a given country.

Technological choices depend on the same criteria as for the regional level.

- LOCAL LEVEL

This level will inter-link the different systems of a given institution within a given country.

A technical and economic study will determine the needs, required services and distance involved in order to select the most suitable physical architecture. The choice is between LANs (Ethernet, Token Ring, etc.), 100 Base X or 100 Base VG high-speed local networks, ATM local networks and MANs (DQDB or FDDI).

- INTERNATIONAL LEVEL

This level will interconnect the African information highway with other international networks.

The different levels -- local, regional and national -- can be connected directly to international networks such as the Internet, Ref, Rinas and Rinee.

5.6 PREREQUISITES: PROJECTS

In order to tap the full potential of the information revolution, prerequisites to the generalization and efficient utilization of the African information highway have been defined. These prerequisites are in the form of projects, which could be either brief seminars, medium-length training courses or long-term training programs, or major projects concerning specific aspects of management/society.
Following is a description of these projects:

- Seminars, training courses or programs:
  . "AGIR" (*Act*): a 5-day seminar
  . "MAINTENIR" (*Maintain*): a 3-month training course
  . "CONCEVOIR" (*Design*): a 12-month training program
- Research seminar:
  . "REAGIR" (*Respond*): a 3-day seminar

- A 3-year course at the Information, Communication, Networks and Multimedia School ("Esticrem"),
- A 5-year project entitled "Information society and multimedia in education and research", entitled "SEMER" (*Sow seeds*),

- The global financial control and management structure, entitled "MAITRISER" (*Control*).

5.6.1. OBJECTIVES OF THE SEMINARS, COURSES AND PROGRAMS

- The 5-day "AGIR" seminar

The "AGIR" seminar, which stands for *Administration, Gestion et Intégration des Réseaux et Autoroutes de l'Information* (administration, management and integration of information networks and highways), provides information and training on the architectures, interconnection and management of information networks and highways. The NGO Tilwat International and its partners hosted an AGIR seminar in August 1995 in Niamey, Niger.

- The 3-month "MAINTENIR" training course

The "MAINTENIR" course, which stands for *MAINTEnance, gestioN et Intégration des Réseaux et Autoroutes de l'Information* (maintenance, management and integration of information networks and highways) provides training for maintenance and operating technicians of information networks and systems.

- The "CONCEVOIR" 12-month training program

Meaning "*CONCEVOir, gérer et Intégrer des Réseaux et Autoroutes de l'Information* (design, manage and integrate information networks and highways), this program is intended for information network and highway design engineers.

- The "REAGIR" 3-day seminar

The "REAGIR" seminar, which stands for *RapprochEr, Administrer, Gérer et Intégrer des Réseaux et Autoroutes de l'Information* (unify, administer, manage and integrate information networks and highways), is aimed at fostering exchanges and support between research teams and manufacturers in the North and South.

5.6.2. OBJECTIVES AND COMPONENTS OF THE "SEMER" PROJECT

The "SEMER" project, which stands for *Société informationnElle et Multimédia dans l'Education et la Recherche* (information and multimedia society in education and research), is designed to establish the foundations for an information society anchored in exchange and cooperation, geared to smooth management of changes, optimization of resources and stimulating both public and private sector businesses.

This 5-year project has three main components:

. One: Mobilizing resources and supporting development
. Two: Managing change and stimulating business
. Three: Multimedia in education and research

• COMPONENT ONE: MOBILIZATION OF RESOURCES AND DEVELOPMENT
The aim of this component is to optimize resources (human, physical and financial) in order to support development. This requires:

- Defining a resource integration policy.
- Encouraging the creation of enterprises.
- Fostering cooperation between companies and/or R&D centers.

COMPONENT TWO: MANAGING CHANGE AND STIMULATING BUSINESS

This component is aimed at making new technologies the motors of development. In order to achieve this, it is necessary to:

- Stimulate business in the public and private sectors.
- Promote industrial cooperation on research projects, systematically involving technology transfers.
- Identify applications of new technologies
- Provide information on products and research under way.

- Introduce technological change in companies and their work methods.
- Develop intelligent product interfaces to limit the need for specialized training and skills.

COMPONENT THREE: MULTIMEDIA IN EDUCATION AND RESEARCH

The underlying goal here is to ensure the smooth integration of information, communication and multimedia technologies in education and research. In order to achieve this, it is necessary to:

- Progressively introduce information technology in education and training.

- Integrate multimedia technology in training structures to benefit both the trainee and the trainer. This requires easy access to information and knowledge (know-how, skills).

- Provide multimedia services for research teams.

- Create multidisciplinary services for everyone, with access points in schools, universities, carefully selected public amenities, and research centers.

5.6.3. INFORMATION, COMMUNICATION, NETWORKS AND MULTIMEDIA SCHOOL ("ESTICREM")

This school provides training and research facilities for specialists in IT, communications, networks and multimedia technologies. The training program lasts three years.

The initiative must progressively integrate organization of the "Réagir" seminar and the "Concevoir" training course.

It must establish a system of cooperation with industry, and created an advanced training department tailored to the needs of companies.

5.6.4 GLOBAL FINANCIAL CONTROL AND MANAGEMENT STRUCTURE

As well as overseeing and managing the African information highway, within its role as "project manager" the global financial and management structure coordinates the interfaces between the different projects and ensures that they run smoothly.

This structure also liaises between the different players (states, companies, universities, research centers, schools, AUPELF-UREF, funding organizations, etc.). It has a financial control and management committee, entitled "*Maitriser*" (for **Maitris**e de la r**E**volution info**R**mationnelle, or controlling the information revolution).

The members of this committee are appointed by the African states in conjunction with the external bodies (funding organizations, AUPELF-UREF, etc.).

The diagram below shows the relationships between the different projects.

FINANCIAL CONTROL AND MANAGEMENT STRUCTURE: MAITRISER
ESTICREM SCHOOL
"REAGIR" RESEARCH SEMINAR
"MAINTENIR" TRAINING COURSE
"CONCEVOIR" SPECIALIZED TRAINING PROGRAM
"AGIR" SEMINAR
"SEMER" INFORMATION AND MULTIMEDIA SOCIETY PROJECT

5.7 FINANCIAL CONTROL AND MANAGEMENT ORGANIZATION

The "Maitriser" committee will also be responsible for the financial control and management of the Rinaf African information highway. This implies ensuring that it operates effectively over the long term.

The management system is an intermeshed, multi-tiered organization. It is modeled on the multiple layers of the information highway architecture. At each level, the choice of the management system depends on the scope of the area involved, the needs and functions.

- AT REGIONAL AND INTERNATIONAL LEVEL

- Global financial control and management is ensured by the "Maitriser" committee.
- The committee uses a regional management system, based on an open platform, such as HP Openview (HP), Netview (IBM), Integrateur (France Telecom), ISM (Bull) or NMS (Novell).
- International interconnections are handled either by this platform, or, if deemed necessary due to the resources, information flows and management services involved, by another platform.

- AT THE NATIONAL LEVEL

- A team designated by the country concerned is responsible for management of this system. This role is generally assigned to the national telecoms carrier.
- This team uses a national proprietary or open management system (see above).

- AT THE LOCAL LEVEL

- A team from the institution is responsible for the management, maintenance, operation and financial control of its network.
- The team uses a local manager package, such as Netware (Novell), Windows NT (Microsoft), LAN Server (IBM) or Pathworks (DEC), etc.

Please note:

Initially, the information highway management organization will be based on a hierarchical structure to simplify implementation. It will later be replaced by a meshed, networked organization. This will enable the different local, national and international levels players involved to communicate directly and thus augment the global responsiveness of the management system.

6. Risks and problems involved with information highways

Despite the numerous benefits of information highways, certain risks and problems may arise:

- Network management and congestion,
- Possible negative impact on society:
    . Rejection of certain values and responsibilities,
    . Threat to individual freedoms,
- International commerce insufficiently protected due to a lack of effective security,
- Dependence from a technological, economic and cultural standpoint,
- Risk of creating a deep gulf between North and South,
- Risk of technical, economic, cultural or social isolation.

7. Success factors -- conclusion

If information highways and multimedia communications are to become reality, there must be a tangible political commitment ensuring that the development strategies of the countries concerned integrate these technological advances. Sufficient resources must be also be allocated for these major projects.

The high cost of these developments requires that the countries and funding organizations concerned pool their resources. This has prompted regional-based structures (for example, the African region) and sub-regional based organizations (such as East, West, North, South and Central Africa).

For Africa, aside from the technical problems raised by the need for digital connectivity and bandwidth, the cost of accessing telecommunication and IT networks is not within everyone's reach. Governments and telecoms operators must therefore mobilize their full efforts to ensure that existing networks migrate smoothly to information highways -- and thus avoid the risk of transforming them into limited information "footpaths".

Building an information highway to address real needs means preparing for the information revolution and controlling the information society that will ineluctably follow. This implies "acting" to "sow" the seeds of the information society; "control" and "maintain" the balance in order to "design" an information highway in which everyone can integrate, express themselves and "respond" democratically.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 40-E
23 April 1996
Original: English

For Information/Support

Agenda item: 1.2

PLENARY MEETING

SOURCE: DIRECTOR, TELECOMMUNICATION DEVELOPMENT BUREAU

TITLE: PRELIMINARY RESULTS OF ITU/BDT TELECOMMUNICATION SECTOR SURVEY FOR AFRICA

Under the auspices of the ITU Development Sector's Study Group on Telecommunication Development Strategies and Policies and within the framework of the BDT Policies, Strategies and Financing Programme, a survey was prepared in 1995 to document and analyse the present telecommunication sector structure around the world. Responses have been received so far from over 125 Member Administrations of which 32 administrations are from Africa.

The survey process is also in conformance with the Strategic Plan of the Union for the period 1995-1999, endorsed by the 1994 Kyoto Plenipotentiary, which recognized that information exchange, particularly in the policy domain, would be a priority of the Union. The Strategic Plan noted the trends towards restructuring of the sector, notably the separation of operational and regulatory functions and the introduction of competition in the provision of goods and services. These changes are having a substantial impact on the role of ITU Member Administrations and members. By acting as a clearing house for the exchange of information on experiences in the restructuring process, the ITU will be able to assist members in making informed national policy choices regarding infrastructure alternatives, the role of competition, licensing and restructured regulatory regimes.

ITU/BDT is presently analysing the results of the survey. A database has been designed to manage the information and facilitate the analysis. ITU/BDT proposes to survey Member Administrations on an annual basis in order to monitor and analyse world trends in policy and regulation.

The purpose of the survey is to describe national structures. It is divided into two parts. Part One requests information on policies, regulations and the organization of the sector and corresponds to Questions from ITU-D Working Party A/1. Part Two is intended to address policies regarding financing of telecommunication development and the telecommunication manufacturing industry and corresponds to Questions from/to ITU-D Working Party B/1.

This document provides a snapshot of the most significant results obtained from 32 African Administrations. As the analysis is still underway, this should be considered as a preliminary draft. The final results of the 1995 survey will be discussed at the 1996 ITU-D Study Group 1 Working Party meetings (10-13 September 1996). A more detailed survey will be conducted in 1996 in light of the results of the Finance Colloquium (Abidjan, March 1996) and the AF-RTDC Conference.

Telecommunications Sector Structure Survey

PART ONE

SECTION I - STRUCTURE OF THE TELECOMMUNICATION SECTOR

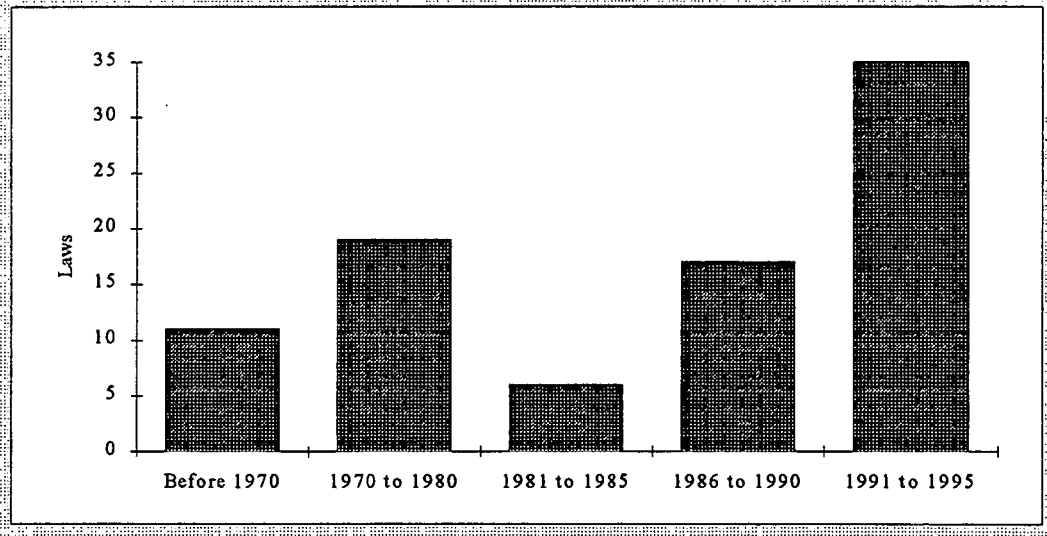
This section examines the actual structure of the sector, including the instruments which govern the sector, mechanisms used to change these instruments, service provision, privatization and competition.

Laws, decrees and instruments governing the Sector

The respondents were asked to list laws, decrees, etc., the year in which they were adopted and to provide any explanatory remarks. A listing of the African respondents is attached as Table 1.

The oldest law provided in the responses is dated 1924 of Morocco and relates to the monopoly regulation of telephony and telegraph services. The table and figure below demonstrate that since 1990, 17 of the 32 responding countries have either introduced new laws or amendments to previous laws to provide for the separation of operational and regulatory functions, as well as corporatization of the operator. This is likely to continue as the sector evolves further, thereby necessitating the need for new laws and regulations (i.e., market structure, licensing, interconnection, etc.).

Figure 1: Telecommunication laws



Source: ITU/BDT Regulatory Database.

Procedures to modify telecommunications laws and regulations

Respondents were asked to indicate procedures used to change telecommunication laws or regulations or introduce new ones. Twenty-six countries indicated that they had a procedure to changes laws and regulations. Most of the responses indicated that modifications of existing laws or creation of new laws were normally initiated by the appropriate Ministry. From the Ministry, it is

sent to the National Assembly (or Parliament). In 18 cases, approval by the National Assembly (or Parliament) was sufficient. In seven cases, the National Assembly or Parliament was required to attain Presidential approval. In Nigeria, the decision by the National Ministry alone was sufficient to amend a law or regulation.

LAWS OF THE TELECOMMUNICATION SECTOR — TABLE 1 — AFRICA

	Year adopted	Law	Remarks
Algeria			
	1975	Ordonnance No.75-89	Portant code des Postes et Télécommunications
Angola			
		Labour Act - under revision	
	1985	Telecommunications Act 4/85	The State has the monopoly on providing all kinds of services of telecoms.
	1994	Delimitation of statal areas.	
	1994	Privatizations Act	
	1994	Foreign investments Act	
	1995	Public entreprises Act	
Benin			
	1988	Décret No. 88-225 du 2/6/88	Réglementation des installations télécom.
	1989	Arrêté No. 032/Mic/DGM/DEP/OPT du 16/05/89	Réglementation des installations télécom.
	1990	Loi No. 90-026 du 10/09/90	Privilèges en matière de recouvrement
	1993	Décret No. 93-261 du 5/11/93	
Burkina Faso			
	1994	Décret No. 94.388/PRES/MICM/MCC du 2 Novembre	Transformation de l'ONATEL en société d'Etat (SE)
Burundi			
	1971	Décret présidentiel	En voie de modification
Cameroon			
	1967	No.67/LF/20 du 12 Juin	Loi sur la radioélectricité privée
	1987	No.87/021 du 17 Décembre	Loi crée un budget annexe aux P&T
Chad			
	1964	La Loi No.16, 1964	Création des Services P.T.
	1975	Protocole d'accord	Création de Télécommunications Internationales de Tchad
	1976	Contrat de Société	Organisation de la Télécommunications Internationales de Tchad
	1976	Décret No. 152/P.CSM/M.P.T.	Organisation de l'ONPT
	1976	L'Odonnance No. 14/P.CSM	Création de l'ONPT
	1977	Décret No. 193/P.CSM	Modifiant le Décret 152
	1986	Décret No.027/PR et No.009	Modifiant le No.152 et additif au No.027
	1994	Décret No. 167/PR/MC	Fixation des tarifs postaux, financiers et des services des télécommunications.
Comoros			
	1989	Loi No. 89-0005/AF	Création d'une société nationale des P&T
	1992	Ordonnance No.92-004/PR	Mise en place du statut de la SNPT
Côte d'Ivoire			
	1995	Décret portant sur organisation et fonctionnement de l'Agence des Télécoms.	Organe éxecutif

	Year adopted	Law	Remarks
	1995	Loi sur les télécommunications	
	1995	Décret portant sur l'organisation et le fonctionnement du Conseil des Télécoms (CTCI)	Organe de controle de l'Agence
Djibouti			
	1968	1889/S.G - C.G	Arrêté du Gouvernement
	1968	957/SG - C.G	Arrêté du Gouvernement
Ethiopia			
	1952	Proclamation for the establishment of Ethiopian Telecommunications	
Guinea			
	1992	Loi L/92/016/CTRN	Réglementation des Télécommunications
	1993	Décret création SOTELGUI, STATUTS SOTELGUI, Convent. de concession	Avec cahier des charges annexé
	1995	Réglement des Radiocommunications L/95/018/CTRN	
Kenya			
	1977	Kenya Posts & Telecommunications Corporation Act CAP 411	Still in operation
Madagascar			
	1993	Loi 93/01	
Mali			
	1972	Arrete 513.MIT	Principe d'installation de I.P.
	1989	Decret 89-345-PRM	Statuts SOTELMA
	1989	Ordonnance 89-32 PRM	Création SOTELMA
	1990	Loi 90-0181AN-RM	Ratification
	1991	Ordonnance 91-014CTSP	Principe d'organisation de Société et Entreprise d'Etat.
Mauritania			
	1993	Code des Postes et Télécommunications	
Mauritius			
	1988	Telecommunications Act	
Morocco			
	1924	Dahir, 25 novembre 1924	Relatif au monopole de l'Etat en matière de télégraphie et de téléphonie avec ou sans fil.
	1970	Décret n° 2-70-378, 22 septembre 1970	Conditions d'installation de postes téléphoniques pour les besoins du service, au domicile de hautes personnalités de l'Etat et de certains fonctionnaires et agents de l'Etat tel qu'il a été modifié et complété.
	1972	Décret n° 2-72-296, 4 août 1972	Déterminant l'organisation des services télégraphiques et téléphoniques
	1972	Note de service n° 255T-C22, 18 juillet 1972	Relative aux catégories de conversations téléphoniques interurbaines définies par le décret n°2-72-296 du 4 août 1972
	1984	Dahir portent loi No. 1-84-8, 10 janvier 1984	Instituant l'Office National des Postes et Télécommunications
	1984	Décret n°0 2-84-20	Relatif aux modalités d'application du dahir portant loi n°1-84-8 du 10 janvier 1994

	Year adopted	Law	Remarks
	1988	Decret 2-87-671, 17 octobre 1988	Fixe les attributions et l'organisation du Ministère des Postes et Télécommunications
Mozambique			
	1992	Law 22/92	Basic Telecoms law
	1992	Decree 23/92	Transforms the National Operator into a Public Company
	1992	Decree 22/92	Creates the National Communications Institute of Mozambique - INCM
Niger			
	1959	Decret 59/104	Organise l'OPT
	1959	Ordonnace 59/103	Crée l'OPT (EPIC)
	1970	LOT 70/18	Crée l'OPT (EPA)
	1988	Ordonnance 88/042	Crée l'OPT en EPIC
	1988	Decret 81/059	Création STIN (Société d'Economie Mixte)
	1988	Decret 99/241	Organise
Nigeria			
	1992	Decree 1992	Nigerian Telecoms Ltd. (Nitel) signed performance agreement with government.
	1993	Decree 75, 1992	Decree setting up a Regulatory Body called Nigerian Communications Commission (NCC).
Rwanda			
	1974	Décret - loi	Télécommunications
	1992	Arrêté du 1er Ministre No.8/021	Organisation & Attributions des accès de l'Administration Centrale
	1992	Loi no. 8/92	Réforme Institutionelle des Télécommunications
	1993	Arrêté Présidentiel No. 85/16	Concession de Gestion des Télécommunications
Senegal			
	1961	Décret 61-442	Radioélectricité réorganisation du CNCT
	1972	Loi 72/39	Relative aux Télécommunications réglementation
	1984	Décret 84/359	
Seychelles			
	1988	Telecommunications Act	
South Africa			
	1955	The Radio Act 3	As amended
	1958	The Post Office Act 44	As amended
	1976	Radio Act. No. 52 of Independant Broadcasting Authority	New legislation to free the airwaves.
	1976	Broadcasting Act No. 73	
	1991	Post Office Amendment Act (Act 85)	Transfer of all rights and privileges of the Postmaster General to two operating companies establisehd by this Act: Telekom SA Ltd and Post Office Lts.
	1993	Act No. 153	Indepndent Broadcasting Authority Act
	1994	Ammendment of Section 28 of Act. No.153 of 1993	
	1995	Independent Broadcasting Authority Amendment Act	

	Year adopted	Law	Remarks
Sudan			
	1974	Telecommunications	
Swaziland			
	1983	Corporation Act No. 11	
Tanzania			
	1993	Tanzania Communications Commission Act	The law came into force on 1st January, 1994
Togo			
	1989	Loi No. 89-14	Portant statut de zone franche de transformation pour l'exportation.
	1990	Loi No. 90-26	Portant réforme du cadre institutionnel et juridique des entreprises publiques.
	1991	Decret 91-024	Portant transformation de l'OPTT en Société d'Etat.
	1991	Decret 91-197	Pris pour l'application de la loi No. 90-26 du 1990 portant réforme du cadre institutionnel et juridique des entreprises publiques.
Uganda			
	1983	Act 3 ofParliament	Established UP&T Corporation.
Zambia			
	1993	Broadcasting Act	
	1994	Telecommunications Act	
	1994	Radio Communications Act	
Zimbabwe			
	1970	Posts and Telecommunication Acts (Chapters 250 & 251	

Provision of telecommunication services and privatization

This section addresses the provision of basic telecommunications services, the intent of countries to privatize the main operator, the percentage envisaged for sale, and the anticipated procedure for privatization.

All 32 African respondents completed this section. Some 12 countries indicated that services were provided by more than one operator. After further examination, it was recognized that the question was perhaps misleading in that these 12 responses signified more than one operator for certain services only (e.g., mobile cellular, paging, data). The question was intended to relate to basic telephony only. In the case of Cameroon, for example, there are two operators, both state owned, one being the Ministry of Posts and Telecommunications and the other INTELCAM. In Chad and Niger, there are also two operators, one for local and long-distance telephony (Office National des Postes et Télécommunications du Tchad, Office des Postes et Télécommunication du Niger) and the other for international services (Société des Télécommunications du Tchad, Société des Télécommunications du Niger). In Guinea, Madagascar, Mauritius, Nigeria, South Africa, Tanzania, and Zambia there is one main operator for basic telephony but multiple operators are licensed for mobile cellular, and paging. In Senegal, as well, there is one main operator but more than one for mobile-satellite services. In Uganda, two paging operators have been licensed.[1]

Regarding ownership of the main operator, 18 countries indicated that the main operator was 100% state owned, 12 did not respond, and two countries indicated that the main operator was not state owned (Sudan and Seychelles). Six countries answered that the main operator has been corporatized and five indicated that they planned to corporatize.

As for future plans for privatization, six countries announced no intention to privatize, four did not respond, and twenty indicated that they would privatize. Figure 2 indicates the responses concerning envisaged time periods for privatization. When asked about the percentage of private ownership expected, two countries (Côte d'Ivoire and Madagascar) indicated that the range of private involvement would be between 50% - 75%; six countries (Guinea, Mauritius, Mozambique, Niger, Rwanda, and Swaziland) indicated expected private participation of between 20% - 49%. All of these eight countries indicated that the procedure for privatization would take the form of an open bidding process, except Mozambique who stated that the procedure was not yet determined.

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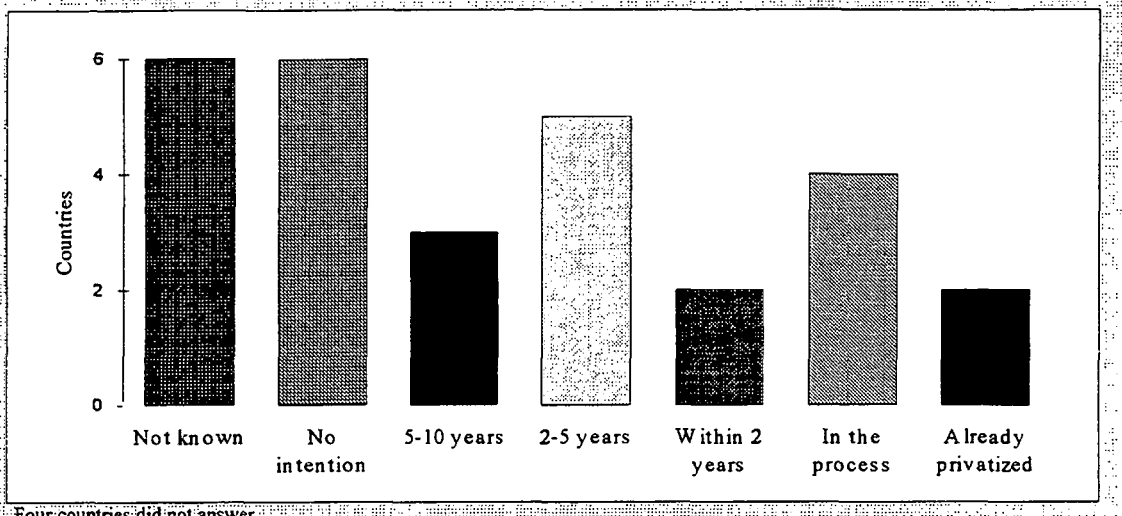
[1] In some cases, an entity has been licensed but it is not yet operating. Most of the respondents indicated "licensed" entities.

Figure 2: Time periods for anticipated privatizations

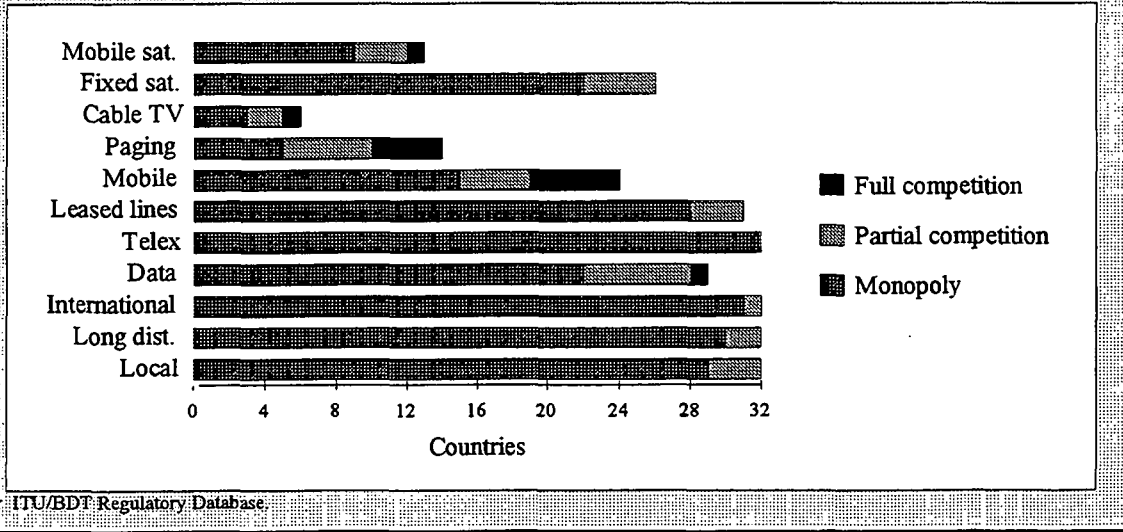


Note: Four countries did not answer.
Source: ITU/BDT Regulatory Database.

Level of competition

The status of competition was reviewed for a wide range of services. In general, the survey results at this point demonstrate that most services continue to remain under monopoly provision. Figure 3 indicates the responses for each service. In the area of local services, Sudan, Tanzania, and Zambia indicated partial competition. Sudan indicated that for local, long distance, leased lines, and mobile satellite, partial competition was allowed (two operators exist (STPC and Sudatel)). In Tanzania, local, long distance and international services, leased lines, and fixed-satellite services were open to partial competition (TTCL and ZANTEL are authorized; TTCL for the whole country and ZANTEL for the area of Zanzibar). Zambia did not provide any detail.

Figure 3: Level of competition



Source: ITU/BDT Regulatory Database.

SECTION II - THE REGULATORY PROCESS

Section II examines the regulatory process in each country, the responsible body for decision making, and the establishment of a regulatory authority (including, functions, reporting responsibility, licensing, and interconnection).

Subsection II.1 - The regulator

Responsibility for major telecommunication decisions

Respondents were asked to indicate which entity within the government had the overall responsibility for the telecommunications sector. Four respondents indicated that it was the head of state, 11 indicated that it was the Cabinet, 19 the sector ministry, and four the regulator.[2]

Separate regulatory authority

The purpose of this section was to identify which countries have established a separate regulatory authority. It is clear that the term "separate" has different meaning for different audiences. It was intended to signify "independent" in terms of finance and authority. Of the 32 countries responding, eight indicated the existence of a separate regulatory authority. Seven of the eight indicated that the regulatory authority reported to the sector ministry and one indicated that the authority reported to the head of state (see Table 2). In addition, 15 countries indicated an intention to create a regulatory entity in the next five years.

Table 2: Countries with a separate Regulatory Authority

Country	Regulatory Authority	Reporting to
Angola	Direcção Nacional de Correios e Telecomunicações	Sector Ministry
Côte d'Ivoire	Agence des Télécom. de Côte d'Ivoire	Conseil des Télécom.
Mauritius	Telecommunication Authority	Head of State
Mozambique	Instituto Nacional das Comunicações de Moçambique	Ministry of Transport & Communications
Nigeria	Nigerian Communications Commission	Min. of Communication.
Senegal	DERPT	Ministère de la Communication
Tanzania	Tanzania Communications Commission	Sector Ministry
Zambia	Communications Authority	Sector Ministry

Source: ITU/BDT Regulatory Database.

Subsection II.2 - Regulation

Policy changes (past and future)

Countries were asked to indicate the significant policy changes effecting the sector over the past two years and those expected in the next two years. Figure 4 demonstrates the range of responses.

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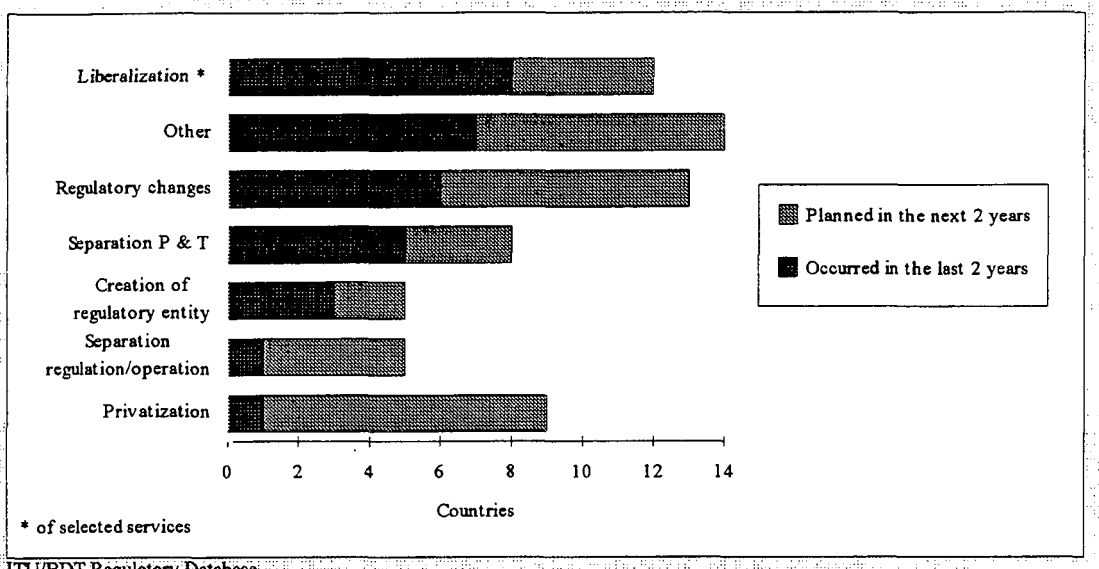
[2] Some countries gave more than one response, indicating that there is a shared responsibility.

Figure 4: Major policy changes



Source: ITU/BDT Regulatory Database

Data and documents to be filed by each operator with the regulatory authority or government entity

A question was raised concerning the filing of documents to the regulator or ministry. Ten countries indicated that accounting rates had to be filed; 15 reports and accounts; ten interconnection rates; 16 tariff tables; 12 service performance indicators; 14 business/investment plans; and five cost manuals. For those countries which have a separate regulatory authority, almost all data and documentation was to be filed with the regulatory authority with the exception of Senegal and Angola, which demonstrates the varying roles of the regulatory authorities in Africa.

Interconnection of networks and the role of the regulator

As competition is fairly limited throughout the region, the subject of interconnection is only beginning to be faced. Twelve countries indicated that interconnection was theoretically permitted. However, three of the 12 do not allow any competition in services. Nine of the others have some form of competition, predominantly in mobile cellular, but also in paging, data, in some cases mobile satellite, and even in local, long distance and international (e.g., Tanzania). The role of the regulator/government entity in interconnection was found to be one of oversight/arbitration in eight cases. Four countries did not specify the role.

Tariff regulation

Seventeen countries indicated that they employed some form of tariff regulation. Eight countries indicated that tariffs were either submitted by the operator and then approved by the ministry or determined directly by the ministry. Four countries indicated that tariffs were linked with the inflation index and five did not specify the form of regulation.

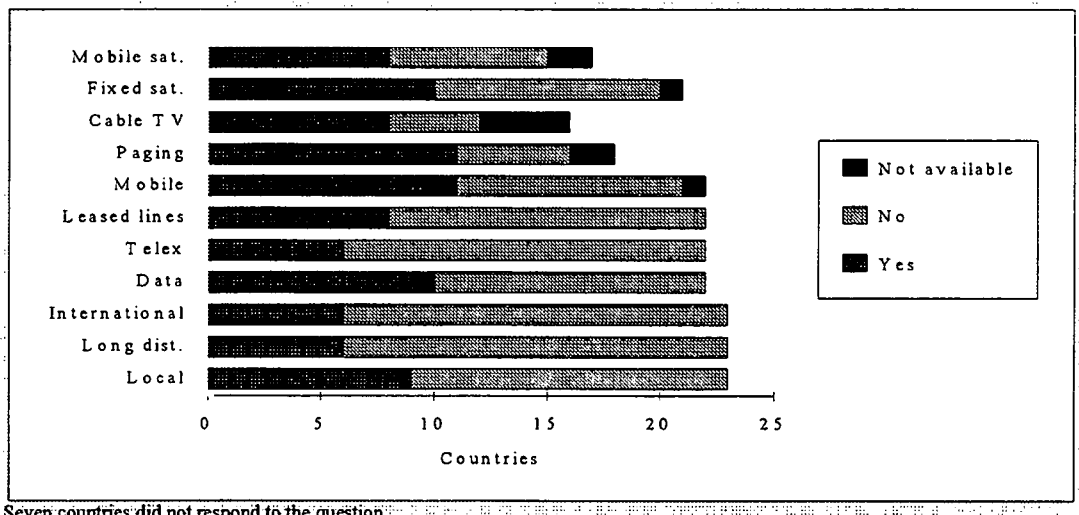
Regulatory functions

As there are few regulators in Africa, at present most of the regulatory functions identified are under the control of the Ministry. Certain services which have not yet been introduced (such as Internet access or cable television) are listed as either not regulated or not available. For those countries with established regulatory authorities such as Côte d'Ivoire, Mauritius, Mozambique, Nigeria, Tanzania, and Zambia, most services are regulated by the regulatory entity (see Table 3 for further details).

Subsection II.3 - Licensing

This section explores the requirement for licensing certain services. As most services continue to be provided on a monopoly basis by the PTT, licensing has not yet become a common practice. Operators providing services open to competition were, however, required to obtain a license.

Figure 5: Services subject to licensing



Note: Seven countries did not respond to the question.
Source: ITU/BDT Regulatory Database.

SECTION III - PRIVATE SECTOR PARTICIPATION

This section aims at giving an overview of a country's position on private local and foreign participation/ownership in the telecommunication services industry, including broadcasting and cable TV, and on measures (private ownership, Build-Operate-Transfer (BOT), Build-Transfer-Operate (BTO) schemes) taken to encourage private sector participation.

This section identifies the public switched telephone services the private sector is permitted to provide and what financial and operating forms are used to provide all, or selected, public switched telephone services. Countries having privatized, or planning to privatize, the national operator, were also invited to indicate the procedure they have chosen, in order to show a detailed picture of the private sector's participation in telecommunication services.

Regulatory Functions

TABLE 3

AFRICA

	Licensing of telecom operators	Licensing of cellular service providers	Licensing of mobiles satellite providers	Licensing of fixed satellite providers	Licensing of cable television	Licensing of Internet access providers	Establishment of licensing fees	Numbering plans	Tariff approval	Technical standards	Inter-connection rates	Frequency allocation	Type approval	Monitor service quality
Algeria	Ministry	Ministry	Ministry	Ministry		Operator		Ministry	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry
Angola	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Ministry	Not regulated	Not regulated	Regulator	Not regulated	Not regulated
Benin	Ministry	Ministry	NA	NA	NA	Ministry	Ministry	Operator	Other	Operator	NA	Ministry	Operator	Ministry
Burkina Faso	Ministry	Ministry	Ministry	Ministry	Ministry		Ministry	Operator	Ministry	Operator		Operator		
Burundi	Operator	Operator	Not regulated	Not regulated	Ministry	Not regulated	Operator	Operator	Ministry	Operator	Operator	Operator	Operator	
Cameroon	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry	Other	Ministry	Operator	Ministry	Ministry	Ministry
Chad	Operator	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Ministry	Operator	Ministry	Operator	Operator	Operator	Ministry	Operator
Comoros	NA	NA	NA	NA	NA	NA	Operator	Operator	Ministry	NA	NA	Ministry	Ministry	Operator
Côte d'Ivoire	Regulator	Regulator	Regulator	Regulator	Other	Regulator	Regulator	Regulator	Regulator	Regulator	Operator	Regulator	Regulator	Regulator
Djibouti	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry	Operator	Operator	Ministry	Ministry	Operator
Ethiopia							Operator	Operator	Other	Operator	Operator	Operator	Operator	Operator
Guinea	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry
Kenya	Operator	Operator	Operator	Operator	Ministry	Operator	Operator	Operator	Ministry	Operator	NA	Operator	Operator	Operator
Madagascar	Ministry	Ministry				Ministry	Ministry	Operator	Ministry	Ministry	Ministry	Ministry	Ministry	Operator
Mali								Operator	Ministry	Operator	Ministry	Other	Operator	Operator
Mauritania	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Ministry	Other	Ministry	Operator	Operator	Operator	Operator	Operator
Mauritius	Regulator	Regulator	Regulator	Regulator	Regulator	Regulator	Ministry	Operator	Regulator	Regulator	Operator	Regulator	Regulator	Regulator
Morocco	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Ministry	Ministry	Ministry	Ministry	Not regulated	Ministry	Ministry	Ministry
Mozambique	Regulator	Regulator	Regulator	Regulator	Regulator	Regulator	Regulator	Operator	Ministry	Regulator	NA	Regulator	Regulator	Regulator

	Licensing of telecom operators	Licensing of cellular service providers	Licensing of mobiles satellite providers	Licensing of fixed satellite providers	Licensing of cable television	Licensing of Internet access providers	Establishment of licensing fees	Numbering plans	Tariff approval	Technical standards	Inter-connection rates	Frequency allocation	Type approval	Monitor service quality
Niger	Operator	Operator	Operator	Operator	Operator	Operator	Ministry	Operator	Ministry	Operator	Operator	Operator	Operator	Operator
Nigeria	Regulator	Regulator	Regulator	Not regulated	Regulator	Regulator	Regulator	Operator	Other	Regulator	Regulator	Ministry	Regulator	Regulator
Rwanda	Ministry	Ministry	Ministry		Ministry		Ministry	Operator	Ministry	Ministry	Operator	Ministry	Ministry	Ministry
Senegal	Ministry	Ministry	Ministry	Ministry	Operator	Operator	Operator	Operator	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry
Seychelles	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry	Operator	Ministry	Operator		Ministry	Ministry	Ministry
South Africa	Ministry	Ministry	NA	NA	NA	Operator	Ministry	Operator	Ministry	Ministry	Ministry	Ministry	Ministry	Operator
Sudan	Ministry	Operator	Ministry	Ministry	Ministry	Operator	Ministry	Operator	Ministry	Ministry	Ministry	Ministry	Ministry	Ministry
Swaziland							Operator	Operator	Ministry	Operator	Operator	Operator	Operator	Operator
Tanzania	Regulator	Regulator	Regulator	Regulator	Other	Regulator	Regulator	Regulator	Regulator	Regulator	Regulator	Regulator	Regulator	Regulator
Togo								Operator		Operator		Ministry	Operator	Operator
Uganda	Ministry	Ministry	Ministry	Ministry	Other	Ministry	Operator	Operator	Ministry	Operator	Operator	Ministry	Operator	NA
Zambia	Regulator	Regulator	Regulator	Regulator	Regulator	Regulator	Regulator	Operator	Regulator	Regulator	Regulator	Regulator	Regulator	Regulator
Zimbabwe									Ministry		NA			

Note: NA signifies not applicable. If no information was provided, it was left blank.

- Among the 32 African countries having responded to the survey, 12 declared that they did not allow private sector participation.[3] Eight countries did not respond to the question, and 12 indicated that they permitted private sector participation for providing all or selected public switched telephone services (e.g. cellular, data, paging, VSAT services) under the following financial forms:

Table 4: Private Sector Participation

Countries	Complete private ownership	Joint venture with government	Joint venture with local/foreign investors
Mauritius Nigeria	•	•	•
Guinea	•	•	
South Africa Zambia	•		•
Madagascar Seychelles Uganda	•		
Burundi Sudan		•	
Rwanda Tanzania			•

Note: Figures show number of combinations of ownership existing in the region.
Source: ITU/BDT Regulatory Survey

- Nineteen African countries declared that they did not use any of the three indicated forms of operating (i.e., BOT, BTO, Franchise) to encourage private sector participation. Three countries (Mauritius, Mozambique and Seychelles) stated that they operated under the franchise scheme and ten countries gave no opinion.

The results shown in this section indicate that half of the respondents have not made policy reforms in the area of private participation, and more than the majority have not employed any of the operating forms described.

[3] The question was perhaps misleading as some countries responded "not permitted", and then declared that for a specific service and under one of the listed financial forms it was permitted.

Box 1: Zambia's policy reforms in the telecommunications sector

Zambia has an area of 752 617 square km and a dispersed population of 9.2 million (in 1994). GDP per capita was $US 330 in 1994. The country is recognized by the United Nations as a least developed country (LDC). In 1995, the number of main lines was 79 786 and teledensity 0.87. Some 72 000 inhabitants are on the waiting list for service. There are 548 public payphones in use.

In order to meet development needs and increase the quality and availability of telecommunication networks and services, the Zambian Government has started implementing policy reforms.

At the regulatory level, these reforms have included:

- In 1994, the Telecommunications Act was passed which separated posts and telecommunications operations and created two companies Zambia Telecom Company Limited (ZAMTEL) and Zambia Postal Services Corporation (ZAMPOST). ZAMTEL is a limited liability company owned 100% by the state company, Zambia Industrial and Mining Company. Privatization of ZAMTEL is intended to take place within two-five years by sale of shares with the Government maintaining a "golden" share.
- Telecommunications services were deregulated. Currently competition is allowed partially for local services and mobile satellite services and fully for mobile cellular and paging services. Two mobile operators were licensed in September 1995, ZAMTEL and TELECELL. Other services remain under monopoly control. All telecom services are subject to licensing except cable TV, which is not yet available. Interconnection of networks is permitted to allow a fair play among operators.
- A regulatory body was created, the Communications Authority, under the sector ministry. This Authority is financed by license fees and by Government appropriation. It is responsible for regulating the sector and licensing all services. Some regulatory issues such as technical standards and interconnection rates are set up in accordance with the operators, which are also responsible for numbering plans. Major telecommunication decisions are taken by the Cabinet.

The government has taken the following measures to encourage private sector participation:

The provision of local, trunk, international services were open to the private sector under the following financial forms: complete private ownership and joint venture with foreign and/or local investors. Private participation is not limited but as mentioned above, when ZAMTEL is privatized, the Government will retain a golden share.

At the economic level, the Government created a market economy and removed its control on prices, in order to create a favourable climate to national and foreign investments. Restrictions on foreign exchange controls were removed as a financing policy to secure the investments necessary for developing telecom infrastructures.

Zambia has undertaken policy reforms at all levels of the telecom sector and is on the way to further liberalize the sector as it plans to introduce competition for all services and privatize the national operator. Zambia has made the necessary reforms to improve the development of the telecommunication sector. By allowing private sector participation, it will alleviate its investments in telecom infrastructures, allow customers requirements to be met more rapidly, the network to be extended and modernized, and attract foreign and local investors.

SECTION IV - UNIVERSAL SERVICE

Some countries have given a definition to the concept of "universal access to basic services" or "universal service" and some countries have not. The purpose of this section is to identify which services are considered as universal services, what policies have been implemented in order to ensure universal access to basic services, what is the next phase in the development of telecommunication infrastructure aiming at achieving universal service, which measures do not involve the telephone operator in bringing about universal service, what specific universal service obligations do operators have to meet and what other obligations are imposed on operators. The review of all of these points will help define how universal service is considered by the different countries, its importance, its meaning and the extent to which operators are committed to bring about universal service. (See Table 5.)

- Among the 32 African countries, 17 declared having a definition of universal service. All of them defined the following basic services as being universal services: telephony, telex and fax. Some countries have also included data transmission and availability of basic services within walking distance into the definition. Ten countries indicated that they had no definition of universal service and five countries did not answer.
- The most frequently stated policies, implemented to ensure universal access to basic services, are direct subsidization from government and use of access charges. Mentioned less frequently are cross subsidization between services, followed by universal service funds.
- The next phase in the development of telecommunication infrastructure aiming to achieve universal service can be summarized into three main objectives: one public phone in every community within walking distance (town, school, clinics, etc.), one phone in every home, and an increase in telephone penetration in rural areas.
- Plans to bring about universal service that do not involve the telephone operator (e.g., cable television operators) do not appear to be a common policy in African countries. Only eight countries indicated they had such plans or measures.
- More than 20 countries, irrespective of whether they have or do not have a definition of universal service, declared that they had specific universal service (or similar) obligations for operators. Some countries indicated that these specific universal service obligations were included in contractual programmes and/or in licenses between the government and the operator/other licensed operators. These agreements also frequently require a number of other obligations on services or performance. Less than four countries indicated not having specific universal service obligations and other obligations on operators.

SECTION V - INFORMATION INFRASTRUCTURE

Information flow and interactive services are becoming more and more important aspects of the communication environment, as technologies evolve rapidly and allow new services to be made available to customers. This section identifies the presence or the lack of policies, strategies and goals to develop a nationwide broadband interactive network; the funding or not of such initiatives by the government; the status of cable TV and the allowance of telecommunications companies to provide cable TV services and vice versa; the possibility for telecommunication companies to provide interactive services; access to Internet and restrictions placed on Internet services providers.

The purpose of this section is to give an overview of national commitments to information infrastructure and services.

- Among the 32 African countries, only Angola and Senegal indicated that they had a policy/strategy to develop a broadband interactive network. Angola is elaborating such policy/strategy and Senegal intends to develop telecommunications with information highways and the Internet network. This result is not surprising, as most of the African countries are committed as a first priority to develop a basic telecommunication infrastructure to provide basic telecommunication services to a large part of their population that still does not have access to a telephone.

TABLE 5

Universal Service **AFRICA**

	Official definition of universal access to basic services	Policies ensuring universal access					Plans for univeral service without phone operator
		Direct subsidization from government		Cross subsidization between services			
		Access charges		Other policies		Universal service funds	
Algeria	✓	✓	✓	✓	😐	😐	✓
Angola	✓	✓	😐	😐	😐	😐	✓
Benin	✓	✓	😐	😐	✓	😐	☒
Burkina Faso	✓	✓	✓	😐	✓	😐	😐
Burundi	☒	😐	😐	😐	✓	😐	☒
Cameroon	😐	😐	😐	😐	😐	✓	😐
Chad	✓	😐	😐	😐	😐	😐	☒
Comoros	☒	😐	😐	😐	😐	✓	☒
Côte d'Ivoire	✓	✓	😐	😐	😐	😐	✓
Djibouti	😐	😐	😐	😐	😐	😐	😐
Ethiopia	☒	😐	✓	😐	😐	😐	☒
Guinea	✓	☒	☒	✓	✓	😐	☒
Kenya	✓	😐	✓	✓	😐	😐	☒
Madagascar	✓	✓	😐	😐	😐	😐	☒
Mali	☒	😐	😐	😐	😐	😐	☒
Mauritania	✓	😐	😐	😐	✓	✓	☒
Mauritius	☒	✓	✓	☒	☒	😐	☒
Morocco	✓	✓	✓	✓	☒	✓	😐
Mozambique	✓	☒	✓	☒	☒	😐	☒
Niger	😐	✓	😐	😐	😐	😐	✓
Nigeria	☒	✓	😐	😐	☒	☒	☒
Rwanda	☒	✓	😐	😐	😐	😐	☒
Senegal	✓	😐	😐	😐	✓	✓	☒
Seychelles	☒	😐	✓	😐	😐	😐	☒
South Africa	☒	☒	✓	☒	☒	😐	✓
Sudan	✓	☒	☒	✓	☒	😐	✓
Swaziland	😐	☒	✓	☒	☒	😐	☒
Tanzania	✓	😐	✓	😐	😐	✓	✓
Togo	✓	✓	😐	😐	😐	😐	✓
Uganda	☒	😐	😐	😐	😐	😐	😐
Zambia	😐	😐	😐	😐	😐	😐	😐
Zimbabwe	✓	☒	✓	☒	☒	☒	☒

✓ Yes
☒ No
😐 No response

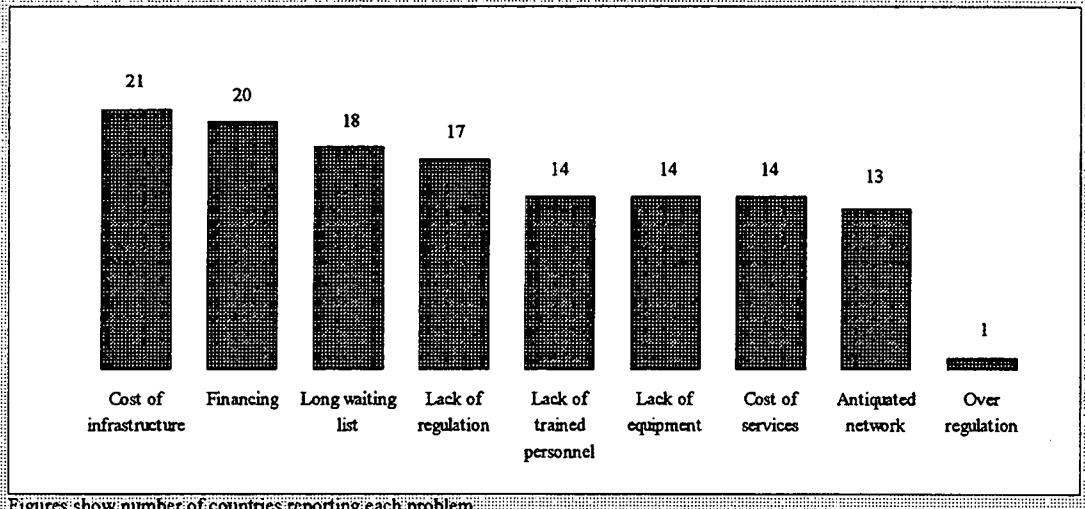
- Only Kenya indicated availability of cable television services.[4] In this country, the new service is regulated and cable TV operators are not allowed to offer telecommunications services or vice versa. Twenty countries declared that cable TV was not available, and 11 did not give a response.
- Plans for telecommunications companies to provide interactive services have been made in six countries. Eleven countries indicated that no such plans had been made, and 15 countries did not answer the question.
- Access to Internet is available in 12 countries, including Senegal and Nigeria which have placed restrictions on access. Eleven countries do not have access to Internet, and eight gave no response.

SECTION VI - NATIONAL TELECOM NEEDS

The purpose of this section is to identify a country's national telecom needs by listing the most pressing problems encountered by operators in the telecommunication sector, and by defining other factors inhibiting the full optimization or utilization of the present infrastructure.

Among the problems listed in the survey, each has been noted at least once by an African country. As shown below, the major problems for African countries are the cost of infrastructure, the lack of financing, regulation, and a long waiting list for new service.

Figure 6:
Ranking of problems expressed by African telecommunication administrations, 1995



Note: Figures show number of countries reporting each problem.
Source: ITU/BDT Regulatory Database.

- The other factors inhibiting the full optimization or utilization of the present infrastructure are mainly of commercial, economic, financial for both operators and customers, political and technical concerns.

[4] ITU World Telecommunication Database, indicates that Tanzania has 520 cable television subscribers as of 1994.

PART TWO

SECTION VII - FINANCING THE DEVELOPMENT OF TELECOMMUNICATIONS

This matter, including the Report on Q.4/1 was studied and discussed in detail at the ITU/BDT Africa Telecommunications Finance Colloquium (Abidjan, 25-29 March 1996). The results of the colloquium will be presented to the African Regional Telecommunication Development Conference. A detailed survey will be conducted in 1996 in light of the outcome of the colloquium and the AF-RTDC. It will cover the finance/economic aspects of telecommunications.

SECTION VIII - INDUSTRIALIZATION AND TECHNOLOGY TRANSFER*

This section addresses the situation of a country's telecom equipment manufacturing capabilities in relation to industrialization and technology transfer. The identification of telecom equipment manufacturing capabilities, policies and plans concerning the local manufacturing of telecom equipment, the ways in which development of the telecommunication equipment manufacturing industry is related to overall national development and the existence of a national programme of industrialization which includes telecommunications aspects, are all aspects of telecommunication industrialization of a country.

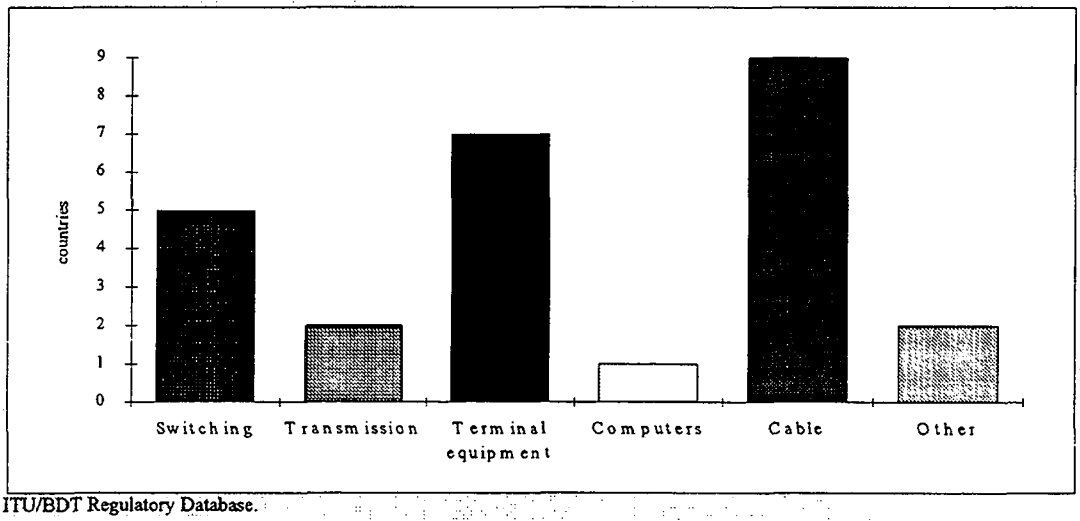
To understand more completely the links between industrialization and technology transfer, the following points are addressed: arrangements for access to technology transfer; the links between national institutions and technology transfer programme and projects; research and development activities and programmes in telecommunications conducted in the country; the conversion of these R&D activities into industry; the technical and economic assistance received for the telecommunication equipment manufacturing industry; and the country's expertise/experience in dealing with telecommunications technology transfer.

The purpose of the section is to understand the current situation, how it has evolved and what kind of assistance the country needs to proceed with the introduction or expansion of local manufacture of telecommunications equipment. A more detailed survey will be conducted in 1996 on the basis of the decisions of the AF-RTDC-96, concerning industrialization proposals/initiatives.

- Among the 32 African countries, 12 declared that they manufactured (or assembled) at least one of the following telecommunications equipment:

* Only preliminary results.

Figure 7: Telecom equipment manufacturing capability



Source: ITU/BDT Regulatory Database.

Note: In some cases, manufacturing is limited to "assembly of parts".

Nine of these countries have implemented policies concerning local manufacturing of telecommunication equipment. These policies consist mainly of investment incentives, liberalization of the manufacturing industry, support to increase national production and encourage the establishment of plant. Two countries that did not have any telecommunication equipment manufacturing capabilities have established plans for this purpose. Sudan plans "to prepare the environment for manufacturing. There is an ongoing analysis of cable manufacturing and assembly of telephone set"[5]. Senegal plans to establish a local cable and terminal equipment manufacturer. Nine countries declared that they did not manufacture any telecom equipment and did not have any plans to do so. Eleven countries gave no response.

- The telecommunication equipment manufacturing industry is viewed as an extremely important component in overall national development, as indicated by some of these countries. It has an impact on the country's economy mainly by providing employment, and helping save and earn foreign exchange, etc.
- Among the 32 African countries, only Algeria, Kenya, Mauritius, South Africa and Zimbabwe indicated that they had industrialization programmes that include telecommunications aspects, and 18 declared that they did not.
- Kenya, Mali, Zimbabwe and Rwanda have access to technology transfer under the following arrangements: joint-ventures, assistance contract with partner, on site training, etc. Ten countries declared not having access to these arrangements.
- Six countries indicated that national institutions have been linked to programmes and projects related to technology transfer, and ten countries indicated that they had not.
- Research and development activities have been conducted in seven countries, but only Zambia and Zimbabwe have converted these activities into industry.

[5] Response from Sudan.

- Kenya, Seychelles, South Africa and Zimbabwe received technical and economic assistance for the telecommunication equipment manufacturing industry under the following forms: assembly assistance; investment in local manufacturing capability; technology transfer; training; development studies; from foreign industries, international organizations and other countries. Fourteen declared that they have not received any assistance.
- Only six African countries: Algeria, Mali, Senegal, South Africa, Sudan and Zimbabwe responded that they had expertise and/or experience in dealing with telecommunications technology transfer, and 17 stated that they did not have expertise/experience in this field.
- There is an important need for assistance at all levels. Twenty countries expressed their assistance requirements to proceed with the local manufacturing of telecommunications equipment. Assistance is mainly needed for the following sectors: equipment, investment, financing, policy setting, establishment of industry/plant, technology transfer and expertise, R&D activities, access to information and technical assistance.

This section has demonstrated that a large number of African countries are lacking the basic elements to create and develop telecommunication equipment manufacturing. The reasons for this situation are mainly the low level of technology transfer, expertise, research and development activities, the small economic and technical assistance received and also the lack of plans or policies to encourage and promote the development of this industry.

Conclusion

This preliminary survey has been very useful in identifying the present status of regulatory and policy developments, as well as future expectations. It will be of great benefit to the ITU and will be a useful tool for all countries, and the ITU membership in general, in understanding and exchanging experiences with each other in order to identify policies and procedures which are suitable to each national circumstance.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 41-E
25 April 1996
Original: French

For Information/Support

Agenda item: 2.1

SOURCE: CENTRAL AFRICAN REPUBLIC

TITLE: DEVELOPMENT OF NATIONAL TELECOMMUNICATION INFRASTRUCTURE, IN PARTICULAR IN RURAL AREAS

I General information on the Central African Republic

The Central African Republic, occupying a territory of 623 000 km^2, is bounded to the north by Chad, to the south by Zaire and Congo, to the west by Cameroon and to the east by Sudan.

At the administrative level, the Central African Republic is divided into 16 prefectures and 67 sub-prefectures.

The Constitution of 14 January 1995 provides for the division of the territory into regions, prefectures, sub-prefectures and municipalities administered by elected bodies.

The main economic activities are as follows:

Industry

Textiles and leather, food, chemicals, building and public works at Bangui, sugar refinery in the Bambari region, palm oil factory at Bossongo in the Lobaye region, timber in Lobaye and Sangha Mbaéré, cotton ginning mills in the cotton growing areas of the north-west and the centre, hydro-electric plants at Boali in the Bangui region and at Zangba in the Mobaye region.

Mining resources

Diamonds in Mambéré Kadeï, Sangha Mbaéré, upper Kotto and lower Kotto, uranium at Bakouma (not yet exploited). Other mining resources have not yet been developed. Petroleum is the subject of ongoing studies.

Agriculture

The main crops under cultivation are the following: cotton in the north-west, the west, the north (Ndélé region) and the centre; coffee in the west, the centre and the east; oil palms in the M'baïki, Bangui and Mobaye regions, and tobacco in the west.

Food crops are grown throughout the country, and cattle farming is being developed in several regions.

Tourism

The main tourist areas are the game-hunting reserves of Vakaga, Bamingui Bangoran and Nola (forest elephants).

Transport

The Central African road network comprises 6 000 km of main highways, including 510 km of tarred roads, 4 000 km of regional roads and 15 000 km of country tracks.

The national and regional trunk roads and a number of country tracks (particularly in development project areas) are passable all year round.

The Mombasa-Lagos trans-African highway runs through Bangassou and Bangui to the Cameroon frontier.

The Oubangui River is an important transport artery, from Bangui to Brazzaville and Kinshasa and from Bangui to Lobaye.

The main statistical data are reproduced in Annex 1.

II General outline of the telecommunication situation

Since 1990, Central African telecommunications have been administered by a semi-public corporation, the Société Centrafricaine des Télécommunications (SOCATEL), in which the shareholding partners are the Central African State (60%) and the Compagnie Française des Câbles Sous-marins et Radio (France Câbles & Radio or FCR, a subsidiary of France Telecom) (40%).

The Central African Republic's telecommunication network comprises:

- four reliable electronic telephone exchanges, at Bangui, Bambari, Berbérati and Bouar. The Bangui exchange also handles national and international transit traffic;
- four antiquated electromechanical or semi-electronic telephone exchanges, at Bangassou, Boali, Carnot and Mbaïki;
- one national satellite communication system, known as the TELCASAT network, which comprises one main high-capacity station at Bangui and eight secondary low-capacity stations at Bambari, Bangassou, Berbérati, Bossangoa, Bouar, Carnot, Kembé and M'baïki;
- one high-frequency radio network for telegraph and telephone traffic between Bangui and a number of provincial towns. (Annexes 2A and 2B); all links operate on a system of timeslots and trunk communications are possible only between Bangui and another town equipped with a primary or autonomous station;
- the standard A earth station in the INTELSAT system, at Bangui, for international traffic;

– since July 1995, a cellular network (Centrafrique Radio Téléphone), with capacity for 200 subscribers, at Bangui.

Of the 67 major and secondary administrative centres, only four (Bangui, Bambari, Berbérati and Bouar) are equipped with fairly reliable telephone networks, providing comprehensive service for subscribers. In five other towns (Bangassou, Bossangoa, Carnot, Kembé and M'baiki), telephone booths must be used for the national and international automatic telephone service.

Annex 3 gives an overview of the network as at 31 December 1995.

The Telecommunication Regulation Act of January 1996 has liberalized the telecommunication sector in the Central African Republic. A cellular network with access to the international service is also being operated currently at Bangui by the private company TELECEL Centrafrique. Under another act, SOCATEL is given the status of public operator.

III Telecommunication infrastructure in rural areas

In terms of population distribution and density, the rural telephone environment may be divided into three broad categories[1]:

i) densely populated areas, including industrial zones, factories, high buildings and suburban areas;

ii) isolated municipalities and the villages they comprise. The commercial, cultural and economic development of such isolated municipalities and villages calls for the provision of telephone services;

iii) sparsely populated areas, including farms, plantations, oil production facilities, roadside shops, etc.

Sparsely populated sites are probably the most difficult to service. By definition, few lines are needed for each site (one only as a rule), and the anticipated utilization rate is also low.

An analysis of the present state of telecommunications in the Central African Republic leads to the following conclusions:

– All provincial towns come within these categories.

– The Central African telecommunication network is underequipped in relation to the country's considerable needs, and what little infrastructure exists is concentrated for the most part in the capital.

– Rural areas lack telecommunication facilities.

– In areas where there are telephones, the equipment is either inadequate to meet demand or obsolete and based on technology that satisfies neither the constraints of the rural environment nor the need for new services.

As the resources available to SOCATEL are inadequate to satisfy the requirements of certain individual subscribers in the interior of the country, a number of companies and private individuals have been authorized to install and operate their own high-frequency radio telephone links.

This private radiotelephony system is subject to special regulations and rates. Point-to-point links are established between parent stations - based in Bangui for the most part - and stations scattered

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[1] Source: Document 2/39 of BDT Study Group 2.

throughout the country (mines, forestry holdings, farms, tourist facilities, etc.). Links are established in simplex mode, using single sideband equipment.

Some externally funded State-run companies are operating in rural areas. Even where they are concerned, however, the corresponding industrial zones are lacking in basic telecommunication infrastructure.

The companies in question include:

- the Société de Gestion Sucrière (SOGESCA) in the Bambari region (sugar plantation, production and marketing plant);
- the Centrafricaine des Palmiers à huile (CENTRAPALM) in the Lobaye region (palm oil plantation, production and marketing plant).

To prevent such situations from arising, **it is recommended as a matter of importance that, with regard to financing, ITU and the financing agencies (ADB, the World Bank and UNDP among others) draw up a practical booklet which includes telecommunications in the design and evaluation of all development projects.**

It may also be recalled that participants' contributions at the ITU-BDT/TRT seminars[2] on telecommunications for integrated rural development had served to draw attention to a number of essential recommendations, including:

The integration of rural telecommunications, on the same basis as urban telecommunications, into telecommunication development plans (rural services/urban services) and their inclusion in national project financing plans.

IV Conclusion

Despite the substantial investments already made, there is an acute shortage of telecommunication facilities, particularly in rural areas.

The lack of infrastructure in rural areas creates to a communications vacuum which isolates these areas from all economic and cultural development endeavours.

As was said in Buenos Aires, the inadequacy of the telecommunication service in rural areas is due not so much to a lack of political will on the part of developing countries as to a lack of financial resources. For that reason, programme No. 9 concerning integrated rural development must not be confined to studies. Everything should be done to ensure that, once the studies are completed, access to the different sources of financing is facilitated. In that connection, the Central African

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[2] Three seminars were held:

- November 1993 in the People's Republic of China;
- June 1994 in Tunisia;
- December 1994 in France.

Republic is in favour of the pilot project for the establishment of community telecentres which will provide services and telematic support, as well as payphones. The Central African Republic, which has very low telephone penetration, is one of the 20 countries involved in this pilot project and is awaiting its concrete implementation.

As an illustration of telecommunication needs in rural areas, mention should be made of the pressing demands being made for the services concerned by the rural populations themselves, who consider that SOCATEL's implementation rate is too slow.

SOCATEL is to carry out a triennial development programme (1997-1999) which will place particular emphasis on rural areas. Its overall objective is to make available to the Central African population a diversified range of reliable telecommunication facilities, which will raise telephone density by the year 2000 to:

- between 1% and 2% in the main towns;
- 0.5% in the country as a whole (the average level for sub-Saharan Africa was estimated by ITU to be 0.4% in 1992).

Given an anticipated density of 0.5%, the Central African Republic needs to have 18 000 lines by the year 2000, including roughly 2 000 in rural areas.

Implementation of this triennial investment programme calls for the mobilization of financial resources on a scale beyond SOCATEL's self-financing capacity.

Given an estimated investment of 20 thousand million CFA francs, the assistance of several donors is required.

For that purpose, the Central African Republic plans in 1996 to organize a sectoral consultation of donors to finance the programme.

ANNEX 1

A General information

Surface area:	623 000 km^2
Population in 1992 (based on 1988 census):	2 957 268 inhabitants[3]
Political capital:	Bangui (524 360 inhabitants)
Economic capital:	Bangui[4]
Main towns:	Berberati (47 148 inhabitants) Bouar (43 454 inhabitants) Bambari (41 165 inhabitants) Bossangoa (33 699 inhabitants) Carnot (40 967 inhabitants)
Level of urban settlement:	37% of the population (1988)
Population growth rate:	2.5%
Population density:	5 inhabitants per km^2 (1995 estimate)

B Macro-economic aggregates

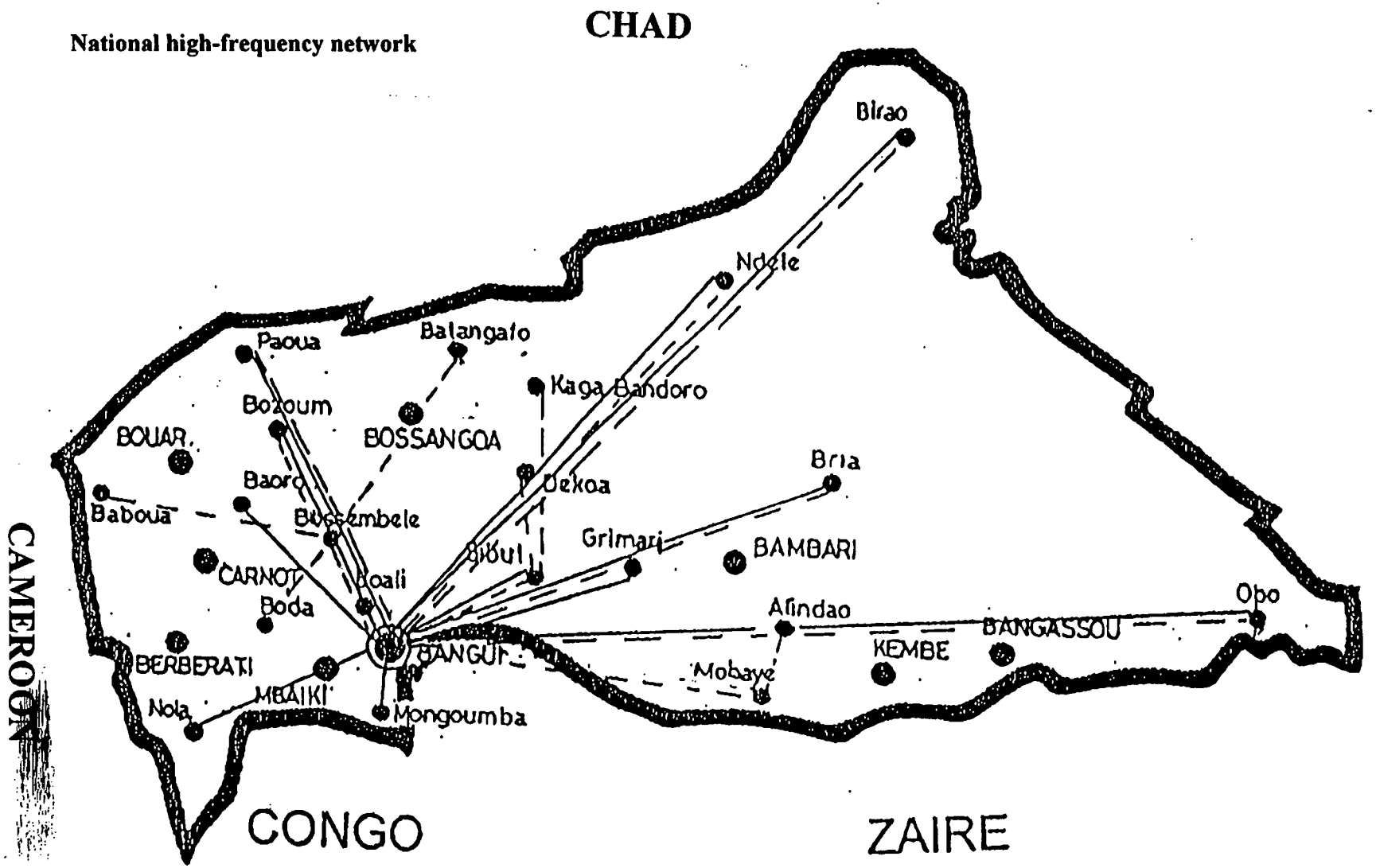
	1986	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**
GDP MFCFA	402 447	382 573	89 116	401 954	406 512	404 412	398 339	387 048
GDP growth %	3.58	-4.94	1.71	3.30	1.13	-0.52	-1.50	-2.83
Growth per capita GDP %	1.05	-7.26	-0.77	0.78	-1.33	-2.95	-3.90	-5.20

[3] December 1993 projection: 2 994 349 inhabitants.

[4] December 1993 projection: 546 320 inhabitants.

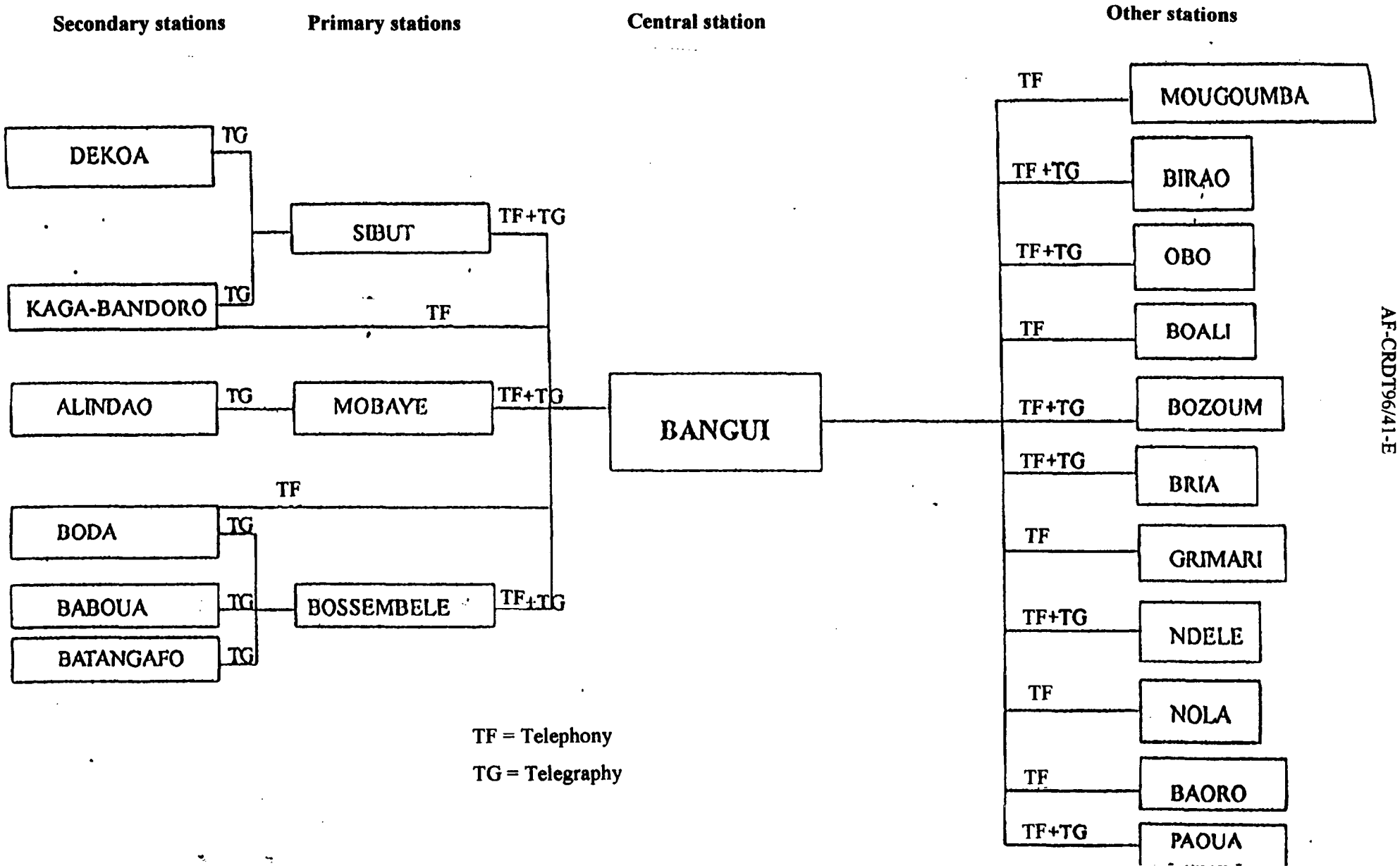
ANNEX 2A

National high-frequency network



ANNEX 2B

Configuration of the national high-frequency network



TF = Telephony

TG = Telegraphy

ANNEX 3

Overview of the network at 31 December 1995

Telecommunication statistics

Number of main lines: (including 7 180 for Bangui)	7 800
Provinces:	620
Number of cellular subscribers:	200
Telephone density (main lines per 100 inhabitants):	0.23
Growth of main lines:	8%
Dedicated links:	26

Private radio links

- Fixed service: 68 central stations (10 of which provide both fixed and mobile services), and 212 outstations.
- Mobile service: approximately 20 central stations (mainly in Bangui) and 180 mobile stations.

2 State of the telecommunication network

TABLE 1

TELCASAT network

No.	Centre	Local network	Operation	SCPC channels	Diameter	Noise temperature ° k	Power
1	Bangui	Yes	Automatic	33	11 m	41	750 W
2	Bambari	Yes	Automatic	6	7.3 m	70	10 W
3	Bangassou	Yes	Semi-automatic	3	7.3 m	70	10 W
4	Berberati	Yes	Automatic	6	7.3 m	70	10 W
5	Bossangoa	No	Booth	3	7.3 m	70	10 W
6	Bouar	Yes	Automatic	6	7.3 m	70	10 W
7	Carnot	Yes	Semi-automatic	3	7.3 m	70	10 W
8	Kembé	No	Booth	3	7.3 m	70	10 W
9	M'baïki	Yes	Semi-automatic	3	7.3 m	70	10 W

INTELSAT system

1 Digital carrier: 2 Mbit/s; Diameter: 14 m; Power: 125 W

TABLE 2

High-frequency network

No.	Centre	Network	Link	Power	Power system
1	Alindao	No	TG	20 W	Generator
2	Baboua	No	TG	20 W	Generator
3	Baoro	No	TF	30 W	Generator
4	Batangafo	No	TG	20 W	Generator
5	Birao	No	TG and TF	100 W	Solar + gen.
6	Boali	Yes	TG and TF	100 W	Enerca
7	Boda	No	TG and TF	20 W and 30 W	Generator
8	Bossembele	No	TG and TF	20 W and 30 W	Generator
9	Bozoum	No	TG and TF	20 W and 30 W	Generator
10	Bria	No	TG and TF	100 W	Solar + gen.
11	Dekoa	No	TG	20 W	Generator
12	Grimari	No	TG	20 W	Generator
13	Kaga-Bandora	No	TG and TF	20 W and 30 W	Generator
14	Mobaye	No	TG	20 W	Generator
15	Mongoumba	No	TG and TF	20 W and 30 W	Generator
16	Ndele	No	TG	20 W	Generator
17	Nola	No	TG	20 W	Generator
18	Obo	No	TG and TF	100 W	Solar
19	Paoua	No	TG and TF	20 W and 30 W	Generator
20	Sibut	No	TG and TF	20 W and 30 W	Generator

TG = Telegraph

TF = Telephone

TABLE 3

Switching characteristics

Centre	Type	Model	Year	Lines	Occupation	Condition	Observations
Bangui	Digital	OCB 283	1992	12 000	7 180	Good	Multifunction
Bambari	Digital	OPUS	1992	208	134	Fairly good	Auto trunk
Bangassou	X-bar	CP200Z	1966	100	56	Antiquated	Manual trunk
Berberati	Digital	OPUS	1992	208	173	Fairly good	Auto trunk
Boali	X-bar	CP 50	1977	50	17	Antiquated	Manual trunk
Bossangoa	Booth		1992				3 auto trunk circuits
Bouar	Digital	OPUS	1992	208	113	Fairly good	Auto trunk
Carnot	X-point	XP 100	1977	400	63	Antiquated	Manual and booth auto trunk
Kembé	Booth		1992				3 auto trunk circuits
M'baïki	X-point	XP 100	1977	400	56	Antiquated	Manual and booth auto trunk
TOTAL				13 574	7 800		

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 42-E
25 April 1996
Original: English

For Action

Agenda item: 2.4

PLENARY MEETING

SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU

TITLE: INTERNATIONAL SYMPOSIUM ON THE ROLE OF TELECOMMUNICATION AND INFORMATION TECHNOLOGY IN THE PROTECTION OF THE ENVIRONMENT (TUNIS, 17-19 APRIL 1996)

Objectives of the International Symposium on the Role of Telecommunication and Information Technology in the Protection of the Environment (Tunis, 17-19 April 1996)

- To bring the telecommunication and environment communities together for the first time.
- To identify major environmental problems.
- To identify the resources needed to address them.
- To identify the most appropriate tools and means which the telecommunication community could offer as a contribution to the protection of the environment, in keeping with "Agenda 21".
- To identify requirements for access to these technologies.
- To stimulate forward-looking reflection on the issue.
- To recommend an action programme setting out further stages of the process begun by the ITU for the promotion of telecommunication and information technologies for the protection of the environment.

The International Symposium on the Role of Telecommunication and Information Technology in the Protection of the Environment, organized in Tunis by the ITU in collaboration with the Ministry of Communications and the Ministry of Environment and Land-Use Planning, within the framework of implementation of Resolutions 7 and 8 adopted by the World Telecommunication Development Conference (Buenos Aires, March 1994) and Resolutions 35 and 36 adopted by the ITU Plenipotentiary Conference (Kyoto, September-October 1994),

endorsing the preambular paragraphs of those Resolutions, and reaffirming

a) that telecommunication and information technologies have an important role to play in protecting the environment and in promoting sustainable development activities;

b) that, as practical experience shows, the latest telecommunication and information technologies, especially those associated with space systems, are extremely useful in implementing and conducting environmental protection activities, such as: observation of the Earth and the degradation of ecosystems; monitoring air, river, harbour, sea and ocean pollution; remote sensing, studying phenomena such as desertification, drought, floods and cyclones; studying the impact of environmental degradation liable to affect the conservation and sustainable use of biological diversity; studying wild fauna; developing forestry resources; controlling deforestation, etc.;

c) that the use of telecommunication technologies can significantly reduce paper consumption, which ultimately saves forests;

d) that telecommunication and information technologies such as telecommuting and teleconferencing can both replace the use of transport, particularly in urban areas, thus lowering the level of air pollution by reducing emissions of greenhouse gases, particularly CO2, and save energy;

e) that telecommunication and information technologies may make a significant contribution to the development of rural areas, stem rural exodus and hence reduce overcrowding in towns;

f) that it is important to make maximum use of the possibilities offered by science, particularly telecommunication technologies such as remote sensing, to organize training and to disseminate information on these aspects, as stated in Chapters 35 and 40 of Agenda 21 adopted at the Earth Summit (Rio de Janeiro, June 1992),

recommends

that ITU/BDT with the technical support of the other ITU Sectors and the backing of the environment community

1 draw up and implement a comprehensive plan of action in the form of a global operational telecommunication-environment project on the development and use of telecommunication and information technologies for the protection of the environment and sustainable development, which will be an inter-regional project with regional and/or subregional components and will take account of the specific characteristics and needs of the different regions/subregions concerned;

2 pursue efforts to carry out specific studies in an international context on proposed methods of evaluating impact on the environment and subject them to detailed tests in order to determine whether they are applicable to the different info-communication methods taking account of socio-cultural and economic diversity worldwide;

3 develop a framework and procedures allowing ITU/BDT to ensure international coordination in seeking telecommunication and information technologies solutions for the protection of the environment;

4 pursue preparation of the policy document begun by Study Group 2 for promoting the use of telecommunication and information technologies, especially space technologies, for environmental protection applications and establish a framework for international cooperation which will enable all those concerned (governments of developed and developing countries, manufacturers and consumers of technology, private sector, international organizations, United Nations specialized agencies, etc...) to carry out, promote and develop projects to ensure optimum use of the most appropriate telecommunication and information technologies for the protection of the environment and sustainable development;

5 organize seminars, regional workshops, training and research programmes, exhibitions and other activities in order to study the matter in greater depth and heighten awareness among all those concerned of the value of implementing multilateral and bilateral projects within the framework of international cooperation and consider, if necessary, holding an international conference with the aim, *inter alia*, of identifying and carrying out pilot projects in this area at regional, subregional and national level, in cooperation with international organizations and with the support of international telecommunication operators;

6 encourage national, subregional, regional and international cooperation between the environment and telecommunication communities for the implementation of specific environment-telecommunication projects;

7 develop and disseminate appropriate course material for conducting training programmes on the subject and disseminate information on telecommunication and information technology applications for the protection of the environment and sustainable development.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 43-E
25 April 1996
Original: French

For information/support

PLENARY MEETING

Note by the Secretary-General

FINANCIAL RESPONSIBILITIES OF CONFERENCES

The attention of the African Regional Telecommunication Development Conference is drawn to the provisions of Article 34 of the Convention of the International Telecommunication Union (Geneva, 1992) which stipulate that:

"1. Before adopting proposals or taking decisions with financial implications, the conferences of the Union shall take account of all the Union's budgetary provisions with a view to ensuring that they will not result in expenses beyond the credits which the Council is empowered to authorize.

2. No decision of a conference shall be put into effect if it will result in a direct or indirect increase in expenses beyond the credits that the Council is empowered to authorize."

Pekka TARJANNE
Secretary-General

UNION INTERNATIONALE DES TÉLÉCOMMUNICATIONS
BUREAU DE DÉVELOPPEMENT DES TÉLÉCOMMUNICATIONS

CONFÉRENCE RÉGIONALE AFRICAINE DE DÉVELOPPEMENT DES TÉLÉCOMMUNICATIONS
(AF-CRDT-96)
Abidjan (Côte d'Ivoire), 6-10 mai 1996

Document 44-F/E
29 avril 1996
Original: français
anglais

Pour information/référence

Point de l'ordre du jour: 3.1

SÉANCE PLÉNIÈRE

ORIGINE: BDT
SOURCE BDT

TITRE: COLLOQUE SUR LE FINANCEMENT DES TÉLÉCOMMUNICATIONS EN AFRIQUE
TITLE: AFRICA TELECOMMUNICATIONS FINANCE COLLOQUIUM

UNION INTERNATIONALE DES TELECOMMUNICATIONS

BUREAU DE DEVELOPPEMENT DES TELECOMMUNICATIONS

Abidjan, Côte d'Ivoire
25-29 mars 1996

Colloque sur le financement des télécommunications en Afrique
Africa Telecommunications Finance Colloquium

Finance / Finances

Partnership/ Partenariat

Abidjan Côte d'Ivoire, 25 - 29 March 1996
Telecommunication Development Bureau
International Telecommunication Union

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Africa Telecommunications Finance Colloquium
Colloque sur le Financement des Télécommunications en Afrique
Abidjan, Côte d'Ivoire, 25-29 March 1996

AFRICA NEEDS TELECOM FINANCE
L'AFRIQUE A BESOIN DE FINANCEMENT POUR SES TELECOMMUNICATIONS

...and this Colloquium aims to generate fresh financial flows for the mutual benefit of telecom users, investors and operators.

- What needs to be done to bring this about?

... et ce colloque vise à générer de nouveaux flux financiers dans l'intérêt mutuel des utilisateurs, des investisseurs et des opérateurs dans le domaine des télécommunications.

- Quel est l'éventail de possibilités?

Contents[1] | **Page** | **Plan**

FACTORS AFFECTING THE FUTURE OF FINANCE	**2**	**FACTEURS AYANT UNE INCIDENCE SUR L'AVENIR DU FINANCEMENT**
Starting points	**2**	Points de départ
Evidence	**3**	Tableau réel
Trade liberalisation	**5**	Libéralisation du commerce
Procurement	**7**	Passation de marchés
Global information infrastructure	**7**	Infrastructure mondiale de l'information
InfoDev	**8**	InfoDev
FINANCIAL INSTITUTIONS, RESOURCES AND STRATEGIES	**10**	**LES INSTITUTIONS FINANCIÈRES: LEURS RESSOURCES ET LEURS STRATÉGIES**
Rules of the game	**10**	Règles du jeu
New players	**11**	Nouveaux acteurs
Private capital: score and scope	**12**	Capitaux privés: bilan et perspective
Getting ready	**13**	Etre prêt
From dragon to elephant	**15**	Du dragon à l'éléphant
FINANCIAL ENGINEERING	**16**	**MONTAGE FINANCIER**
Fiction and facts	**16**	Fiction et réalité
Appraisal of investment cost and finance	**17**	Evaluation du coût et du financement des investissements
Investors' perspective	**18**	Point de vue des investisseurs
Attractive recipes for private capital	**19**	Recettes pour attirer les capitaux privés
Partnerships	**22**	Partenariats
Joint ventures	**23**	Opérations conjointes
Bidding process	**24**	Appels d'offre
Valuation and debt	**24**	Estimation de la valorisation et de la dette
Local initiatives	**26**	Initiatives locales
Risk management	**29**	Gestion des risques
CROSS BORDER CO-OPERATION	**32**	**COOPÉRATION TRANSFRONTIÈRE**

[1] **Annexes:**
1 Sector reforms in Africa 1996
2.1 Traditional sources of finance
2.2 The new configuration
2.3 The current African ownership /control pattern
2.4 Harmonizing divergent interests
3 Privatisation case study
4 Financial sources, instruments and strategies

[1] **Annexes:**
1 Réformes sectorielles en Afrique, 1996
2.1 Sources de financement traditionnelles
2.2 La nouvelle configuration
2.3 Structures d'organisation et d'exploitation des Telecommunications en Afrique
2.4 Harmoniser des intérêts divergents
3 Etude de cas: Privatisation
4 Sources, instruments et stratégies financiers

FACTORS OF FINANCE

♦ "Investment in the telecom sector is reasonably safe and comfortable returns are likely over a relatively short period of time. On account of short gestation periods and early returns, investment has been forthcoming easily and there is considerable private interest." This is a quote from a leading figure in the Asian environment. The Colloquium endeavours to pave the way so that it may describe the African reality in due course.

♦ The focus of this brochure is on the **factors affecting the future of finance in Africa.**

Starting points

♦ A broad-brush rapid assessment of the African record and outlook is in order. The African Telecommunication scenario is a study in contrasts - which is normal when reviewing over 50 countries - ranging from nations with advanced services to nations with very low basic telephone penetration and wide discrepancies in their respective stages of sector reform **(annex 1).**

♦ Here is the challenge: today, telecom plays an increasingly crucial role for improving the quality of life and bringing the world together. In particular, telecom is a prerequisite to balanced socio-economic growth and increased public benefit.

♦ Furthermore, telecom is the glue for social cohesion at national or regional level as well as in the development of trade in goods and services.

FACTEURS DE FINANCEMENT

♦ "Les investissements dans le secteur des télécommunications présentent relativement peu de risques et il est probable que les taux de rentabilité seront confortables à relativement court terme. Compte tenu de la brièveté des périodes de gestation et de la rapidité avec laquelle les capitaux investis deviennent rentables, il est facile de mobiliser des ressources pour l'investissement; par ailleurs le secteur privé se montre très intéressé." Ces mots ont été prononcés par une personnalité asiatique. L'objectif de ce colloque est de déblayer le terrain pour que ceci se réalise aussi en Afrique.

♦ Cette brochure met l'accent sur les **facteurs ayant une incidence sur l'avenir du financement en Afrique.**

Points de départ

♦ Une évaluation rapide et schématique de la situation et des perspectives des pays africains s'impose. La situation des télécommunications en Afrique est contrastée, ce qui est normal puisque l'étude porte sur plus de 50 pays dont certains bénéficient de services modernes alors que d'autres se caractérisent par un taux de pénétration du service téléphonique de base très faible et par des écarts importants pour ce qui est de la réforme de leur secteur des télécommunications **(Annexe 1).**

♦ Voici l'enjeu: aujourd'hui, les télécommunications jouent un rôle de plus en plus déterminant dans l'amélioration de la qualité de la vie et le rapprochement des peuples. Elles sont en particulier un préalable à une croissance socio-économique équilibrée et à l'amélioration du bien-être de la collectivité.

♦ En outre, les télécommunications sont le liant du tissu social aux niveaux national et régional et du développement du commerce des biens et des services.

♦ Most wealthy and emerging market countries have recognised the **strategic importance** of the telecom sector as it evolves into a multi-media configuration and core infrastructure that increasingly determines the direction of progress of countries and for the future of mankind. And they are acting on it by implementing a variety of policies intended to **speed up the modernisation process**, within the general framework of their national policies for **economic**, **social** and **cultural** development.

♦ In the face of this awareness, the sober reality is that many countries in the African region are still unable to meet the demand for basic telecom services due to **scarcity in financial resources and the connected deficiency of absorbing current technology because of inadequate organisational and management structures**.

♦ How can we envisage to tackle the chronic backlog of telephone demand which impedes in its wake further socio-economic development, if not by an **ambitious investment drive**: what financial tools can be employed to foster modernisation and expansion - in the face of vast areas and populations untouched by telecom-munications across the Continent?

♦ Our discussion takes place in an era of intensifying global competition, in a setting where **multiple risks need to be successfully managed** to attract financial and complementary human as well as physical resources toward investments that meet the demands for more and better services.

♦ Les pays les plus riches et ceux qui s'ouvrent à l'économie de marché ont reconnu **l'importance stratégique** du secteur des télécommunications à l'ère du multimédia, au moment où l'infrastructure de base des télécommunications détermine de plus en plus l'orientation de l'évolution des pays et de l'avenir de l'humanité. Dans cette optique, ces pays mettent en oeuvre des politiques très diverses visant à **accélérer le processus de modernisation** compte tenu de leur politique nationale de développement **économique, social** et **culturel**.

♦ Face à cette prise de conscience, la réalité sans fard est que de nombreux pays d'Afrique ne peuvent pas encore satisfaire la demande de services de télécommunication de base parce que **les ressources financières leur font cruellement défaut et qu'ils ont des difficultés à intégrer les nouvelles technologies**, en raison de **structures d'organisation et de gestion inappropriées.**

♦ Comment pouvons-nous espérer donner suite aux demandes encore insatisfaites de raccordement au réseau téléphonique, qui freinent le développement socio-économique sinon en lançant un **programme d'investissement ambitieux**: de quels outils financiers disposons-nous pour encourager la modernisation et l'expansion dans des vastes zones du continent africain demeurant à l'écart des télécommunications?

♦ Notre colloque se tient à un moment où la concurrence mondiale se fait de plus en plus vive, où **il faut savoir bien gérer des risques divers** pour pouvoir attirer des ressources financières, humaines et physiques et les mobiliser en vue d'investissements qui permettront de satisfaire les exigences liées à la diversification et à l'amélioration des services fournis.

Evidence	Tableau réel
♦ The 1994 World Telecom Development Conference endorsed the Buenos Aires Action Plan for the benefit of the Least Developed Countries (LDCs), of which the majority are African countries. Various initiatives taken to date in ITU-D Study Groups deal with pertinent finance issues in the context of **policy formulation, corporate financial management, and adequate cost accounting systems**[2].	♦ La Conférence mondiale de développement des télécommunications de 1994 a adopté le Plan d'action de Buenos Aires en faveur des pays les moins avancés (PMA), qui, dans leur majorité, sont des pays africains. Divers programmes qu'ont engagés à ce jour les Commissions d'études de l'UIT-D portent sur des questions de financement pour la **formulation de la politique générale des télécommunications, la gestion financière des sociétés et l'établissement de systèmes de comptabilité analytique adéquats**.
♦ A cross-section of 28 African countries have reported on their endeavours to finance their investment plans. Only a few have gone beyond traditional forms of mostly aid-related financing supplemented by internally generated funds. But those operating in a market economy environment indicated various **new style financial instruments** that augment their investment activities, alongside a new impetus towards productivity gains, better billing and collection performance, and probably most important, new measures to improve the investment climate.	♦ Un groupe représentatif de 28 pays africains ont rendu compte des initiatives qu'ils avaient prises pour financer leurs plans d'investissement. Peu nombreux sont ceux qui sont allés au-delà des formules de financement traditionnel lié essentiellement à l'aide, auquel s'ajoutent des fonds internes. Toutefois, les pays à économie de marché ont indiqué qu'ils avaient opté pour des instruments financiers d'un nouveau style leur permettant d'accroître leurs activités d'investissement tout en créant une nouvelle dynamique en ce qui concerne les gains de productivité, l'amélioration des opérations de facturation et de perception et, élément vraisemblablement le plus important, la prise de nouvelles mesures pour rendre plus favorable le climat d'investissement.
♦ A weak area across the board is cost management and analysis: hence cost based pricing of services and products is poorly anchored. Only a few countries determine various unit costs, employ marginal costing methods, and have current training programmes on the above issues. Many countries stress their **interest in obtaining orientation** on cost analysis, cost allocation methods as well as on ways and means of tapping local capital markets, of accurately setting fee and license structures, and raising funds from interested private value-added service providers or potential joint venture partner firms.	♦ De manière générale, la gestion et l'analyse des coûts sont un point faible, d'où une certaine inadéquation des prix des services et des produits et des coûts. Seuls quelques pays établissent des coûts unitaires, utilisent des méthodes d'estimation des coûts marginaux et ont actuellement des programmes de formation sur ces questions. De nombreux pays ont indiqué qu'ils souhaitaient vivement **obtenir des informations** sur les méthodes d'analyse du prix de revient et de ventilation des coûts ainsi que sur les différents moyens de faire appel aux marchés de capitaux locaux, de bien définir les structures des licences et des droits correspondants et de trouver des capitaux auprès de fournisseurs de services à valeur ajoutée privés intéressés ou d'éventuelles sociétés partenaires pour des opérations conjointes

[2] ITU-D document 131 (rev.2), 4.12.95, Rapporteur T. Pillet

Trade liberalisation	Libéralisation du commerce
♦ How will African telecoms be affected by an eventual General Agreement on Trade and Services (GATS) which is being negotiated in the World Trade Organisation (WTO)?	♦ Quelle incidence l'éventuel accord général sur le commerce et les services (GATS), actuellement négocié au sein de l'Organisation mondiale du commerce (OMC), aura sur les télécommunications en Afrique?
♦ The focus here is on the **financial** implications.	♦ L'accent est mis ici sur les incidences **financières**.
♦ At stake is the application of **liberal and fair trade principles** to the domain of telecom networks and services. These principles include most favoured nation (MFN) treatment, national treatment, market access, reciprocity and transparency. In short, their application would propel telecoms into an international economic activity context as any other industry of global significance. Not only is this likely to happen but it will also extend beyond telecom confines to include other segments of the multimedia complex.	♦ Ce qui est en jeu, c'est l'application des **principes du libéralisme et de l'équité dans les échanges commerciaux** aux réseaux et services de télécommunication, à savoir le traitement de la nation la plus favorisée (NPF), le traitement national, l'accès au marché, la réciprocité et la transparence. En bref, leur application ferait entrer les télécommunications sur la scène économique internationale au même titre que n'importe quelle autre activité d'importance mondiale. Non seulement ce phénomène semble devoir se produire, mais il s'étendra par-delà les télécommunications au multimédia.
♦ What are then the **plausible scenarios** from the point of view of African telecoms?	♦ Quels sont alors les **scénarios plausibles** du point de vue des télécommunications en Afrique?
♦ A recent policy study explores the possible answers based on the analysis of five countries (Ghana, Guinea, Senegal, Tanzania, Uganda)[3]. The authors argue in favour of **step-by-step liberalisation** according to types of services. They stress the importance of a viable regulatory regime that sets rules of fairness and protects the public good.	♦ Une étude de politique générale récente examine les réponses possibles à partir de l'analyse de cinq pays (Ghana, Guinée, Sénégal, Tanzanie, Ouganda. Les auteurs prônent une **libéralisation progressive** selon les types de services. Ils soulignent qu'il est important de mettre en place un régime réglementaire viable afin de fixer des règles d'équité et de protéger le bien public.

[3] ITU-D document 4, 15.3.96 (B. Sanou and S. Moshiro)

◆ As regards finance and investment, they report that the 10 countries participating in the Co-ordinated African Programme of Assistance on Services (CAPAS) (i.e. the above plus Benin, Burkina Faso, Kenya, Nigeria, Zimbabwe) "recognise the imperative of re-adjusting previous goals of universal service to **service availability**, through a mix of individual and community telephone lines (payphones and telecenters) as well as giving priority to business consumers. Fortunately, good opportunities for achievement of improvement exist".

◆ Pour ce qui est du financement et des investissements, ils relèvent que les dix pays participant au Programme africain coordonné sur l'assistance en matière de services (CAPAS) (c'est-à-dire les pays susmentionnés, plus le Bénin, le Burkina Faso, le Kenya, le Nigéria et le Zimbabwe) "sont conscients qu'il faut revoir la priorité donnée précédemment à l'universalité et privilégier la disponibilité des services. Pour ce faire, il faut installer des lignes téléphoniques individuelles et communautaires (publiphones ou télécentres) et desservir en premier les abonnés d'entrepris. Heureusement, des possibilités d'amélioration existent".

◆ "Equipment can be acquired relatively cheaply, a broader range of technical solutions requires easily manageable levels of capital, and access to private foreign financial and human capital is made easier by the globalisation of trade, in particular trade in telecom services, coupled with multilateral liberalisation arrangements under the GATS".

◆ "Il est possible d'acheter des équipements relativement bon marché; par ailleurs, la plus grande diversité des solutions techniques exige des montants facilement gérables et, avec la mondialisation du commerce - en particulier, le commerce des services de télécommunication - et la conclusion d'accords multilatéraux de libéralisation dans le cadre du GATS, il est plus facile de mobiliser des capitaux et des ressources humaines sur les marchés étrangers privés."

◆ An annex to the GATS telecom articles contains a **users' "bill of rights"**, guaranteeing access and use of telecom networks and services within countries and across borders, e.g. for the benefit of financial institutions, tourist firms, data and software business etc. to cultivate their relations with actual and potential customers.

◆ Une annexe des articles du GATS sur les télécommunications contient une **déclaration des droits de l'utilisateur** garantissant l'accès aux réseaux et aux services de télécommunication et leur utilisation à l'intérieur des pays et au-delà des frontières, dans l'intérêt des institutions financières, des agences de tourisme, des entreprises de données et de logiciels, etc., afin d'entretenir leurs relations avec leurs clients réels ou potentiels.

◆ World Bank experts advocate even a **"serve it or loose it"** policy towards monopolising or dominating operators, i.e. by inviting interested parties to come in and cover neglected parts of the country, of the system, or serving neglected user groups[4]

◆ Les experts de la Banque mondiale vont même jusqu'à prôner une politique du **"à prendre ou à laisser"** à l'encontre des opérateurs dominant et monopolisant le marché, en invitant les parties intéressées à venir assurer la couverture de zones délaissées du pays, prendre en compte certains éléments abandonnés du système ou desservir des groupes d'utilisateurs défavorisés.

[4] World Bank Discussion Paper no. 232, 24.3.94, (P. Smith, G. Staple)

♦ A more comprehensive report of the Fifth Regulatory Colloquium held at ITU headquarters in December 1995 on the subject of "Trade Agreements on Telecommunications: Regulatory Impli-cations' is being made available to the participants.

Procurement

♦ The emerging new principles will also clarify rules in respect of **fair purchasing procedures** for telecoms equipment and services.

♦ A **well working procurement policy** will scan markets systematically, build up corresponding informatics support including the screening of suppliers of equipment and of capital, so as to obtain cost reductions thanks to wide-net sourcing. **Evaluation and selection procedures** should be continuously improved with the help of training programmes so as to ensure the most diligent use of resources, value for money in terms of product quality, justified pricing, products/services guarantees and maintenance obligations. And to become a **respected partner in negotiations**, it is important to convey appropriate knowledge of and respect for one's own corporate culture, management style and modes of operation.

Global information infrastructure

♦ Africa's place within the global information infrastructure (GII) build-up has a number of financial facets. To highlight the issues by orders of magnitude, the world-wide info communication industry or multimedia industry including telecom, computing and audio-visual components is growing at almost twice the rate of the world economy and accounts meanwhile for over 6% of world product. Africa's share in world product is about 5% and its information/communication industry share is hardly 1%.

♦ Un rapport plus complet du cinquième colloque sur la réglementation qui s'est réuni au siège de l'UIT en décembre 1995 pour examiner la question des "accords commerciaux dans les télécommunications: conséquences réglementaires" sera mis à la disposition des participants.

Passation de marchés

♦ Les nouveaux principes qui voient le jour permettront également de clarifier les règles pour ce qui est des **procédures d'achat équitables** d'équipements et de services de télécommunication.

♦ Une **politique d'achat bien conçue** permettra d'analyser systématiquement les marchés, de mettre en place la logistique informatique correspondante, notamment pour filtrer les fournisseurs d'équipements et de capitaux afin d'obtenir des réductions de coûts grâce à une diversification des sources. Les **procédures d'évaluation et de sélection** devraient sans cesse être améliorées grâce à la mise en place de programmes de formation afin d'assurer l'utilisation des ressources la plus judicieuse possible, un bon rapport qualité-prix, des prix justifiés, des produits et des services garantis et le respect des obligations de maintenance. Pour se faire respecter en tant que **partenaire de négociation**, il importe d'amener ses interlocuteurs à bien connaître et à respecter la culture, le style de gestion et le mode de fonctionnement de sa propre entreprise.

Infrastructure mondiale de l'information

♦ Le rôle de l'Afrique dans la mise en place de l'infrastructure mondiale de l'information (GII) a plusieurs aspects financiers. Pour prendre les questions par ordre d'importance, l'industrie mondiale des infocommunications ou l'industrie du multimédia, télécommunications, informatique et audiovisuel compris, progresse à un rythme deux fois plus élevé que celui de l'économie mondiale et représente pour l'instant plus de 6% du produit mondial. La part de l'Afrique dans le produit mondial est d'environ 5% et sa part dans l'industrie des infocommunications est à peine de 1%.

♦ The 1995 ITU World Telecommunication Development Report presents the latest available data for 1994 on the state of the telecom industry and deals with the concept of multimedia readiness of countries. In the 1980s, long distance and international traffic were the more profitable market segments, but the development of multimedia services could imply that the **more attractive long-term market is the local one**. The emerging technologies of converging computing, telecom and television (which is more widespread in Africa than telephony) are less sensitive to transmission costs and capacity constraints.

♦ Within the era of systematic experimentation - or "technology in search of applications"- countries tend to fare better where **competitive market entry** is allowed. Furthermore, private initiatives, possibly in new forms of partnership, drive the process towards the realisation of economic, social and cultural benefits. As a result, competitive advantage for domestic business is strengthened or maintained.

INFODEV

♦ The World Bank launched an externally financed grant fund in 1995 enabling developing countries to benefit from the information and convergence revolution - InfoDev. The Programme is designed toward an annual budget of up to 10 million USD to support about 25 initiatives. Its objective is to foster promising applications and private investment in building up the components of the new technology base. In Africa, work is getting underway on a "virtual university" and a framework for Internet connectivity. The virtual university will enable students in a host of countries to access on-line lectures sent out from multiple locations, thus lowering the costs of building facilities in their own countries.

♦ Les auteurs du rapport de l'UIT sur le développement des télécommunications dans le monde (1995) donnent les dernières données disponibles pour 1994 sur la situation du secteur et s'interrogent sur les pays qui sont prêts à se lancer dans le multimédia. Dans les années 80, le trafic longue distance et le trafic international étaient les créneaux commerciaux les plus rentables mais, avec le développement des services multimédias, il se pourrait que le marché à long terme **le plus intéressant soit le marché local**. Les technologies nouvelles issues de la convergence des industries de l'informatique, des télécommunications et de la télévision (plus répandue en Afrique que le téléphone) sont moins sensibles aux variations des coûts de transmission et aux contraintes de capacité.

♦ A l'ère de l'expérimentation systématique où - "la technologie est à la recherche d'applications" - les pays tendent à mieux faire sur les marchés où la concurrence est autorisée. De plus, des initiatives privées, éventuellement sous de nouvelles formes de partenariats permettent de se rapprocher de la réalisation des objectifs économiques, sociaux et culturels. En conséquence, l'avantage concurrentiel dont jouissent les entreprises nationales est maintenu, voire renforcé.

INFODEV

♦ La Banque mondiale a lancé en 1995 un programme d'aide financée par des sources extérieures afin d'aider les pays en développement à tirer parti de la révolution de l'information et de la convergence. Ce programme intitulé "InfoDev" bénéficie d'un budget annuel maximal de 10 millions de dollars EU pour appuyer environ 25 projets. Son objectif est d'encourager des applications prometteuses et d'inciter le secteur privé à investir dans la construction des différentes composantes de la nouvelle base technologique. En Afrique, des travaux sont consacrés à l'établissement d'une "université virtuelle" et à un cadre pour la connectivité à Internet. Cette université virtuelle donnera aux étudiants de nombreux pays la possibilité d'accéder à des cours en ligne dispensés par de multiples établissements, ce qui permettra de faire des économies sur la construction d'installations dans leur propre pays.

♦ It appears that contributions of 4,5 millions USD have been pledged so far from a cross-section of government and corporate sources.	♦ Il apparaît que plusieurs institutions publiques et privées, constituant un échantillon représentatif, se sont engagées à verser des contributions d'un montant de 4,5 millions de dollards EU.

FINANCIAL INSTITUTIONS, RESOURCES AND STRATEGIES

Rules of the game

◆ Old-style financing of telecom investments is on its way out. In the 1980s about 65% of investment was financed by the PTOs themselves, about 15% from official sources (multilateral, bilateral credits and aid, export credits and own government contributions) and about 20% from private sources (mostly commercial bank and supplier arranged loans for creditworthy countries)[5].

◆ The **new financing dynamics** rely much more on the private sphere. Its share has risen to over 50% and funds are raised in a variety of orchestrated ways and means.

◆ The **overall volume of facilities** in the form of bonds, syndicated loans and equities on international capital markets is increasing. In the words of the Bank of International Settlements (BIS) the markets are "awash with liquidity", with persistence of a borrowers' market, a high volume of loanable funds, and an increasing range of borrowers accessing the international security markets at low cost[6]. There is continuing buoyancy of flows into Asia and to a lesser extent to Latin America, to the point where some countries are taking preventive measures especially against short-term capital inflows to avoid macroeconomic disturbances, recalling the Mexican crisis of December 1994.[7]

INSTITUTIONS FINANCIÈRES: LEURS RESSOURCES ET LEURS STRATÉGIES

Règles du jeu

◆ L'ancien mode de financement des investissements dans les télécommunications est sur le point de disparaître. Dans les années 80, près de 65% des investissements étaient financés par les opérateurs publics de télécommunication eux-mêmes, environ 15% provenaient de sources publiques (aide et crédits multilatéraux, bilatéraux, crédits à l'exportation et contributions des Etats eux-mêmes) et près de 20% de sources privées (essentiellement des prêts consentis par des banques commerciales ou des fournisseurs à des pays solvables).

La **nouvelle dynamique de financement** repose beaucoup plus sur le secteur privé dont la contribution a augmenté pour passer à plus de 50%. Les capitaux sont réunis selon différentes formules.

◆ Le **volume global des ressources** sous forme d'obligations, de prêts syndiqués et de capital-action sur les marchés internationaux des capitaux augmente. Selon la Banque des règlements internationaux (BRI), les marchés "regorgent de liquidités", situation qu'explique la persistance d'une forte demande, un volume élevé de capitaux disponibles et un nombre croissant d'emprunteurs ayant accès au marché international des titres à un faible coût. L'élasticité des flux de capitaux à destination de l'Asie et, dans une moindre mesure, à destination de l'Amérique latine, ne se dément pas à tel point que certains pays prennent des mesures préventives en particulier contre les entrées de capitaux à court terme pour éviter des dysfonctionnements macro-économiques semblables à la crise mexicaine de décembre 1994.

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[5] Telecommunications Sector Background and Bank Group Issues, joint World Bank/IFC Seminar, 16.2.1994
[6] BIS: International Banking and Financing Market Development, Basle, February 96
[7] OECD: Financial Market Trends, Paris, February 96, No. 63.

♦ There are **changes in the structure of financial intermediation** such as: the institutionalisation of savings: the growing role of institutional investors in the packaging of financial deals; world-wide mobility of capital flows within a framework of intense competition, though tempered by a good deal of co-operation between the major players.

♦ The **public sector at large**, i.e. governments, state agencies and supranational institutions are playing a more modest role in the supply of funds. They have redefined their **roles as guardians, facilitators, and match makers**, "inconspicuous for most of the time, thus allowing the game to flow, but not afraid to take centre stage when a difficult decision is necessary. They cannot raise the players to a fine performance - only supplyside reforms can do that - and occasionally they may need to show a red card to cool things down, thus maintaining stability and allowing the players, the operational agents, to display their skills."

♦ **La structure de l'intermédiation financière** a connu des modifications: institutionnalisation de l'épargne, renforcement du rôle des investisseurs institutionnels dans le montage des dossiers financiers, mobilité à l'échelle mondiale des flux de capitaux dans un contexte de vive concurrence bien qu'atténuée par une étroite coopération entre les principaux acteurs.

♦ Le **secteur public dans son ensemble**, c'est-à-dire les Etats, les organismes publics et les institutions supranationales jouent actuellement un rôle plus modeste dans la fourniture de capitaux et ont redéfini leur **rôle en tant qu'arbitres, animateurs et intermédiaires** "qui, restant sur la touche la plupart du temps permettant ainsi au jeu de se dérouler, n'ont pas peur de monter en première ligne lorsqu'il faut prendre une décision difficile. Ils ne peuvent pas élever le niveau de jeu des joueurs - pour cela, il faudrait des réformes côté offre - et parfois ils ont besoin de sortir un carton rouge pour calmer le jeu c'est-à-dire maintenir la stabilité et permettre aux joueurs - les acteurs opérationnels - de démontrer leurs talents".

New players

♦ The new players in the telecom finance arena include the private investment banks, institutional investors, brokers, financial advisors, package deal arrangers in addition to the familiar international equipment and service providers, public sector financial and technical co-oporation institutions as well as the export credit finance insurance and guarantee agencies.

♦ The share of domestically raised capital broadly correlates with the **stage of development** of the country concerned. Internally generated funds are an important matching device particularly in newly liberalising markets, both in terms of security or risk reduction and as a sign of efficiency in operations.

Nouveaux acteurs

Les nouveaux acteurs du financement des télécommunications sont les banques d'investissement privées, les investisseurs institutionnels, les courtiers, les conseillers financiers, les responsables du montage des dossiers financiers auxquels s'ajoutent les fournisseurs d'équipements et de services internationaux bien connus, les institutions de coopération technique et financière du secteur public et les organismes de garantie et d'assurance des crédits à l'exportation.

♦ La part de capitaux mobilisés au niveau national est grosso modo proportionnelle au **niveau de développement** du pays intéressé. Les fonds internes constituent un mécanisme d'adéquation important, en particulier sur les marchés qui commencent à se libéraliser, en termes de sécurité ou de réduction des risques et sont en outre une preuve d'efficacité des transactions.

♦ Official sources are unlikely to contribute more than about 10% in the foreseeable future. But the participation of official lenders does help to attract further private investment.

♦ The multilateral agencies have become lead agents in preparing the ground for tapping the equity markets, abroad and at home.

Private capital: score and scope

♦ Over the last 10 years some 20 billion US$ dollars have been raised in **international equity capital markets** by Governments who have privatised their telecom companies. Over the last 3 years, international telecom operators and financial institutions have invested some 20 billion US dollars in privatizations in Asia, Europe, and Latin America. If the 25 - 30 countries currently considering Privatizations all go forward with their plans, the world financial system will be called upon to allocate some 150 billion US dollars into the telecom sector before the end of the century.

♦ The private sector's growing participation in telecom development tends to bring along more efficient management practices, more drive towards innovative technology, more concern with customer and market needs. At the same time, this evolution puts pressure on governments to **create a stable, attractive environment** - because private investors shy away from uncertainty and undue risk to say the least.

♦ The challenge to tackle in close co-operation among the development partners: **to bring into harmony the profit drive by the private sector partners and the public/social responsibilities of governments** in realizing their respective telecom strategies.

♦ Il est peu probable que la part des organismes publics de financement soit, dans un avenir proche, supérieure à 10% environ mais la participation de bailleurs de fonds publics ne manque pas d'aider à attirer de nouveaux investissements privés.

♦ Les institutions multilatérales en sont venues à jouer un rôle prééminent dans les démarches qui doivent être entreprises avant de recourir aux marchés des capitaux participatifs aux niveaux international et national.

Capitaux privés: bilan et perspectives

Ces dix dernières années, les Etats qui ont privatisé leur compagnie des télécommunications ont mobilisé près de 20 milliards de dollars EU sur les **marchés internationaux des capitaux participatifs**. Ces trois dernières années, les opérateurs internationaux des télécommunications et des institutions financières ont investi près de 20 milliards de dollars EU dans des privatisations en Asie, en Europe et en Amérique latine. Si les 25 à 30 pays, qui envisagent actuellement de procéder à des privatisations, concrétisent tous leurs plans, le système financier mondial devra, d'ici à la fin du siècle, dégager près de 150 milliards de dollars EU pour le secteur des télécommunications.

♦ La participation accrue du secteur privé au développement des télécommunications se traduit par la mise en place de méthodes de gestion plus efficaces, par une plus grande dynamique propice aux technologies novatrices et par une prise de conscience accrue des besoins des clients et des exigences du marché. Dans le même temps, cette évolution n'est pas sans effet sur les Etats puisqu'elle les incite à **créer un environnement stable et attractif** car les investisseurs privés n'aiment pas l'incertitude et les risques inutiles, c'est le moins qu'on puisse dire.

♦ Le défi à relever en étroite coopération avec les partenaires de développement **est de conjuguer harmonieusement "l'appât du gain" des partenaires du secteur privé et les responsabilités publiques et sociales des Etats** dans l'exécution de leurs stratégies des télécommunications.

♦ In the African setting, with the vast majority of productive resources at the village level, the attention of financiers/investors must be drawn to the need for **ambitious rural penetration and modernisation programme** in the form of a concerted rural development strategy.

♦ For the benefit of infrastructures services such as transport, energy, water supply, education and health or environmental protection, telecoms offer a number of advantages in terms of compressing time and space and economising physical inputs. Telecommunication makes the other sectors more efficient and is one of the critical factors **for market-oriented agricultural and agro-business development** with healthy effects for employment, inducing skilled people to stay rather than migrate to the often overcrowded cities. These outcomes are of immense financial importance as a **productivity increasing factor and as a source of national savings** to foster domestic investments in new business enterprises.

♦ **Annex 2: figures 1-3** present the financial evolution described so far in broad terms.

Getting ready

A recent article in the Financial Times reflects emerging tendencies in the financial world: "Africa is considered the final frontier of the world's emerging markets. In 1993, only 4% of emerging market portfolios flowed to the region. But after South Africa's transition to democracy in April 1994 and a wave of market reforms in many neighbouring countries, **Africa's investment climate is becoming much more hospitable**... More money flowing to the region has increased activity on the region's bourses and improved local business practices.

♦ En Afrique où les ressources productives sont concentrées dans les villages, il faut attirer l'attention des financiers et des investisseurs sur la nécessité de mettre en place **un programme de pénétration rurale et de modernisation ambitieux, sous forme d'une stratégie de développement rural concerté**.

♦ Pour des services d'infrastructure tels que les transports, l'énergie, la distribution d'eau, l'éducation et la santé ou la protection de l'environnement, les télécommunications offrent un certain nombre d'avantages car elles permettent de réduire le temps et les distances et de faire des économies sur le plan matériel. Améliorant l'efficacité des autres secteurs, les télécommunications constituent un des éléments essentiels **d'un développement agro-industriel et agricole** axé sur le marché et ont des effets bénéfiques sur l'emploi puisqu'elles incitent les personnes qualifiées à rester sur place plutôt qu'à partir vers des villes souvent surpeuplées. Ces résultats ont une importance financière considérable en tant que **facteur d'accroissement de la productivité et source d'épargne nationale** propre à encourager des investissements nationaux dans de nouvelles entreprises.

♦ **Annexe 2: les Figures 1 - 3** présentent l'évolution financière décrite jusqu'ici en termes généraux

Etre prêt

♦ Un article récent du Financial Times rend compte des nouvelles lignes d'évolution du monde financier: "l'Afrique est considérée comme l'ultime marche dans la constitution de nouveaux marchés dans le monde. En 1993, 4% seulement des investissements de portefeuilles sur ces nouveaux marchés sont allés à la région mais, après l'avènement de la démocratie en Afrique du Sud en avril 1994 et la vague de réformes dans de nombreux pays voisins, **le climat d'investissement en Afrique devient plus propice** ... L'afflux de capitaux a conduit à un regain d'activité sur les places boursières des pays de la région et à une amélioration des pratiques commerciales locales ...

Within the past two years, twelve institutions have formed Africa funds worth nearly $ 1 billion... Until recently, the majority of Africa's 16 stock markets were closed to foreigners... In Harare the volume of trading has increased by 400% since the bourse opened to foreigners in June 1993"[8]. The presence of foreign funds is reinvigorating not only African finance but also African business performance: "Fund managers demand up-to-date, accurate corporate reporting and as a result, disclosure has been rapidly improving."

♦ It is a sign of **growing interest in African telecom finance** that several of the well-known and widely respected specialised international firms in the fields of financial advisory services, investment banking, and package deal arrangements have recently created Africa Telecommunication units or divisions headed by executive directors.

♦ Also at the **World Economic Forum** early February 1996 in Davos, Switzerland, where world political, economic and business leaders compared views and visions, a special session focused on Africa as the next economic "dragon". Among the issues raised where: 1) the current investment surge; 2)domestic political and ethnic rivalries giving way to new entrepreneurial initiatives, effective educational Programmes and sound economic policies; 3) telecoms offering the greatest potential for foreign investors. Presentations were made by representatives from Ghana, South Africa and Uganda, and the session was moderated by an IMF representative.

♦ Ces deux dernières années, douze institutions ont constitué des fonds africains d'une valeur de près d'un milliard de dollars ... Récemment encore, la majorité des 16 bourses des pays d'Afrique étaient fermées aux étrangers. A Harare, le volume des transactions commerciales a augmenté de 400% depuis que la bourse s'est ouverte aux étrangers en juin 1993". Les fonds étrangers donnent une nouvelle vigueur non seulement aux finances, mais aussi aux résultats commerciaux des pays d'Afrique: "les financiers exigeant des informations précises et actualisées sur les sociétés, le secret a été rapidement levé."

♦ Le fait que plusieurs sociétés internationales bien connues et respectées spécialisées dans des domaines comme les services de consultance financiers, les opérations d'investissements et les montages de dossiers financiers aient créé récemment des unités ou des divisions des télécommunications africaines dirigées par des directeurs généraux est le signe que le **financement des télécommunications en Afrique suscite un intérêt croissant**.

♦ Au **Forum économique mondial** également qui s'est tenu début février 1996 à Davos (Suisse) et au cours duquel des dirigeants politiques, des responsables économiques et des industriels de premier plan du monde entier ont comparé leurs vues et leurs prévisions, une séance spéciale a été consacrée à l'Afrique, prochain "dragon" économique. Les sujets abordés étaient les suivants: 1) l'actuelle vague d'investissements; 2) le remplacement de rivalités politiques et ethniques par des projets de création d'entreprises, la mise en place de programmes éducatifs efficaces et de politiques économiques saines; 3) le plus grand potentiel que les télécommunications offrent aux investisseurs étrangers. Des exposés ont été faits par les représentants du Ghana, de l'Afrique du Sud et de l'Ouganda et la séance a été animée par un représentant du FMI.

[8] Financial Times of 1.2.1996: Global Fund Managers make tracks for Africa

From dragon to elephant	Du dragon à l'éléphant
The "dragon" symbol is borrowed from Asia. Our host country has chosen the symbol of the elephant to indicate strengths that are more fitting to the African scene. In the words of the Prime Minister "The elephant's character is calmness, serenity, self-confidence, knowing its force and moving at a sure pace. The African elephant symbolises healthy, solid and lasting economy."[9]. He went on explaining that its strong legs stand for: 1) progress in agriculture, 2) energy and industrial transformation, 3) services including telecom privatisation, and 4) exports, especially South-South.	♦ Le symbole du "dragon" est emprunté à l'Asie. Nos hôtes ont choisi l'éléphant, pour symboliser les forces du continent. Comme l'a dit le Premier Ministre: "C'est un animal calme, serein, sûr de lui, connaissant sa force et marchant à pas sûrs. L'éléphant d'Afrique, c'est une économie à la fois saine, solide et qui doit durer dans le temps."[9] Il a poursuivi la métaphore en expliquant que les pattes puissantes de l'éléphant représentent: 1) le développement de l'agriculture; 2) la transformation du secteur énergétique et du secteur industriel: 3) la privatisation des services, y compris les services de télécommunication et 4) les exportations, en particulier Sud-Sud.

[9]Jeune Afrique, Janvier 1996, Côte d'Ivoire: Cap sur l'an 2000, page 59.

FINANCIAL ENGINEERING

Fiction and facts

♦ In many discussions dealing with state ownership and public provision of services versus private ownership and service, it is argued that grants, cheap loans and official guarantees secure low user prices whilst alternatives with commercial financing would lead to higher price levels.

♦ This kind of theoretical confrontation is not only sterile, it is also contradicted by the facts prevailing in almost any economic sector. Why should another reality prevail in telecommunication?

♦ The usual pattern in telecom is service that is biased towards urban centres and a **backlog of unmet demand** that has built up over years and would require accelerated rates of network and services extension to shorten the waiting list.

♦ The familiar approach does not take account of **human "needs" alongside economic "demand"**, defined as purchasing power of individuals, households and business as well as public administrations.

♦ Unmet needs relate to non available means of access to service, in the villages off the main roads, in the rural hamlets surrounded by large open areas of extensive crop farming and/or migrating animal husbandry. There is **potential purchasing power in the context of community approaches**: communal ways of offering service via kiosks, possibly in collaboration with the local postal structure, or concessions contracted to a private entrepreneur are viable options because the very community character entails that **many meagre incomes can be seen as pooled demand for lifeline service.**

MONTAGE FINANCIER

Fiction et réalité

♦ Dans le cadre du débat portant sur le choix entre, d'une part, monopole d'Etat et fourniture publique des services et, d'autre part, propriété privée et fourniture privée des services, d'aucuns soutiennent que les aides et garanties publiques et les prêts consentis à des conditions favorables permettent la pratique de prix peu élevés pour les utilisateurs, ce qui n'est pas le cas lorsque le financement est assuré par des banques commerciales.

♦ Ce type de confrontation théorique est non seulement stérile, mais également contredit par les faits constatés dans la quasi-totalité des secteurs de l'économie. Pourquoi la réalité devrait-elle être différente dans les télécommunications?

♦ Le marché des télécommunications se caractérise par la desserte prioritaire des centres urbains et par la constitution au fil des ans d'une **demande non satisfaite** qui exigerait que soit accélérée l'extension des réseaux et des services pour que soient réduites les listes d'attente.

♦ Le modèle classique ne prend pas en compte les **"besoins" humains à côté de la "demande" économique**, c'est-à-dire le pouvoir d'achat des particuliers, des ménages et des entreprises, ainsi que des administrations publiques.

♦ Par besoins non satisfaits on entend l'absence de moyens d'accès aux services dans les villages situés à l'écart des grandes artères de communication, ainsi que dans les bourgs ruraux perdus au milieu de vastes étendues consacrées à la production agricole et/ou à l'élevage extensifs. Or, on peut parler de **pouvoir d'achat potentiel dans le cadre de ces communautés**; la fourniture des services communautaires par l'intermédiaire de kiosques, éventuellement en collaboration avec la structure postale locale, ou l'octroi de concessions à des entreprises privées constitue des options viables, étant donné qu'on peut considérer que, par essence, à chaque communauté correspond **une demande de services essentiels par la simple addition d'un grand nombre de revenus modestes.**

Appraisals of investment cost and finance	Evaluation du coût du financement des investissements
♦ Given the considerable demand backlog, there is ample evidence of rapid improvements once the chain of demonopolisation ⇒ competitive market access ⇒ equal footing or "national treatment" in WTO terms ⇒ productivity and efficiency drive is set in motion. In the wake of **productivity gains and concomitant cost rebalancing, facilitated by market expansion, tariff adjustments towards reductions can follow suit.** For this scenario to happen it is essential for the enterprise to know its cost generation and distribution pattern over its principal service products. Practical guideposts derived from this knowledge - before making investment and financing decisions - are unit cost analysis and bench-marking or comparative analysis. **Staff workshops** of maximum two weeks duration may be necessary but are also sufficient to implant the required know-how.	♦ Etant donné l'existence de cette demande non satisfaite considérable et dès lors qu'on lance le processus "démonopolisation" ⇒ accès à la concurrence dans le marché ⇒ égalité de situation ou "traitement national" au sens de l'OMC ⇒ gains de productivité et d'efficacité, les exemples d'amélioration rapide sont nombreux. Une fois obtenus des **gains de productivité, s'accompagnant d'un rééquilibrage des coûts, favorisés par l'expansion du marché, il est possible de procéder à des ajustements visant à réduire les tarifs.** Pour ce faire, il est indispensable que l'entreprise connaisse la structure de formation et de distribution des coûts de ses principaux éléments de service; cette connaissance est un préalable à l'établissement d'indicateurs pratiques, tels que l'analyse des coûts unitaires et l'établissement de données de référence ou l'analyse comparative, que l'entreprise consultera avant de prendre toute décision dans les domaines de l'investissement et du financement. Des **ateliers de formation du personnel**, d'une durée de deux semaines au plus, peuvent être nécessaires, mais ne sont pas suffisants pour développer le savoir-faire requis.
♦ More sophisticated analysis is required when projecting: **cashflow generation** requirements for modernisation and/or extension projects; capital budgeting paths of alternative project finance options; hedging foreign currency claims/obligations by way of future contracts or option contracts; revenue forecasting based on alternative market structure scenarios and demand projections related to corresponding projections for operating costs, depreciation, financing costs and taxes/duties to be paid.	♦ Toutefois, l'entreprise doit procéder à une analyse beaucoup plus approfondie lorsqu'il est question de conditions à satisfaire pour **générer une marge brute d'autofinancement** en vue de projets de modernisation et/ou d'agrandissement; choix de la formule d'élaboration de son budget d'investissement en fonction de différentes modalités de financement d'un projet; couverture de créances/obligations en devises sous forme de contrats ou de contrats avec options à terme; prévision de ses recettes en fonction de différents scénarios tenant compte de la structure des marchés et projection de la demande compte tenu de la projection des coûts d'exploitation, d'amortissement, de financement et des impôts/taxes qu'elle devra acquitter.

♦ The most demanding analysis relates to evaluating the **respective merits and demerits of debt/equity packages** being proposed by potential partners, weighing their specific offers, terms and conditions, and setting against them one's own requirements in terms of market conform license fees, performance bonds in respect of service targets, human resource and training obligations, and most prominently mutually satisfactory management and revenue sharing arrangements.

♦ What are the critical concerns from the **point of view of governments when assessing external investment proposals**? Among them are most likely that the investor takes a long-term interest in the country as well as his track record and commitment elsewhere. His financial strength, quality of service, and operational capability need to be established. These are just a few considerations, which merit further work and reflection at the colloquium.

Investors' perspective

♦ The investor's perspective needs also careful analysis. Some interesting points are brought out by a recent World Bank Workshop on the subject[10]Investors realised that "it is risky to enter a country before the licensing procedure started". Major factors they examine before deciding where to invest include: 1) economic growth, 2) stability in the regulatory framework; 3) locations where IFC and local sources can assist with loans; 4) tariff adjustment mechanisms and 5) the types of technology needed. A key point: "Remember that you are dealing with a different legal system and culture."

♦ L'analyse la plus exigeante concerne l'évaluation des **avantages et inconvénients respectifs des rapports dettes/fonds propres** proposés par différents partenaires potentiels; à cette fin, l'entreprise doit "peser" les différentes offres, leurs termes et conditions et les évaluer en fonction de ses propres attentes, des droits de licence prévus selon le marché, des garanties de bonne exécution par rapport aux objectifs de service, des obligations à remplir dans les domaines des ressources humaines et de la formation et, surtout, des dispositions prévues en matière de partage des recettes et en vue de garantir une gestion mutuellement satisfaisante.

♦ Quelles sont les préoccupations essentielles d'un **Etat lors de l'évaluation de propositions émanant d'investisseurs étrangers**? Les principales, probablement, sont l'intérêt à long terme que l'investisseur manifeste pour le pays, ainsi que ses réalisations passées et ses engagements dans d'autres pays. Sa santé financière, la qualité de ses services et sa capacité opérationnelle doivent être reconnues. Il ne s'agit là que de quelques exemples qui devront être étoffés et approfondis au colloque.

Point de vue des investisseurs

♦ Le point de vue des investisseurs doit lui aussi faire l'objet d'une analyse minutieuse. Un atelier organisé récemment par la Banque mondiale[10] a permis de dégager certains points intéressants en la matière. Selon les investisseurs, "il est risqué de s'implanter dans un pays avant que soit lancée la procédure d'octroi de licences". Avant de décider d'investir dans un pays, un investisseur prend notamment en considération: 1) sa croissance économique; 2) la stabilité de son cadre réglementaire; 3) les secteurs où la SFI et les sources de financement locales peuvent aider en octroyant des prêts; 4) l'existence de mécanismes d'ajustement tarifaire, et 5) les types de technologie nécessaires. Une remarque essentielle: "Ne jamais oublier que le régime juridique et la culture y sont différents."

[10] Investment opportunities in telecommunications insfrastructure in emerging markets, World Bank Group, 12-13 December 1994.

The investor also needs a business plan with adequate capitalisation and the proper balance of expatriates and local talent. One public telecom operator "prefers to stay in a country a maximum of two years and then turn control over to the local entity."

♦

♦ One disturbing feature reflected in the responses of investors consulted is that "in terms of market structure they would like to have exclusivity" in order to reduce the level of risk. Now this is clearly like setting back the clock since the liberalisation and privatisation process **should not result in replacing public by private monopolies.**

♦ Where the legal and regulatory environment is deficient, investors may either drop out or ask for guarantees to limit their risk and demand higher returns to cover these additional risks.

Attractive recipes for private capital

♦ A number of ways are being pursued in various countries to find the recipe best suited to their domestic circumstances.

♦ Governments need to provide a framework to enable and enforce competition. The role of ITU/BDT several multilateral and bilateral institutions is increasingly tuned toward offering advice also in this respect. **A well designed competition law** applicable across the economy reduces the need for an extensive telecom specific regulatory mechanism.

♦ The complexities of privatisation can be approached from various angles.

L'investisseur doit en outre disposer d'un projet d'entreprise caractérisé par une capitalisation suffisante et par un équilibre judicieux entre personnel étranger et personnel local. Un exploitant de télécommunication public "préfère limiter son intervention dans un pays à deux ans au maximum, puis passer les rênes à l'entité locale".

♦

♦ Une remarque préoccupante figurant dans les réponses des investisseurs consultés est que "concernant la structure d'un marché, ils souhaiteraient bénéficier de l'exclusivité" pour réduire le niveau de risque; or, ce serait à l'évidence revenir en arrière puisque la libéralisation et la privatisation **ne devraient pas donner lieu au remplacement d'un monopole public par un monopole privé**.

♦ Lorsque le cadre juridique et réglementaire est déficient, les investisseurs peuvent soit se retirer, soit demander des garanties pour limiter les risques qu'ils prennent et exiger des rendements plus élevés pour compenser ces risques supplémentaires.

Recettes pour attirer les capitaux privés

♦ Divers pays mettent en oeuvre un certain nombre de formules pour trouver la recette la mieux adaptée à leur situation.

Les Etats doivent mettre sur pied un cadre pour rendre possible et mettre en oeuvre la concurrence. L'UIT/BDT et plusieurs institutions multilatérales ou bilatérales se consacrent de plus en plus à offrir des avis également dans ce domaine. L'existence d'une **loi sur la concurrence bien conçue**, applicable à tous les secteurs de l'économie, réduit la nécessité d'un mécanisme réglementaire élaboré propre aux télécommunications.

♦ Les complexités d'une privatisation peuvent être abordées sous différents angles.

♦ **Possible reasons for this policy option:** 1) need for private capital to modernise and extend the network; 2) fiscal requirements to reduce public sector debt or current deficits or to finance development in other sectors; 3) efficiency gains expected from business-like operations; 4) independence from government interference; 5) need for arrangement skills and technical know-how (by a strategic investment partner); 6) generating income from licensing or concession fees and/or dividend payments to the general treasury.	♦ **Motifs pouvant militer en faveur de cette option de politique générale:** 1) nécessité de recourir à des capitaux privés pour moderniser et étendre le réseau; 2) obligations fiscales soit de réduire la dette ou des déficits du secteur public, soit de financer le développement d'autres secteurs; 3) gains d'efficacité escomptés d'une gestion de type commercial; 4) indépendance vis-à-vis de l'Etat; 5) nécessité de disposer de compétences en gestion et d'un savoir-faire technique (fourni par un investisseur stratégique); 6) générer pour le Trésor public du revenu sous forme de droits de licence ou de concession et/ou du versement de dividendes.
♦ As the sector is of critical social, economic and national security importance, many interests need to be harmonised for successful privatisation as shown in **annex 2 figure 4**.	♦ Comme le secteur revêt une importance primordiale dans les domaines social et économique et sur le plan de la sûreté nationale, il convient de conjuguer harmonieusement un grand nombre d'intérêts pour mener à bien une privatisation (voir **Annexe 2, Figure 4**).
♦ The **regulatory decisions** to be taken have a direct impact on the financing and privatisation process, especially if a strategic investor or major institutional lender is involved. They may affect the **size of the pool of potential investors, the monetary value of their bids**, and the quantity and quality of **service obligations** they are willing to fulfil.	♦ Les **décisions réglementaires** qui doivent être prises ont une incidence directe sur les processus de financement et de privatisation, notamment lorsque est mis à contribution un investisseur stratégique ou un grand prêteur institutionnel; elles peuvent en effet influer sur le **nombre des investisseurs potentiels, sur la valeur monétaire de leurs offres** et sur la quantité et la qualité des **obligations de service** que ces investisseurs sont disposés à remplir.
♦ The financially relevant issues include: ♦ tariff and rate rebalancing policies; price cap vs. rate of return approach, accounting and depreciation rules, services subject to price control, transition time to cost-based-rates, revenue sharing arrangements, cross-subsidy requirements and restrictions, length of exclusive period (if any) and phasing for introduction of competition.	♦ Dans le domaine financier, la réflexion doit porter sur: les politiques de rééquilibrage des tarifs et des taxes; une comparaison entre une politique de prix plafonds et une formule privilégiant le taux de rendement, les règles de comptabilité et d'amortissement, les services dont les prix feront l'objet d'une régulation, la durée de la période de transition vers des taxes fondées sur les coûts, les mécanismes de partage des recettes, la nécessité de pratiquer des subventions croisées et leurs limites, la durée de la période d'exclusivité (éventuellement) et l'introduction progressive de la concurrence.

♦ Just as regulatory and sector structure decisions affect the privatisation process, the reverse is also true. The principal issue: the **degree of control that the state, in its capacity as owner of the public telecom system will exercise** over the company's operations. If the state retains a majority sharesholding in the privatised entity and has commensurate voting rights, it will be in a position to exert direct influence on the company's capital expenditure and network plans. Depending on how long the state intends to exercise such control, the need for regulatory mechanisms to control tariffs, performance, and quality of service is diminished.

♦ Areas of interest where "control" may be sought by a **strategic investor** include: the capital expenditure Programme, the rate structure and levels, and the accounting system.

♦ These days, **competitive advantage** is gained not so much by being able to provide a complete range of services, but rather being flexible and responsive to customers. In this new environment, customer demands are arguably better served by a series of smaller, private companies than by a single, state-owned operator.

♦ The **acid test** of liberalisation, competition and privatisation is whether they succeed in raising the level of investment. In most Asian and Latin American countries, the results have varied but are positive. This is shown by the share of revenue that goes into investment, i.e. the self financing ratio.

♦ S'il est vrai que les décisions prises en ce qui concerne les dispositions réglementaires et la structure du secteur influent sur le processus de privatisation, le contraire est également vrai. A cet égard, la question fondamentale qui se pose est de savoir **quel degré d'intervention l'Etat, en sa qualité de propriétaire du réseau de télécommunication public, exercera** sur la vie de la compagnie. En effet, si l'Etat conserve une participation majoritaire dans l'entité privatisée et bénéficie de droits de vote correspondants, il sera en mesure d'exercer une influence directe sur les dépenses d'investissement et sur les projets de développement du réseau de la compagnie. La nécessité de disposer de mécanismes réglementaires pour réguler les tarifs, surveiller les résultats et déterminer la qualité du service diminue en fonction de la durée pendant laquelle l'Etat entend exercer son droit de regard.

♦ Un **investisseur stratégique** souhaitera éventuellement avoir la "maîtrise" des secteurs suivants: programme des dépenses d'investissement, structure et niveaux des tarifs et système de comptabilité.

♦ A notre époque, une entreprise prend **l'ascendant sur ses concurrents** moins pour être capable de fournir une gamme de services complète que pour être apte à répondre avec souplesse aux besoins de sa clientèle. Cela étant, les exigences des clients sont incontestablement mieux satisfaites par une série de petites entreprises privées que par une seule et unique exploitation publique..

♦ La **pierre de touche** de la libéralisation, de la concurrence et de la privatisation est le niveau d'investissement qu'elles parviennent à susciter. Dans la plupart des pays d'Asie et d'Amérique latine, les résultats, bien que variés, sont positifs, comme l'illustre la part de recettes consacrée à l'investissement, c'est-à-dire le coefficient d'autofinancement.

Partnerships	Partenariat
♦ In this unfolding reality new partnerships, alliances, consortia, or simple associations are being created and tested, and some of these experiences may become models for others to follow. Joining forces in the emerging market economy is driven by a host of factors, among them most prominent the **sharing of diverse know how and experience** into a unified structure, and the **sharing of risk** in the face of uncertainty. Four major options are: 1) liaison with a strategic investor who may take management control, at least for a while, 2) creation of a competitive provider group, 3) the classic joint venture, and 4) consortium constructions with combined technical and financial partners.	♦ Dans cette nouvelle réalité de nouveaux partenariats ou consortiums, de nouvelles alliances ou de simples associations sont créées, puis essayées, certaines de ces nouvelles formules étant appelées à devenir peut-être des modèles. L'union des forces dans l'économie de marché naissante est motivée par différents facteurs, dont les principaux sont la **mise en commun de savoir-faire et d'acquis divers** dans le cadre d'une structure unifiée et le **partage des risques** liés à l'incertitude. On peut à cet égard distinguer quatre grandes options: 1) l'association avec un investisseur stratégique qui se charge éventuellement de la gestion, du moins pour un temps, 2) la création d'un groupe de fournisseurs compétitifs, 3) la coentreprise, ou joint venture, classique, et 4) la création de consortiums regroupant partenaires techniques et financiers.
♦ They range from partnerships between traditional telecom industries to marriages with newcomers from multimedia and increasingly from other infrastructure sectors such as railways, power generation, pipeline distributors etc. Management and revenue sharing schemes may extend over 10 - 15 years or more rarely last 20 - 25 years. Some deals of 2-3 years are designed as a start up operation after which the company is expected to float stock or pay out the temporary partner.	♦ Ces options débouchent soit sur des partenariats entre des industries de télécommunication classiques, soit sur des mariages avec de nouveaux venus du multimédia ou, de plus en plus, d'autres secteurs de l'infrastructure, tels que compagnies du chemin de fer, compagnies d'électricité, grandes sociétés de distribution de fluides, etc. Les accords de gestion et de partage des recettes peuvent s'étendre sur 10-15 ans ou, plus rarement, sur 20-25 ans. Certains associations sur 2-3 années visent à créer une dynamique après quoi la compagnie doit normalement émettre des titres ou rembourser son partenaire d'un temps.
♦ In the forefront of partnership considerations are the legal possibilities and requirements, management structures and control, the accounting system, and the risk/revenue sharing modalities.	♦ L'établissement d'un partenariat est dicté par les considérations essentielles suivantes: possibilités et contraintes juridiques, structures et responsabilités dans le domaine de la gestion, comptabilité et modalités de partage des risques et de répartition des recettes.

♦ The traditional **project finance** approach requires a business plan, capital budgeting procedures, and performance checks as the project gets rolled out, but no lasting partnerships are usually being established. This is quite different for a **joint venture** (e.g. with a strategic partner) and for the host of arrangements that have come into life in different parts of the world over recent years.

♦ The financial advisor of the government or the telecom authority designs a **financial model for partnership co-operation**. In other cases a lead arranger composes a bouquet of vendor finance, debt, equity portions, advises on the fee levels and structures for licenses and franchises as well as performance bond stipulations, complemented by agreements on revenue sharing and tariff policy.

Joint ventures

♦ Joint ventures are common commercial practice throughout the world in most sectors of industry. **Relatively new in telecom**, but with experience accumulating from Latin America, Asia and Eastern Europe, they provide an operational vehicle to pursue more sophisticated financial policies - tapping the global debt markets, selecting the right external credit, pursuing vendor financing and appropriate multilateral and bilateral institutional financing. These financial benefits ease the internal financing requirements of the telecom operator and remove a call on Government finances which can be reallocated to development in other sectors.

♦ La formule classique de **financement d'un projet** exige l'établissement d'un projet d'entreprise et de procédures d'élaboration d'un budget d'investissement ainsi que l'exécution de contrôles des résultats au fur et à mesure de la réalisation du projet, mais aucun partenariat durable n'est normalement mis sur pied. Cette formule est très différente d'une **coentreprise** (par exemple avec un partenaire stratégique) et des nombreux autres mécanismes qui ont vu le jour ces dernières années dans différentes parties du monde.

♦ Le conseiller financier du gouvernement ou l'organe responsable des télécommunications conçoivent un **modèle financier de partenariat**. Dans d'autres cas, un ordonnateur compose un bouquet mêlant apports financiers sur fonds propres, endettement et participation au capital social, et donne des avis sur l'établissement des tantièmes et des structures en vue de l'octroi de licences et de concessions ainsi que sur la fixation de cautionnement de bonne fin, complété par des accords portant sur les modalités de partage des recettes et d'établissement des tarifs.

Opérations conjointes

♦ Les coentreprises, ou joint ventures, sont de pratique courante dans la plupart des secteurs d'activité du monde entier. **Relativement nouvelles dans les télécommunications**, mais fortes de l'expérience s'accumulant actuellement en Amérique latine, en Asie et en Europe de l'Est, elles constituent un mécanisme permettant de pratiquer des politiques financières plus évoluées: emprunter sur les marchés mondiaux, choisir la source extérieure de crédits idoine, rechercher des financements d'apport et des financements institutionnels, multilatéraux ou bilatéraux, appropriés. Ces concours financiers soulagent la charge financière interne de l'opérateur de télécommunications et permettent de ne pas faire appel aux finances publiques qui peuvent être affectées au développement d'autres secteurs

Bidding process

♦ The bidding process is another area where financial issues need careful attention. It is evident that the quality of the presentation of proposals by interested parties is of paramount importance. Pre-qualified firms should be encouraged to comment on the draft bidding documents. The advisory process should include experienced financial, technical, economic and of course legal experts.

♦ The process and the desired outcome will vary depending on whether the government just wants capital contribution or enhanced efficiency of services or a combination of these. The detailed stipulations on which clarity is essential include: the scope of services, the license fee, the license life, revocation conditions, price regulation, human resources obligations, roll out targets, support for indigenous business, frequency allocation, financial guarantees, fiscal incentives, a reserve fund to finance higher costs, and the ability to draw on local funds.

♦ A recent **example of an invitation to bid on an ambitious Programme for sector reform** is attached in **annex 3** for illustration; it may serve **as a case study** in one of the working groups of the Colloquium.

Valuation and debt

♦ Valuation of the state-owned carrier and service provider is an important financial issue to be settled before the anticipated partial or total privatisation through a preferably competitive bidding process. A case in point is **Telecom Malagasy**, where the World Bank is engaged with the Caisse Française de Développement in a restructuring project and other institutions are targeted as cofinanciers.

Appels d'offre

♦ Les appels d'offre sont un autre domaine où les questions financières doivent faire l'objet d'un soin minutieux. Il est évident que la qualité de la présentation des propositions soumises par les parties intéressées revêt une importance capitale. Il faudrait encourager les entreprises présélectionnées à commenter les descriptifs de projets d'appels d'offre. Le processus consultatif devrait faire intervenir des spécialistes chevronnés des questions financières, techniques, économiques et, bien évidemment, juridiques.

♦ Le déroulement de la procédure et le résultat escompté seront différents selon que les pouvoirs publics veulent seulement une participation au capital ou bien une amélioration de l'efficacité des services fournis, ou encore une combinaison des deux. Il est indispensable que les clauses détaillées suivantes soient établies avec clarté: champ d'application des services, droits de licences, durée des licences, conditions d'annulation, réglementation des prix, obligations dans le domaine des ressources humaines, objectifs de résultats, soutien de l'activité locale, attribution des fréquences, garanties financières, avantages fiscaux, fonds de réserve destinés au financement des dépassements de dépenses et possibilité de recourir aux ressources financières locales.

♦ Un récent **exemple d'appel à soumission pour un programme ambitieux de réforme du secteur** est présenté pour illustration à l'**Annexe 3**; il peut constituer une **étude de cas** pour l'un des groupes de travail du colloque.

Estimation de la valorisation et de la dette

♦ L'évaluation de l'actif et du passif de l'exploitant public et du prestataire de services est une importante question financière qui doit être réglée avant de procéder à la privatisation partielle ou totale suivant, de préférence, une procédure d'adjudication avec mise en concurrence. Une bonne illustration est fournie par **Telecom Malagasy**, où la Banque mondiale s'est engagée avec la Caisse française de développement dans un projet de restructuration, d'autres établissements étant sollicités pour en assurer le cofinancement.

♦ The **debt problem** facing many African countries impacts on telecom finance in several ways.	♦ Le **problème de la dette** auquel se trouvent confrontés de nombreux pays africains pèse sur le financement des télécommunications de plusieurs façons.
♦ Opportunities for effective and profitable investment in Telecom can often not be seized. A study by experts from the African Development Bank (ADB) points out that the multilateral finance institutions such as African Development Bank, World Bank and European Investment Bank only lend to Government or with the latter's guarantee. This implies that the **entire debt situation** of the country is taken into consideration, **regardless of the viability of Telecom projects.**[11]	♦ Souvent des possibilités d'investissement judicieux et rentable dans les télécommunications ne peuvent pas être saisies. Dans une étude, des spécialistes de la Banque africaine de développement (BAfD) font observer que les institutions financières multilatérales telles que la Banque africaine de développement, la Banque mondiale et la Banque européenne d'investissement, ne prêtent qu'à des Etats ou avec leur garantie. C'est dire que **l'endettement total** du pays est pris en considération, **quelle que soit la viabilité des projets de télécommunication.**
♦ The ADB experts argue that the telecom company's financial autonomy should include the freedom to borrow **without** State intervention. The State guarantee should only come in where donors demand such guarantee. State control can remain in place through representation of the State in the telecom company's Board of Directors.	♦ Les spécialistes de la BAfD font valoir que l'autonomie financière d'une exploitation des télécommunications devrait lui conférer la liberté d'emprunter **sans** l'intervention de l'Etat. Ce dernier ne devrait apporter sa garantie que lorsqu'elle est exigée par les donateurs. Les pouvoirs publics peuvent conserver leur droit de regard grâce à la représentation de l'Etat dans le conseil de direction de l'exploitation des télécommunications.
♦ Likewise, access to capital markets should be achieved freely also by public telecom companies. An example of this option is **South Africa Telkom,** a public company which borrows under its own name.	♦ De même, les entreprises publiques de télécommunication devraient pouvoir elles aussi accéder librement au marché des capitaux. Cette latitude est illustrée par **South African Telkom**, entreprise publique qui contracte des emprunts sous sa propre raison sociale.

[11] Telecommunications Fundation of Africa, Bulletin 1/94

Local initiatives	Initiatives locales
♦ Private sector participation should not be seen as restricted to stakes in the public telecom operator, or only to new and advanced telecom services. The limited extension of the basic network calls for greater efforts to attract private capital. In some African cities **private or professional subscribers** have been willing to take part in the financing of the investments needed for acquiring a telephone. Similar opportunities exist for out-sourcing certain accessory operational functions to **local enterprise**. These may range from construction, maintenance, to billing and collection.	♦ La participation du secteur privé ne devrait pas être limitée à des prises de participation dans l'exploitation publique des télécommunications ni uniquement à des services de télécommunication nouveaux et évolués. Le réseau de base étant limité dans son étendue, il faut en effet un surcroît d'efforts pour attirer les capitaux privés. Dans certaines villes d'Afrique des **abonnés privés ou professionnels** ont été disposés à participer au financement des investissements nécessaires pour l'acquisition d'un téléphone. Par analogie, il est possible de s'en remettre à des **entreprises locales** pour assurer le financement de certaines fonctions d'exploitation accessoires, allant des opérations de construction et de maintenance aux fonctions de facturation et de perception.
♦ It is good to see that the design of agricultural, health or educational development projects and NGO Programme (non-governmental organisations) has started to include the setting-up of telecom facilities, which are essential for those projects to be effective. According to the ADB, this should be in the form of a **component of an agricultural, educational or health project for the rural population** concerned, at only marginal cost. In this way soft loans could be ear-marked for telecom. The national telecom operating company has to ensure that technical standards are respected and that sound interconnections with the public network are established.	♦ On constate avec satisfaction que des projets de développement agricole, sanitaire ou éducatif et des programmes d'ONG (organisations non gouvernementales) ont commencé de prendre en compte dans leur élaboration la mise sur pied d'installations de télécommunication, dont l'existence est indispensable à leur réalisation. Selon des sources de la BAfD, les télécommunications devraient constituer **un élément de tout projet de développement agricole, éducatif ou sanitaire destiné à la population rurale** visée, et ce pour un coût uniquement marginal. Ainsi, des prêts assortis de conditions de faveur pourraient être spécifiquement destinés aux télécommunications. L'exploitant national des télécommunications doit veiller à ce que les normes techniques soient respectées et faire en sorte que des interconnexions fiables soient établies avec le réseau public.
♦ Since the rates and traffic per line are high compared to other regions of the world, telecoms in Africa is financially attractive. In spite of the comparatively heavier investment unit costs, the operating fixed assets always show a profitability of more than 10%, with a few exceptions due to poor management. **The internal financial profitability rate of telecom projects often exceeds 15%.**	♦ Leurs tarifs et leur trafic par ligne étant élevés par rapport à d'autres régions du monde, les télécommunications en Afrique présentent un grand attrait financier. Malgré des coûts unitaires d'investissement comparativement plus élevés, les immobilisations d'exploitation offrent toujours une rentabilité supérieure à 10%, à quelques exceptions près dues à une mauvaise gestion. **Le taux de rentabilité interne des projets de télécommunication excède souvent 15%.**

♦ The interest rates applied by bilateral and multilateral institutions on loans intended for telecom generally do not exceed 10% and can therefore be borne by most telecom projects.

♦ One example of successful investment using domestic and foreign loans is the Senegalese telecom company SONATEL. It has been able to make an advance repayment of some of its debts, ensure self-financing of up to 64% and reduce usage tariffs by 31,6% for firms and 21,8% for residential subscribers.

♦ The **Ecobank in Ghana** provides an illustration of increasingly **tapping national savings** for telecom investment.

♦ As a further example, **Morocco** is passing legislation these days to create an independent Telecom regulator and pave the way to privatisation of ONPT, which has already been separated from the Ministry of Communication. It is planned to set it up as a private share company with a listing on the Casablanca stock exchange. The government is expected to retain a golden (veto) share. A strategic stake of 25-50% will be sold.

♦ The **economic implications** are, that ONPT currently hands over 40% of its revenue to the state. Its revenues account to almost 2% of GNP. The authorities are considering the licensed sale of mobile and other services, while GNP is growing at 7% and Morocco's significant export industries in minerals, tourism, textiles and agriculture require state-of-art communications links.

♦ Les taux d'intérêt appliqués par les institutions bilatérales ou multilatérales aux prêts destinés aux télécommunications n'excèdent généralement pas 10% et peuvent donc être supportés par la plupart des projets de télécommunication.

♦ Un exemple d'investissement réussi, combinant prêts nationaux et prêts étrangers, est celui de l'entreprise des télécommunications sénégalaise SONATEL, laquelle a pu procéder à un remboursement anticipé d'une partie de ses dettes, garantir son autofinancement à hauteur de 64% et réduire ses tarifs de 31,6% pour les entreprises et de 21,8% pour les abonnés résidentiels.

♦ L'**Ecobank du Ghana** illustre le **recours croissant à l'épargne nationale** pour financer les télécommunications.

♦ Autre exemple, le **Maroc** prend actuellement des dispositions législatives pour créer un organe de réglementation des télécommunications indépendant et préparer la privatisation de l'ONPT, qui a déjà été séparé du Ministère des télécommunications. Il est prévu de le constituer en société de capitaux privés et de l'inscrire à la bourse des valeurs de Casablanca. L'Etat devrait conserver une participation majoritaire (droit de veto). Une participation stratégique de 25 à 50% sera vendue.

♦ Les **conséquences économiques** sont que l'ONPT verse actuellement plus de 40% de ses recettes à l'Etat, recettes qui représentent près de 2% du PNB. Les autorités envisagent actuellement la vente sous licence des services mobiles et d'autres services, à une époque où le PNB croît au taux de 7% et où d'importants secteurs d'exportation du Maroc (minéraux, tourisme, textile et agriculture) ont besoin de télécommunications modernes.

◆ The **Islamic Development Bank** (IDB) has recently made a 20 million USD loan bearing no interest in line with Charia principles. Other major recipients of IDB funds are: Algeria, Egypt, Tunisia, followed by Guinea, Mauritania, Burkina Faso, Uganda and Sudan. Smaller amounts have been made available to: Benin, Gabon, Senegal, Chad, Djibouti, Mali, Gambia, Comores, Sierra Leone and Cameroon.

◆ La **Banque islamique de développement** (BID) a récemment accordé un prêt de 20 millions de dollars EU, sans intérêts, suivant les principes de la charia. Autres importants bénéficiaires de prêts de la BID: l'Algérie, l'Egypte, la Tunisie, suivies par la Guinée, la Mauritanie, le Burkina Faso, l'Ouganda et le Soudan. Des prêts de moindre importance ont été accordés: au Bénin, au Gabon, au Sénégal, au Tchad, à Djibouti, au Mali, à la Gambie, aux Comores, à la Sierra Leone et au Cameroun.

◆ In **Algeria**, government, employers and trade unions are reported to have reached agreement on a model to privatise state companies. It remains to be seen if it will be attractive to various foreign financial or industrial investors. The model stresses employment retention and reserves 30% of the capital for employees (of which 5% is distributed free, 5% is available on a three-year credit, and the balance is an option to buy). The IMF also granted a US$ 1.8 billion three year credit under its Extended Fund Facility, following agreement in May with commercial banks to restructure debt of US$3.2 billion.

En **Algérie**, l'Etat, les employeurs et les syndicats se seraient mis d'accord sur un modèle pour privatiser des compagnies publiques. Il reste à voir si ce modèle parviendra à séduire les différents investisseurs financiers ou industriels étrangers. Le modèle met l'accent sur le maintien de l'emploi et réserve 30% du capital aux employés (dont 5% sont distribués gracieusement, 5% sont disponibles moyennant un crédit de trois ans et le solde est proposé à l'achat). Le FMI a de son côté accordé un crédit de trois années de 1,8 milliard de dollars EU dans le cadre de son mécanisme élargi de crédits, après être parvenu à un accord en mai avec des banques commerciales visant à rééchelonner une dette de 3,2 milliards de dollars EU.

◆ **Tunisia** recently had great success with a five year 200 million USD Euroloan, which was heavily over subscribed. Its terms are just 0, 7% over the London Interbank offering rate (LIBOR). This reflects the facts that Tunisia never had to reschedule external debt and that the level of public debt outstanding stands below 50% of GNP. Tunisia is also referred to as an example for attracting the repatriation of funds for investment and related know-how transfer.

◆ La **Tunisie** a récemment enregistré un très grand succès avec un Europrêt sur cinq ans de 200 millions de dollars EU, dont la souscription a été largement excédentaire. Son taux LIBOR (taux offert sur le marché entre banques à Londres) n'est que de 0,7%, ce qui illustre le fait que la Tunisie n'a jamais été amenée à rééchelonner sa dette extérieure et que sa dette publique active est inférieure à 50% de son PNB. La Tunisie est en outre citée comme exemple pour encourager le rapatriement de capitaux aux fins d'investissements et le transfert du savoir-faire connexe.

◆ An illustration of practically all types of **financial sources and instruments** that can be combined according to countries' policy preferences and other local circumstances is shown in **Annex 4**.

◆ Tous les types ou presque de **sources de financement et d'instruments** financiers susceptibles d'être combinés suivant les choix politiques des pays et d'autres circonstances locales sont illustrés à l'**Annexe 4**.

♦ The **availability and cost of finance depend on the following factors**: 1) political and economic stability, in view of risk assessment and credit rating; 2) an unambiguous regulatory framework and a clear government policy regarding: the desired public/private and domestic/foreign mix; flexible and promptly applied rules for the establishment of companies, and non-discriminatory as well as investor-friendly treatment as regards: ownership of assets, taxes and custom duties, revenue retention and profit transfer, procurement, employment, local content and repatriation of assets.

Risk management

♦ Countering uncertainty and instability is the task of risk management. Large budget deficits, a level of government debt exceeding a country's annual national product, and political or legal uncertainty are the main factors that **diminish the potential investment flow or tend to make the funds that are being raised more expensive**.

♦ The types of risk that need attention and the corresponding array of measures control risk are: political risk (expropriation, government imposed restrictions, non-compliance, non-performance, non-payment by public sector partners); economic/legal risk (currency transfer, fluctuation), and the commercial risk proper (insolvency/default of business partners and clients).

♦ La **disponibilité de ressources financières et leur coût dépendent des facteurs suivants**: 1) stabilité politique et économique, de laquelle dépendent l'évaluation des risques et la fixation du taux du crédit; 2) existence d'un cadre réglementaire non ambigu et d'une politique officielle claire concernant: le rapport public/privé et national/étranger souhaité; la souplesse et la rapidité d'application des règles relatives à l'établissement de sociétés ainsi qu'un traitement non discriminatoire et favorable aux investisseurs en ce qui concerne: la propriété des avoirs, les taxes et droits de douane, la non-rétrocession et le transfert des bénéfices, les acquisitions, l'emploi, la participation locale et le rapatriement des avoirs.

Gestion des risques

Remédier à l'incertitude et à l'instabilité relève de la gestion des risques. L'existence d'importants déficits budgétaires, une dette publique d'un niveau excédant le produit national annuel d'un pays et l'incertitude politique ou juridique constituent les principaux facteurs qui **diminuent les flux d'investissements potentiels ou tendent à rendre plus chers les montants empruntés**.

♦ Les types de risque auxquels il faut faire attention et les différentes mesures les illustrant sont: le risque politique (expropriation, restrictions imposées par l'Etat, non-observation des dispositions, non-exécution et non-paiement par les partenaires du secteur public); les risques économiques et juridiques (transfert de devises, fluctuations monétaires) et le risque commercial proprement dit (insolvabilité/défaillance de partenaires commerciaux et de clients).

♦ As telecom operators push into new markets, **leading private risk and insurance brokers are creating telecom units** to offer advice as well as insurance policies. They operate as "virtual" companies within the existing corporate structure. Billing is done on a consultancy basis rather than charged by commissions earned on insurance. This reduces the volatility of a firm's revenues, as telecompanies are charged a yearly fee which covers both consultancy and insurance broking. The annual rates hover around 2,5%. As risk insurance in telecom is emerging as a new business sector, its major products are covering directors and officers liability, financial and political risk, and business interruption	♦ A l'heure où les exploitants des télécommunications prennent pied sur de nouveaux marchés, **d'importantes compagnies de prévoyance et d'assurance privées créent des départements des télécommunications** pour offrir avis et polices d'assurance. Ces départements fonctionnent comme des sociétés "virtuelles" à l'intérieur de la structure de la compagnie existante. Leur rémunération prend la forme d'honoraires de consultance plutôt que de commissions appliquées aux polices; ce procédé permet de réduire la volatilité des recettes d'une entreprise, étant donné que les compagnies de télécommunication paient une cotisation annuelle qui couvre aussi bien les frais de consultance que le courtage en assurance. Les taux annuels tournent autour de 2,5%. L'assurance des risques dans les télécommunications devenant un nouveau secteur d'activité, ses principales dispositions s'appliquent à la responsabilité des dirigeants et du personnel d'encadrement, aux risques financiers et politiques et à l'interruption d'activités.
♦ For illustration, the World Bank has guaranteed repayment of principal of a 50 million USD loan for Jordan's Telecommunications Corporation (TCC). Should TCC capital be floated on the stock exchange during 7 year lifetime of the bonds, investors will be offered a conversion option. The proceeds of the loan are to finance TCC's expansion programme of 210 million USD to install 300,000 new lines up to 1998. Additional sources of funding are expected from the EIB, Japan Eximbank and internal cash generation.	♦ A titre d'illustration, la Banque mondiale a garanti le remboursement du principal d'un prêt de 50 millions de dollars EU accordé à la Compagnie des télécommunications (TCC) de Jordanie. Au cas où TCC émettrait sur le marché des valeurs un emprunt obligatoire, d'une durée de 7 ans, les investissements se verront proposer une option de conversion. Le prêt vise à financer un progamme d'expansion de 210 millions de dollars EU destiné à installer 300 000 nouvelles lignes d'ici à 1998. D'autres sources de financement devraient être fournies par la BEI, l'Eximbank du Japon et par la génération de liquidités internes.
♦ As a further example the Washington based Overseas Private Investment Corporation (OPIC) has singled out project finance and political risk insurance in the telecom sector as a priority. Projects must have 25% US equity. A project funded with say 60% debt and 40% equity would qualify if the US partners held one fourth of that equity or in other words contributed just 10% to the total capital.	♦ Autre exemple, la société Overseas Private Investment Corporation (OPIC), qui a son siège à Washington, s'est fixée comme priorité d'assurer les risques politiques et financiers liés à des projets dans le secteur des télécommunications. Les projets doivent être financés à hauteur de 25% par une participation américaine au capital social. Un projet financé, par exemple, à 60% par des capitaux empruntés et à 40% par des capitaux participatifs serait retenu si les partenaires américains détenaient un quart de ce capital-actions ou, en d'autres termes, apportaient juste 10% du capital total.

♦ To date, OPIC's preference has been for deals with the US partner having operational responsibility in the joint venture. OPIC can take full project risk for up to 10 years with 2-3 years grace. OPIC's new policy is to take a leading role in assembling debt finance, encouraging funding institutions in the institutional markets to lend against the OPIC guarantee. A commercial bank is often appointed to sell the deal to these funding institutions, also referred to as "selling sub-participations."[12]

♦ A ce jour, l'OPIC a donné sa préférence aux dossiers dans lesquels le partenaire américain dispose de la responsabilité opérationnelle dans la coentreprise. L'OPIC peut couvrir tous les risques liés à un projet pendant une durée maximale de 10 ans avec une période de grâce de 2 à 3 ans. Sa nouvelle politique l'amène à jouer un rôle prépondérant dans la mise sur pied d'un financement par endettement, en encourageant les institutions de financement des marchés institutionnels à prêter des fonds contre la garantie de l'OPIC. Souvent une banque commerciale est désignée pour vendre le dispositif à ces institutions de financement, suivant une démarche appelée également "vente de sous-participations".[12]

♦ The familiar public sector risk insurance and guarantee agencies usually known as **Export Credit Agencies (ECAs),** continue to cover the political or country risk, the economic/legal risks, and the commercial risks in varying proportions according to national statutes and practice.

♦ Les agences classiques du secteur public d'assurance des risques et de garantie, appelées communément **Agences de crédit à l'exportation (ACE)**, continuent de couvrir le risque politique, les risques économiques et juridiques et les risques commerciaux selon des degrés divers en fonction de la situation du pays considéré.

♦ The **approaches vary also among investors**, some of whom will tend to be very cautious and **risk averse** (e.g. fixed income oriented investor), others being more adventurous and **tolerant to risk**, accepting larger volatility in the hope of greater capital gain. The growth-oriented investors have a **high level of risk tolerance**, giving top priority to capital growth and accepting large swings in the pursuit of this goal.

♦ Les **attitudes diffèrent également parmi les investisseurs**, dont certains auront tendance à faire preuve d'une très grande prudence et à ne prendre que des **risques calculés** (par exemple investisseurs à la recherche de rendements fixes), alors que d'autres, plus aventureux et plus **portés à prendre des risques**, accepteront une plus grande volatilité dans l'espoir d'un gain supérieur. Ces investisseurs qui donnent la préférence à la croissance ont un **niveau de tolérance du risque élevé** et donnent la priorité à la croissance de leur capital en acceptant, pour atteindre cet objectif, le risque d'importantes fluctuations.

♦ Apart from such more subjective attitudes, there are number of **objective criteria** that enter the decision pattern: 1) latent reserves in current valuation, 2) liquidity status of the partner and level of cash flow, 3) the rate-of-return expectations, 4) local capital available for investment, etc...

♦ A côté de ces attitudes subjectives, il existe un certain nombre de **critères objectifs** qui déterminent la décision, à savoir: 1) existence de réserves latentes dans le cadre de l'évaluation effectuée, 2) niveau des liquidités du partenaire et niveau de la marge brute d'autofinancement, 3) taux de rentabilité escompté et 4) capitaux disponibles sur place pour les investissements, etc.

[12] Telecom Finance, London, June 30, 1995

♦ **Risk assessment in relation to the variety of particular license, franchise or partnership arrangements is an essential requirement in the decision making process. Careful consideration should be given to this issue at the Colloquium.**

CROSS BORDER CO-OPERATION

♦ Cross border initiatives for financing Telecom development look currently very promising.

♦ Several projects have been implemented (e.g. PANAFTEL, RASCOM) and several countries are stepping up the subregional integration of their telecom networks, most prominently Kenya, Uganda and Tanzania. The SPACECOM Project launched by ITU/BDT in 1994 represents a model of partnership for **bringing space technology to rural development.**

♦ The most visionary project to date is **Africa One** which proposes to lay a fiber-optic submarine cable around the entire continent, enabling operators to realise substantial savings on international traffic particularly between African countries which currently relies largely on expensive outside transit. The financing of this major infrastructure (2,6 billion USD) is envisaged with a variety of possibilities. Basically it is proposed that the network will be financed as a whole, not on a country by country basis. Repayment will be arranged by revenue sharing. Finance should be provided by equipment suppliers, multilateral institutions, private sources and large users. This important subject was discussed in the last meeting (Marakech, 11-15 March 1996)

♦ **L'évaluation des risques en fonction de la diversité des mécanismes particuliers d'octroi de licences, d'octroi de concessions ou de partenariats est un élément impérieux du processus décisionnel. Cette question devrait faire l'objet d'un examen minutieux au colloque.**

COOPÉRATION TRANSFRONTIÈRE

♦ Des projets transfrontières de financement du développement des télécommunications apparaissent actuellement très prometteurs.

♦ Plusieurs projets (par exemple PANAFTEL, RASCOM) ont été réalisés et plusieurs pays, notamment le Kenya, l'Ouganda et la Tanzanie, accélèrent actuellement l'intégration sous-régionale de leurs réseaux de télécommunication. Le projet SPACECOM lancé par l'UIT/BDT en 1994 représente un modèle de partenariat visant à **mettre la technologie spatiale au service du développement rural**.

♦ Le projet le plus ambitieux à ce jour, **Africa One,** se propose d'installer un câble sous-marin en fibre optique tout autour du continent africain, ce qui permettrait aux exploitants des télécommunications de réaliser d'importantes économies dans le domaine du trafic international, en particulier entre pays africains, dont une part importante transite actuellement par l'étranger, moyennant un coût élevé. Plusieurs possibilités sont envisagées pour assurer le financement de cette infrastructure à l'échelle du continent (2,6 milliards de dollars EU). En gros, il est proposé que le réseau soit financé, non pays par pays, mais globalement et que l'amortissement se fasse par le biais d'un partage des recettes. Le financement devrait en être assuré par des fournisseurs d'équipements, des institutions multilatérales, des sources privées et de gros utilisateurs; cette importante question a été examinée à la dernière réunion (Marrakech, 11-15 mars 1996).

◆ **FLAG** (Fiber-optic link across the globe) has an African segment. Financing is organised as a syndicated deal by two well-known deal arrangers and involves debt underwriting, advisory services, as well as support from a host of telecom industry, trade finance, project finance and public sector partners. FLAG intends to co-operate with RASCOM to ensure connectivity to land-locked countries.	◆ L'artère **FLAG** (Fiber optic link across the globe, liaison à fibre optique au travers de la planète) comprend un tronçon africain dont le financement est organisé sous forme de coopération bancaire par deux entités bien connues, spécialistes de ces opérations, et met en jeu la garantie des capitaux empruntés, des services consultatifs et le concours d'un grand nombre de partenaires de l'industrie des télécommunications, d'institutions de financement d'activités commerciales et de projets et du secteur public. FLAG entend coopérer avec RASCOM pour assurer la connectivité des pays sans littoral.
◆ **Afronetwork** is a project that aims to set up a Telecom Company in various West African countries, ultimately to be interconnected via satellite and fiber-optic cable.	◆ **Afronetwork** est un projet qui vise à l'établissement d'une compagnie des télécommunications dans plusieurs pays de l'Afrique de l'Ouest, destinés à être interconnectés par le satellite et le câble à fibre optique.
◆ The **SAFE** (South African Far East) fibre-optic cable project is another initiative with an evolving concept of financing.	◆ Le projet de câble en fibre optique **SAFE** (South African Far East) est une autre initiative pourvue d'un mécanisme de financement évolutif.
◆ Another pan-African proposal is AFRILINK by Siemens (Germany) which is a segment-by-segment approach with submarine cables, eventually along the entire continent's coast line in step with growing demand.	◆ Un autre projet panafricain est le projet **AFRILINK** de Siemens (Allemagne) qui propose d'installer, tronçon après tronçon, des câbles sous-marins - qui feront à terme tout le tour du continent - en fonction de l'accroissement de la demande.
◆ All the above initiatives predict considerable revenue increases for participants as a result of traffic increase fostered by enhanced international network capacity.	◆ Toutes ces initiatives prévoient pour les participants des augmentations considérables de recettes grâce à l'accroissement du trafic que favorisera l'amélioration de la capacité du réseau international.

◆ A case in point is the selection of a well known management and auditing firm to work as lead contractor on a 4 year Programme of 75 million USD by USAID for the 12 countries of the Southern Africa Development Community. The Programme is called Regional Telecommunication Restructuring (RTR) and aims to provide management and technical education, advice on policy reform, and promote US investment in the telecom sectors of the member countries.

◆ Une question à régler concerne le choix d'une société de gestion et d'audit bien connue comme principal interlocuteur pour la réalisation d'un programme sur quatre années de 75 millions de dollars EU, accordé par l'agence américaine de développement international (USAID), au profit des 12 pays de la communauté de développement de l'Afrique australe. Dénommé Restructuration des télécommunications régionales (RTR), ce programme vise à fournir une formation technique et dans le domaine de la gestion ainsi que des conseils sur la réforme de la politique générale et à promouvoir les investissements américains dans le secteur des télécommunications des pays membres.

◆ One fifth of the budget goes into the overall regional effort. The lion's share of the national allocations is earmarked for policy and regulatory work, tariffs, value-added services, rural service, efficiency and profitability drives.

◆ Un cinquième du budget est consacré aux travaux d'ensemble sur le plan régional. La part du lion des affectations nationales est spécifiquement destinée à des actions de promotion dans les domaines suivants: politique et réglementation, tarifs, services à valeur ajoutée, service rural, efficacité et rentabilité.

◆ Similar initiatives are underway in North Africa and the Middle East. OPIC is supporting a 250 million USD fund to back private sector development.

◆ Des initiatives analogues sont en cours en Afrique du Nord et au Moyen-Orient. L'OPIC assure un financement à hauteur de 250 millions de dollars EU pour y favoriser le développement du secteur privé.

◆ The new joint contractual schemes have gone beyond familiar turnkey and project finance arrangements. They extend over a complex and colourful spectrum of arrangements. Sometimes the esoteric names like B.O.O. for build-own-operate are just complicated circumscriptions of what is generally known as enterprise creation at one's risk and reward. But many of the new creations are original constructs.

◆ Les nouveaux mécanismes contractuels mixtes vont bien au-delà des programmes clés en main et des systèmes de financement de projets classiques. Ils couvrent en fait un large spectre de dispositions complexes et diverses. Parfois, les appellations ésotériques, comme par exemple B.O.O. pour build-own-operate (réalisation-propriété-exploitation), ne désignent que les formes compliquées de ce que l'on appelle généralement création d'entreprise à ses risques et profits. Toutefois, un grand nombre de ces nouveaux mécanismes sont des réalisations originales.

ANNEX 1
Page 1

Sector Reforms in Africa 1996 - Réformes sectorielles en Afrique 1996						
	liberal terminal trade	reform in progress	separation posts telecom	independent regulator	private or joint venture operators	remarks
	commerce libre de terminaux	réforme en cours	séparation postes et telecom-munication	organisme indépendant de réglemen-tation	exploitants privés ou opérations conjointes	remarques
01 Algerie		1	0	0	→	negotiations with trade union négociations avec les syndicats
02 Angola *		1	1	1	→	under study en cours d'étude
03 Bénin *	1	1	→	0	→	under preparation en cours de préparation
04 Botswana	1	1	1	→	→	under study en cours d'étude
05 Burkina Faso *	1	1	1	0	0	
06 Burundi *	1	1	1	0	1	
07 Cameroun	1	1	1	0	→	under study en cours d'étude
08 Cape Verde *	1	1	1	1	→	under preparation en cours de préparation
09 Central African Republic *	1	1	1	0	1	
10 Comoros Isl. *	0	0	1	1	0	
11 Congo	1	1	→	0	→	under preparation en cours de préparation
12 Côte d'Ivoire	1	1	1	1	1	advanced stage of reform réforme à un stade avancé
13 Djibouti *	1	1	0	0	1	
14 Egypt	1	1	1	0	→	under preparation en cours de préparation
15 Equatorial Guin.*			0	0	0	
16 Eritrea *	1	1	0	0	0	
17 Ethiopia *	1	1	1	0	0	
18 Gabon	1	1	0	0	1	
19 Gambia *	1	1	1	1	1	advanced stage of reform réforme à un stade avancé

Sector Reforms in Africa 1996- Réformes sectorielles en Afrique 1996						
	liberal terminal trade	reform in progress	separation posts telecom	independent regulator	private or joint venture operators	remarks
	commerce libre de terminaux	réforme en cours	séparation postes et telecom-munications	organisme indépendant de réglemen-tation	exploitants privés ou opérations conjointes	Remarques
20 Ghana	1	1	→	1	1	advanced stage of reform réforme à un stade avancé
21 Guinea *	1	1	1	1	1	advanced stage of reform réforme à un stade avancé
22 Guinea-Bissau *	1	0	1	1	1	advanced stage of reform réforme à un stade avancé
23 Kenya	1	1	1	0	→	under preparation en cours de préparation
24 Lesotho *	1		1	0	0	
25 Liberia *			1	0	0	
26 Libyia			0	0	0	
27 Madagascar *	1	1	1	0	1	
28 Malawi *	1	1	→	0	1	under preparation en cours de préparation
29 Mali *	1	0	1	1	0	
30 Mauritania *	1	1	0	0	1	
31 Mauritius	1	1	1	1	1	advanced stage of reform réforme à un stade avancé
32 Morocco	1	1	0	→	1	under preparation en cours de préparation
33 Mozambique *	1	1	1	1	1	advanced stage of reform réforme à un stade avancé
34 Namibia (*)	1	1	1	1	1	advanced stage of reform réforme à un stade avancé
35 Niger *		1	0	0	0	

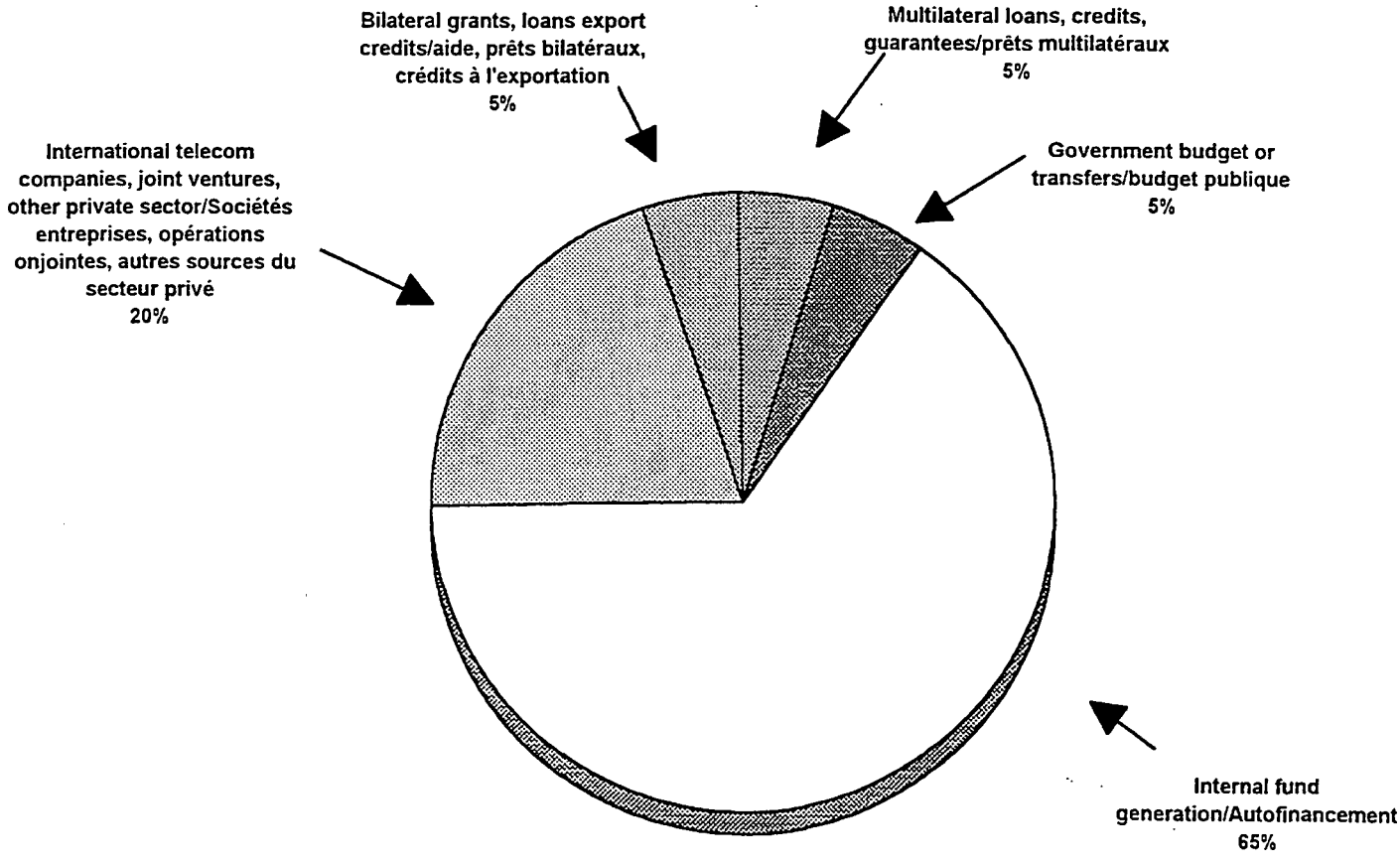
Sector Reforms in Africa 1996 - Réformes sectorielles en Afrique 1996						
	liberal terminal trade	reform in progress	separation posts telecom	independent regulator	private or joint venture operators	remarks
	commerce libre de terminaux	réforme en cours	séparation postes et telecom-munication	organisme indépendant de réglemen-tation	exploitants privés ou opérations conjointes	Remarques
36 Nigeria	1	1	1	1	1	advanced stage of reform réforme à un stade avancé
37 Rwanda *	1	1	1	1	→	under preparation en cours de préparation
38 S. Tomé & Princ*	1	0	1	0	1	
39 Senegal (*)	1	1	1	1	→	under preparation en cours de préparation
40 Seychelles	1	0	1	1	1	
41 Sierra Leone *	1	1	1	0	1	
42 Somalia *						
43 South Africa	1	1	1	1	1	advanced stage of reform réforme à un stade avancé
44 Sudan *	1	1	1	1	1	advanced stage of reform réforme à un stade avancé
45 Swaziland	1	1	0	0	→	under study/en cours d'étude
46 Tanzania *	1	1	1	1	1	advanced stage of reform réforme à un stade avancé
47 Tchad *	1	1	1	0	→	under study/en cours d'étude
48 Togo *	1	0	1	1	→	under preparation en cours de préparation
49 Tunisia	1	1	0	0	1	
50 Uganda *	1	1	→	→	1	advanced stage of reform réforme à un stade avancé
51 Zaire *	1	1	0	→	1	
52 Zambia *	1	1	1	1	→	advanced stage of reform réforme à un stade avancé

Sector Reforms in Africa 1996 - Réformes sectorielles en Afrique 1996						
	liberal terminal trade	reform in progress	separation posts telecom	independent regulator	private or joint venture operators	remarks
	commerce libre de terminaux	réforme en cours	séparation postes et telecom-munication	organisme indépendant de réglemen-tation	exploitants privés ou opérations conjointes	Remarques
53 Zimbabwe	1	1	0	0	→	under preparation en cours de préparation
Total "Yes" Réponses positives	**45**	**43**	**34**	**21**	**26**	**15 countries at advanced stage of reform 15 pays où les réforme sont à un stade avancé**

Note: 1 = yes; 0 = no
* = Least developed countries/pays les moins avancés
(*) = treated as LDC on case-by-case basis/considérés comme PMA au cas par cas
Adapted from /Adapté de: Telecommunications Foundation of Africa, Bulletin 1/95, p.9

Figure 1

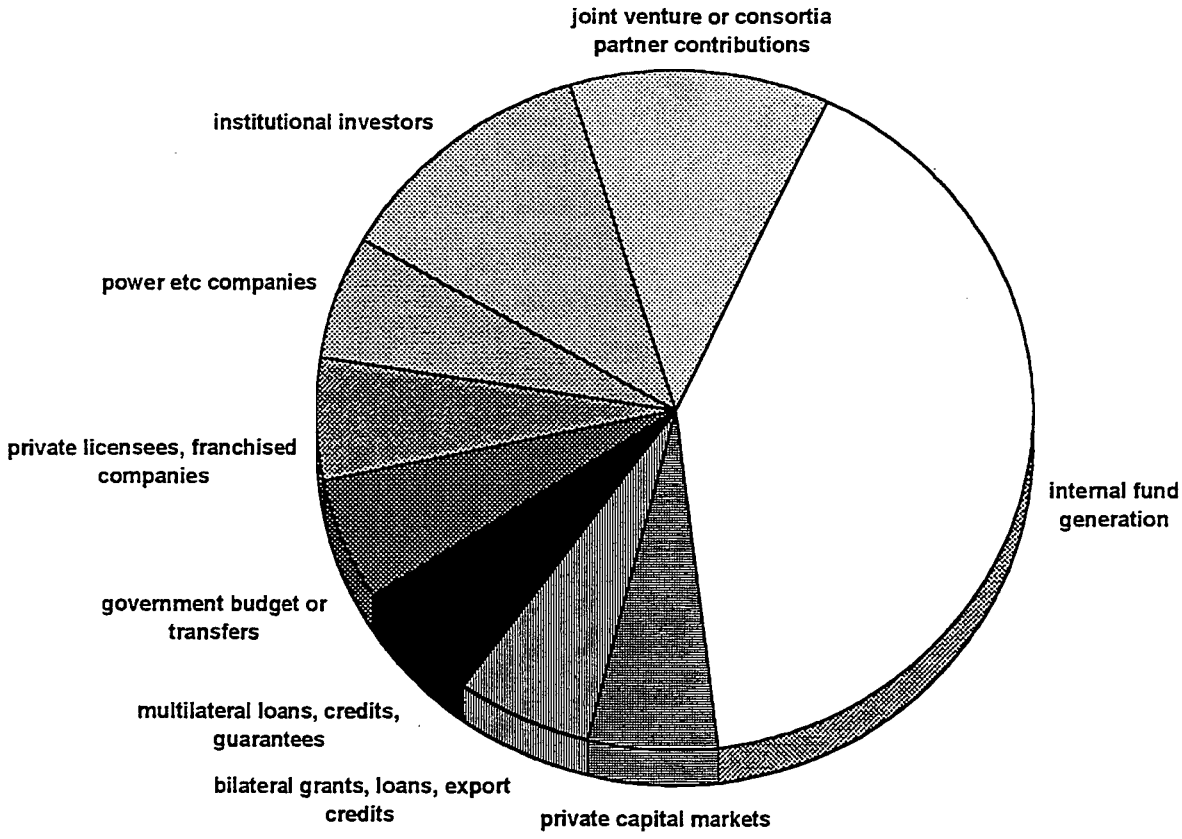
Traditional sources of finance



Sources: ITU & World Bank databases; Telecommunications Foundation of Africa Bulletins 1995; Telecom Finance 1995/96.

Figure 2

The new configuration

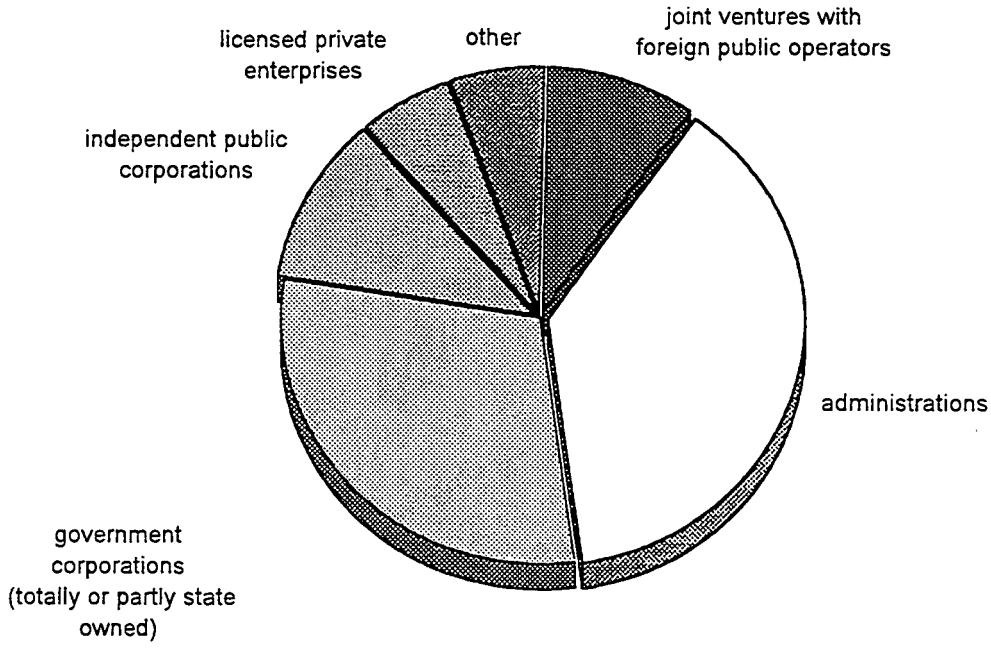


Sources: ITU & World Bank databases; Telecommunications Foundation of Africa Bulletins 1995; Telecom Finance 1995/96.

ANNEX 2.3

Figure 3

The current African Telecom ownership/control pattern

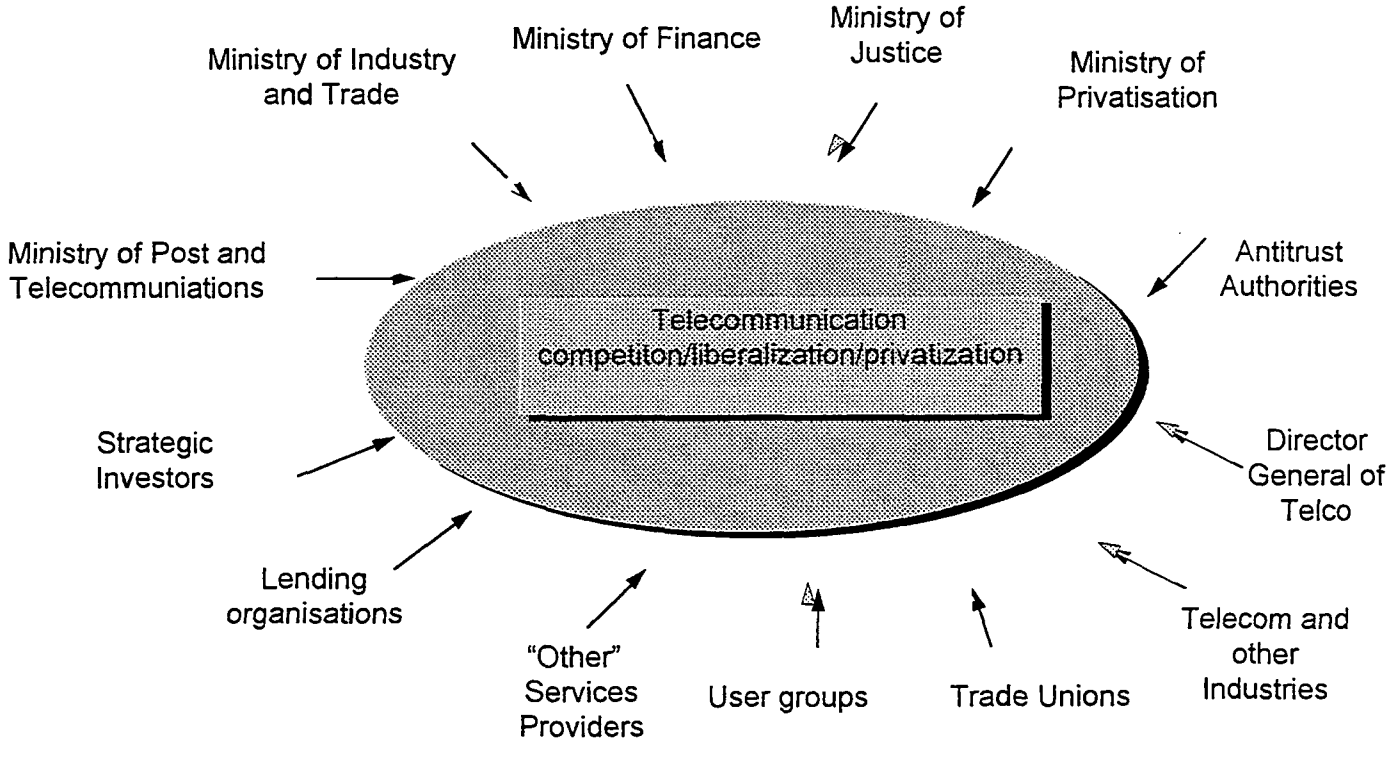


Sources: ITU & World Bank databases; Telecommunications Foundation of Africa Bulletins 1995; Telecom Finance 1995/96.

ANNEX 2.4E

Figure 4

Harmonizing divergent interests

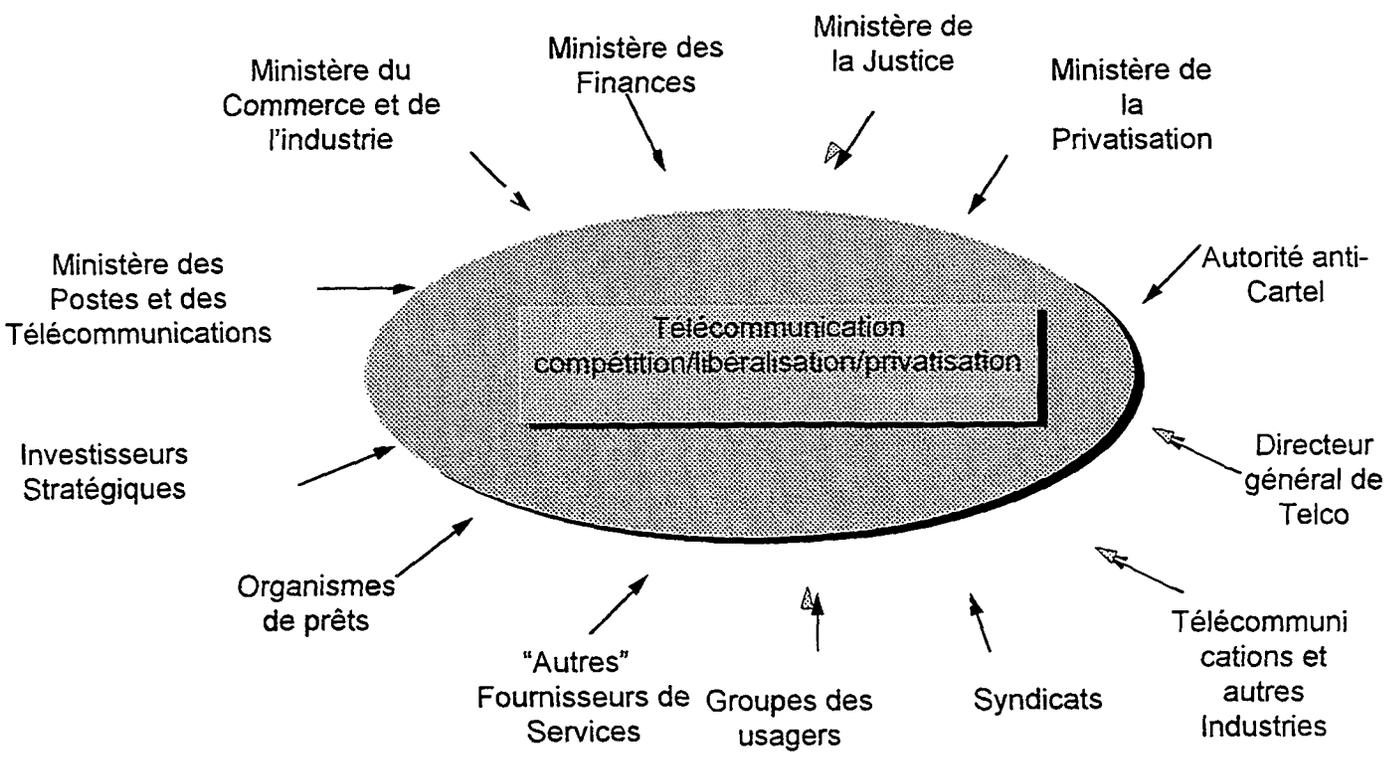


Adapted from Datapro, February 1994

ANNEXE 2.4F

Figure 4

Harmonisation des intérêts divergents



Adapté de Datapro, Février 1994

ANNEX 3E

Case Study

TELECOMMUNICATIONS PRIVATISATION

EXPRESSIONS OF INTEREST

The Government of ... through its Privatisation Unit, invites expressions of interest from experienced network operators, providers of public telephony and other investors who may be interested in the investment opportunities in the telecommunications sector in ...
... is in its 10th year of stable government, comprehensive economic reform and has one of the fastest growing economies in Africa. Over the past 5 years the country has consistently achieved and often exceeded goals set by the IMF and the World Bank for GDP growth and inflation. The International Finance Corporation (IFC) has been retained by the Government as financial advisor for the transactions outlined below.

This privatisation offers qualified investors an opportunity to:

- Acquire a significant majority stake in the existing network, or to
- Bid for a license to build, own and operate a second national network to compete with the existing network

Goals for the sector include:

- Meeting an immediate unmet demand of potential subscribers
- Expanding the network from 42,000 subscribers to about 300,000 by the year 2000, thus boosting penetration per 100 population from 0.23 today to approximately 2.0.
- Achieving internationally accepted service quality targets
- Eliminating Government from ownership and operations while strengthening its policy and regulatory roles
- Fostering competition in all market. Segments

In order to achieve its goals, the Government will, this year:

- Enact comprehensive, internationally developed legislation, establishing an independent regulatory body to provide for the rights and obligations of authorised operators and providing for interconnection, performance obligations and fair competition as well as for the interests of subscribers and investors
- Tender a license to a Second Network Operator (SNO) for local, long distance, international and cellular communications; plus value added services such as Internet access, electronic mail, voice mail and other specialised services; allow the SNO to operate under all existing international telecommunications agreements and agencies to which ... is a signatory; and mandate interconnection to the existing network under contractual terms and conditions to be negotiated prior to closing the transaction
- Create ....Telecommunications Limited to hold the telecommunications assets of the Posts and Telecommunications Corporation (PTC)
- Sell a controlling interest in ... to a qualified strategic investor or consortium of investors

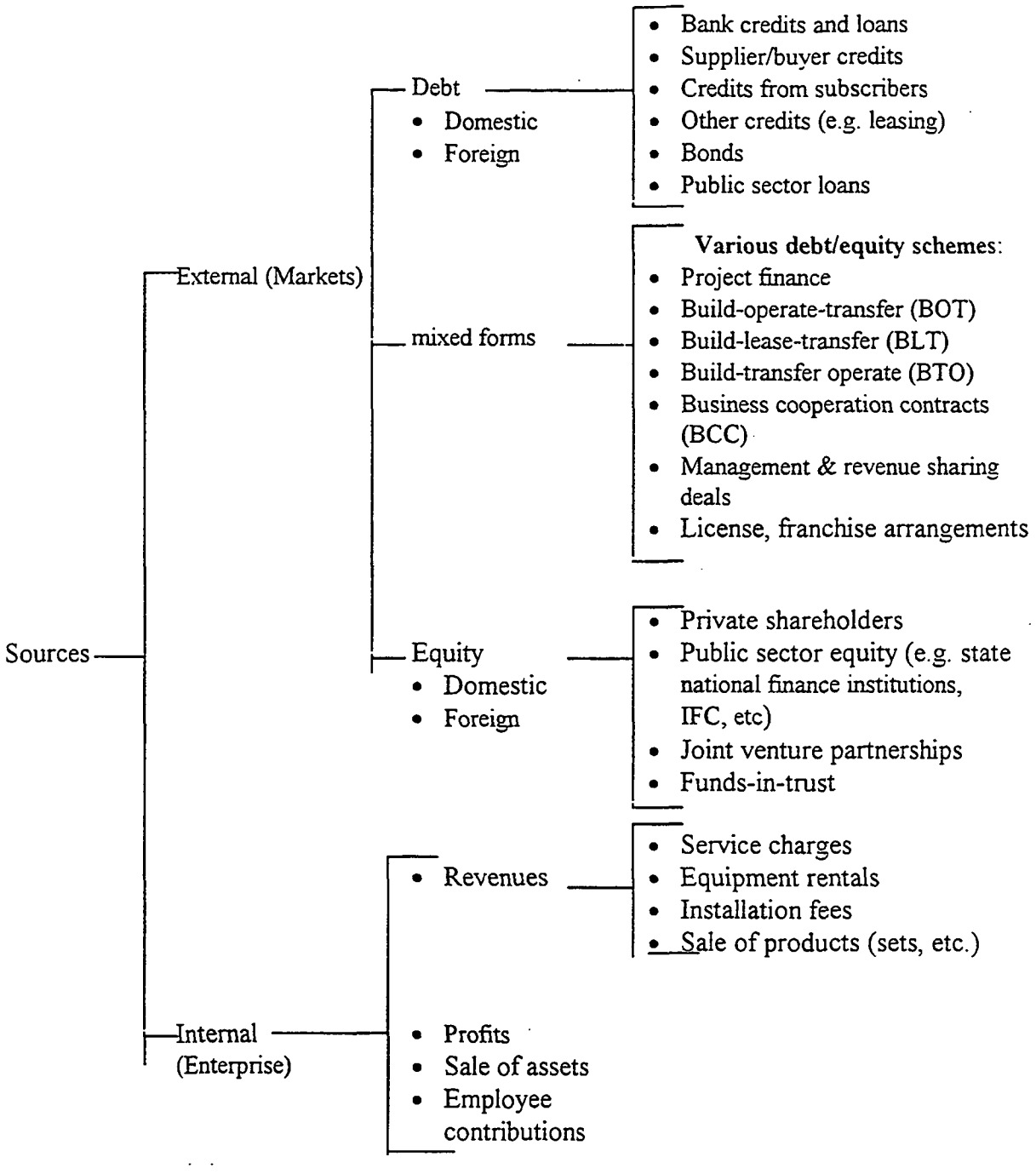
Further information is available to experienced network operators, providers of public telephony and other investors. To obtain this information, interested parties may access the World Wide Web Page .... Privatization. Org or should send their request together with a copy of their latest Annual Report to:...

Source: The Economist, 24 February 1996

ANNEX 4E

FINANCIAL SOURCES, INSTRUMENTS AND STRATEGIES

depending on the telecom sector/market structure
(varying combinations and percentage shares)



Private sector requirements

- **Political and economic stability (risk assessment, credit rating)**
- **Unambiguous regulatory framework**
- **Clear government policy regarding public/private mix, domestic/foreign private share**
- **Rules on establishment of companies**
- **Non-discriminatory treatment in respect of: ownership and control of assets, taxes and custom duties, revenue retention and profit transfer, procurement, employment, local content, repatriation of assets...**

ANNEXE 4F

SOURCES, INSTRUMENTS ET STRATEGIES FINANCIERES

en fonction de la structure du secteur/du marché des télécommunications
(diverses combinaisons et pourcentages)

Exigences du secteur privé

- **Stabilité politique et économique (évaluation du risque, notation du crédit)**
- **Cadre réglementaire bien défini**
- **Politique non équivoque des pouvoirs publics concernant la répartition du secteur public/privé et la prise de participation nationale/étrangère**
- **Règles en matière d'établissement des entreprises**
- **Traitement non-discriminatoire concernant: la propriété et le contrôle des actifs, les impôts et les droits de douane, la retenue et le transfert des recettes et bénéfices, l'approvisionnement, l'emploi, la part locale de production, le rapatriement des avoirs, etc.**

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 45-E
29 April 1996
Original: English

For Information/Support

Agenda item: 3.1 **PLENARY MEETING**

SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU

TITLE: PROGRAMME 1.F - FINANCING

I Introduction

This document serves to provide the rationale as well as a preliminary description of BAAP Programme 1.F The intended objective of all activities in this programme is to organize and implement BDT activities in the field of mobilization and management of financial and other resources and to induce their multiplier effect, to be ultimately quantified and measured by such indicators as network expansion and/or modernization, and increased performance in terms of quality of service and revenues.

To be considered as second draft relevant inputs, among others, are linkages to the Study Group questionnaires (such as to SG 1, Q.4/1) and responses/analyses of the primary and secondary documents of the BDT such as the Telecommunication Development Sector Survey/Questionnaire and the Telecommunication Development Advisory Board, its Vice-Chairmen and Committee(s).

II Background and bases of elaboration of the BDT's financing programme

In addition to the common background of Programme 1 (see BAAP "Programmes, Goals, Objectives, Strategies and Proposed Actions"), it is essential to recall the key mandates of the BDT in the field of financing telecommunications development.

1 High Level Committee (1991)

Recommendations and resolutions which state the financing policy and strategy basis of all work in BDT:

Recommendation 29

To harmonize the objectives of the Union with the functions of the BDT, *we recommend* that the following new provision (No. 116bis) be added to Article 14 (Nice Convention):

No. 116bis:

"to act as a catalyst in mobilizing resources for development, and in promoting the establishment of favourable lines of credit, by creating awareness among the governmental authorities of developing countries of the importance of telecommunications in national development of the priority which might be assigned to this sector, and also by cooperating with international and regional financial and development organizations."

Recommendation 30

We further recommend that No. 16 of the Constitution include a reference to international development organizations. The proposed text might read:

No. 16

"i) promote, with international financial and development organizations, the establishment of preferential and favourable lines of credit to be used for the development of social projects aimed, *inter alia,* at extending telecommunications services to the most isolated areas in countries."

Recommendation 31

However, *we recommend* that the BDT, working within the Development Sector and collegially with other Sectors of the ITU, should ensure that the ITU's catalytic role in stimulating telecommunication development is strengthened.

When its performance is judged at future Plenipotentiary Conferences, at Development Conferences, and by the Council, the BDT must be able to demonstrate that it has pursued with dynamism and efficiency the ITU's catalytic functions, such as mobilizing resources and advising developing countries on a range of policies and restructuring models for generating more internal funds for telecommunications development.

Recommendation 32

Recommend that the distinct functions originally envisaged for the CTD should be integrated into the structure of the BDT, without maintaining the CTD as an identifiable unit within the BDT. Appeal for voluntary contributions to promote telecommunications development can only be successful if the BDT's processes are transparent. Donors will want clear accountability for funds contributed. Ensuring the transparency of its processes should be a high priority for the BDT.

2 Final Acts of the Additional Plenipotentiary Conference (Geneva, 1992)

As detailed in the ITU Constitution and Convention "the Union shall in particular: promote, with international financial and development organizations, the establishment of preferential and favourable lines of credit to be used for the development of social projects aimed, *inter alia*, at extending telecommunication services to the most isolated areas in countries."

3 Telecommunications visions of the future, a perspective of the World Telecommunications Advisory Council (WTAC)

- That governments should be informed to better understand the economic and social benefits arising from investment in telecommunications, and should raise the priorities of this investment accordingly.
- That financing of telecommunications investment should use all available sources:
  - i) direct control of telecommunications revenue/profit for reimbursement into network and service enhancement;
  - ii) increased profit for reinvestment by efficiency/productivity improvement and by new service introduction;
  - iii) borrowings through normal commercial channels or agencies such as the World Bank;
  - iv) private equity funds through full or partial privatization.
- Recognizing the magnitude of the capital needs of the underdeveloped countries, and that disparities in capability and capacity is detrimental to both developing and developed countries, that processes be established to seek innovative and substantial solutions to the challenge of providing targeted investment to specific geographic areas (e.g. to establish connections between countries, as well as within them).

4 World Telecommunication Development Conference (Buenos Aires, March 1994)

(Basis of Study Group 1, Question 4/1)

Policies and ways for financing telecommunication infrastructures in developing countries:

The implementation of modern telecommunication infrastructures in developing countries requires considerable investment, the volume of which usually exceeds the financing capacities of the concerned national administrations or operators.

New sources of investment financing are often needed to ensure the development and modernization of telecommunication infrastructures in developing countries over a reasonable period of time.

Given this situation, the concerned administrations or operators must gain an overall view of the different possibilities offered in financing policies and techniques as well as of factors which can create a climate favourable to investment.

and:

Resolution 4 - paragraph D:

"In order to meet the considerable investment needs arising from the development of modern telecommunication infrastructures, administrations should, in the light of their domestic circumstances and the development strategy adopted, explore every possibility of attracting investments from national savings and encouraging internal and external private participation.

In the consideration of possible investment policies and techniques (such as Official Development Assistance (ODA), leasing, Build-Operate-Transfer (BOT), joint ventures), administrations should take into account the degrees of access to multilateral, bilateral and private sources of funding based on:

- status of the operator and its evolution within the framework of restructuring of the sector (privatization, joint venture, public company with autonomous management, etc.);
- regulatory framework (appropriateness and stability);
- tariff policies and pricing regulation;
- degree of liberalization in regulations governing foreign investments (restrictions on foreign property and repatriation of profits, exchange control, etc.)".

5 The Missing Link

Chapter 9 of the Report of the Independent Commission for Worldwide Telecommunications Development.

6 And to apply to all regions

The Regional Telecommunication Development Conference for Asia and the Pacific, Singapore, 10-15 May 1993.

Financing strategies (Resolution 3),

noting

the importance of financing strategies in the field of telecommunications,

instructs the BDT

1) to conduct research on the merits and demerits of various financing strategies, such as ODA, leasing, BOT, BLT, joint ventures, privatization and other means under the various conditions prevailing in the countries in the Asia-Pacific region; the research shall be scheduled as a one-year programme and cover the following issues:

- options for financing strategies;
- reasons why certain countries have adopted specific strategies;
- conditions for introducing the various strategies;
- merits and demerits of each strategy, based on country case studies;
- conditions for rebalancing tariffs and orienting prices towards costs.

invites

countries in the region, concerned organizations, donor countries and multilateral aid and financing agencies:

1) to cooperate with the BDT and APT in the above study as well as in the implementation of their respective projects;
2) to give due priority to investment in telecommunication development in developing countries in view of its importance as a tool for development of all other sectors;
3) to meet the needs of the region.

7 World Bank (IFC) Report, February 1994 (presented at WTDC-94)

A A $ 330 billion investment is needed to reach basic services:

Given the gap between the LDCs and the industrialized world, the investments are quantified at approximately $ 40 billion per year by LDCs for the next six years to build the basic telecommunication infrastructure. An additional $ 10-15 billion is required for the CIS Republics and central and eastern Europe.

The total investment required is estimated to be nearly $ 55 billion per year, therefore $ 330 billion for Basic[1] infrastructure (if to be achieved in six years).

B Private financing needs greatly increasing:

To reach $ 55 billion a year (or $ 330 billion over six years).

The flows of capital needed in the 1990's are drastically higher than the 1980's:

1980s: 65% of telecommunications investments were self-financed, 15% "official" sources (bilateral and multilateral credit and export development credits plus own government contributions), plus 20% from private sources (commercial banks and supplier-arranged loans for "credit-worthy" countries).

1990s: The actual needs have been recalculated as much higher. They will need to come from private sources. Then, the conditions (such as making operations more efficient) to attract private direct investment and access to domestic foreign capital markets:

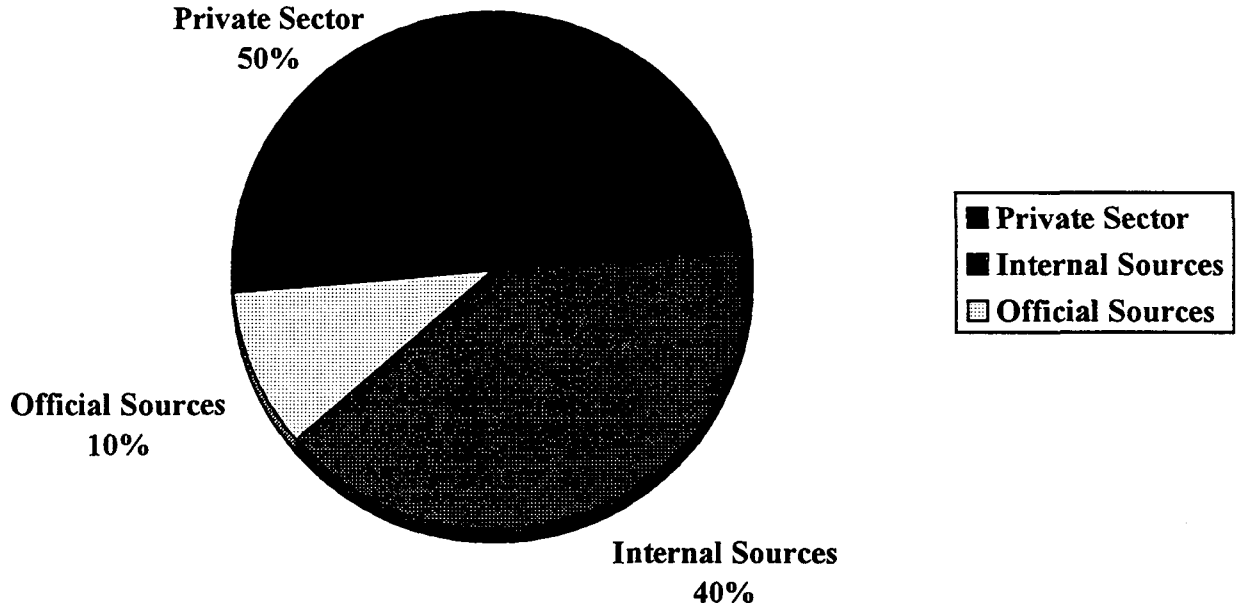
- self-financing could still reach 40% (from 65%);
- "official" sources could still reach 10%.

Although this would represent an increase in absolute value, the percentage from sources, other than from private sources, is decreasing. Private source funding will need to be used to further catalyze private investment and to increase performance.

---

[1] Not any reference to the penetration rate of the industrialized world.

The BDT is a catalyzer for all three sources in the 1990s:



III	**The financing programme consists of the activity line items (as follows)**	Region
1.6F	Develop documentation on existing national telecommunications financing policies and strategies and models (e.g. database, library, etc.).	GLOBAL
1.7F	Development of new models, formulae, guidelines and software in financing, financial forecasting, financial performance evaluation, economic pricing, cross-subsidies, etc. and bring results and feedback to the attention of policy-makers, managers and planners.	GLOBAL
1.8F	Conduct research analysis and studies on: the merits and demerits of various financing strategies (ODA, leasing, BOT, BLT, joint ventures, privatization, etc.) and bring results and feedback to the attention of policy-makers, managers and planners.	REGIONAL
1.9F	Conduct surveys on: - economic viability of investment projects in rural areas (Q.1/1) - economic and financial aspect of licensing; - economic and financing impact of GATs; - financial performance of telecom enterprises (under various status) and bring results and feedback to the attention of policy-makers, managers and planners.	REGIONAL
1.10F	Seminars/colloquia/workshops on telecom financing policy and strategies/economics.	REGIONAL

1.11F	Training of national policy-makers on the above issues.	REGIONAL
1.12F	Planned direct assistance to countries.	REGIONAL
1.13F	Other activities (seminars, workshops, etc.) as might be recommended by the Study Groups.	GLOBAL/ REGIONAL to be defined
1.14F	Direct coordination with Question 4/1 of Study Group 1, among others.	GLOBAL
1.15F	Follow-up of outcome of Finance Colloquia (RDTC Preparatory Meetings on Finance) and Regional Telecommunication Development Conferences related to finance.	AFR ARB for 1996

Actions include:

A Preparatory finance meetings for the regional development conferences:

1) the African Telecommunications Finance Colloquium (Abidjan, Côte d'Ivoire, 25-29 March 1996);

2) the Arab States Telecommunications Finance Colloquium (Amman, Jordan, 1-5 September 1996).

B Central Asian Countries Telecommunications Finance Colloquium (Autumn 1996).

IV Conclusion: financing programme plan of action in evolution

A The workplan document summarizes the activity line items and the actions elaborated on an annual level.

B Following, two page sets of documents - detail action individually and set quarterly, yearly and annual objectives to be summarized as at the end of the reporting period.

C The regions and all parties concerned are actively being engaged in the detailed planning process, using the bases of the programme, the activity lines, and actions.

D Within the framework of the programme, synergies are being achieved with projects (such as Resolutions 32 and 33) and partnerships with the private sector/financing institutions are being engaged.

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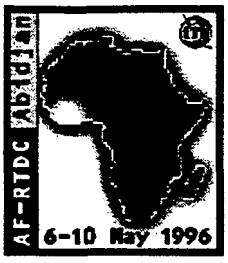

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 46-E
29 April 1996
Original: English

For Information/Support

Agenda item: 2.4

PLENARY MEETING

SOURCE: UNITED STATES

TITLE: LELAND INITIATIVE: AFRICA GII GATEWAY

EXECUTIVE SUMMARY

The developed world is currently witnessing a period of unprecedented advances in information technology innovation and information dissemination. These advances present unique opportunities and special challenges to Africa, where many nations lag behind their global neighbors in developing the information infrastructure to spur growth and to accommodate the demands of a world economy. The opportunity lies in African nations being able to take immediate advantage of the latest technology and leapfrog the usual evolutionary learning-curve. The challenge lies in doing so immediately to fully participate in the world economy and interact with global neighbors.

The goal of the Leland Initiative is to accelerate sustainable development efforts in African nations by enhancing their ability to access, produce, and use information as full and equal participants in the global community. The Initiative has three strategic objectives, structured to maximize impact and ensure continuity. These are to:

* create an enabling environment to facilitate electronic networking and access to Global Information Infrastructure technologies;
* ensure the availability of reliable, accessible, and cost-effective services for accessing information; and,
* increase broad-based utilization of information and global information technologies to enhance USAID sustainable development objectives.

The objectives reflect a three-pronged approach to fostering sustainable development which focuses on policy, supply, and demand conditions. Policy changes are needed to encourage the permanent provision of services. Sufficient human and physical resources must be in place to provide the services. In addition, the scope of demand needs to be broad enough to sustain service provision and to create a lasting development impact.

The strategy will be implemented first in just a few countries. Because the strategy will be demand-driven, country choices have been based on demand and on user needs. Because the strategy recognizes that technology transfer is only part of the solution, the Leland Initiative will also enable Africans to learn how to use new technical tools and how to employ them to take advantage of economic opportunity and come up with African solutions to African problems.

The Initiative will be implemented over four years at a cost of $3 to $4 million per year. Planned interventions will include support for policy and operations research, design and delivery of appropriate training, limited provision of telematics equipment, and experimentation with endowments, trust funds, grants, or loans to promote sustainability. USAID's Africa Bureau will play a lead role in the Initiative, working with the Global Bureau, African consumers, African governments, U.S. and African private firms, voluntary and non-governmental organizations, other donors, and other U.S. Government agencies.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 47A-E
29 April 1996
Original: English

For Action

Agenda items: 1.1, 2.1, 2.4, 3.1 **PLENARY MEETING**

SOURCE: UNITED STATES OF AMERICA

TITLE: CONTRIBUTION TO THE ITU AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE

EXECUTIVE SUMMARY

Let us build a global community in which the people of neighbouring countries view each other not as potential enemies, but as potential partners, as members of the same family in the vast, increasingly interconnected human family.

Al Gore, Vice President of the United States

Ronald Brown, Secretary of Commerce, 1993-1996

Global Information Infrastructure:
Agenda for Cooperation
February, 1995

The United States is pleased to participate in this ITU Regional Conference for the African Region. We wish to share with all nations of the region our experience on the many issues that all telecommunications administrations must face. Ultimately, we hope this can help lead to the successful development of all telecommunications systems in the Region.

CHAPTER 1

Strategies to promote telecommunications development

The following are the key principles the United States suggests may guide telecommunications policy reform in the African Region. The elements of this model are based upon the guiding

principles that have proved useful in evolving the telecommunications infrastructure over the past decade - the five basic principles of the Global Information Infrastructure:

- encouraging private investment;
- promoting competition;
- providing open access;
- creating a flexible regulatory environment; and
- ensuring universal service.

The United States recognizes that every country has special needs and circumstances. We offer the following observations on regulatory strategy as a way of synthesizing the experience of many countries.

1 Competition and universal service: Complementary principles

Telecommunications liberalization, competition, and privatization are key tools for a nation's progress and integration into the global economy. In our view, introducing competition and private investment provides the best means of spurring telecommunications development and attaining nationally defined universal service goals rapidly.

In the United States, we have found that competition both disciplines and stimulates innovation in technology, cost management, pricing, and marketing strategies. Between 1980 and 1993, concurrent with the break-up of the monopoly service provider, domestic long distance traffic more than doubled, while international long distance traffic quadrupled. This reflected the new uses that businesses found for competitively supplied and priced telecommunications services and equipment to lower production costs, speed the delivery of products to customers, and improve customer services. The corresponding decrease in prices resulted in a dramatic increase in carriers' revenues. In 1993, carriers revenues totaled US$ 112.6 billion, with net operating income of US$ 17.1 billion. This represented an increase of 90 per cent and 59 per cent, respectively, over 1980 figures.

But, equally important, we discovered that competition also advanced universal service. Between 1983 and 1993, for example, a period of intense competition in certain sectors in the U.S. telecommunications market, e.g., long distance services, the percentage of households with telephones in the United States increased from 91.4 per cent to 94.2 per cent as 14.6 million households were added to the nation's telephone system. During this period, local rates increased by 10 per cent, while long distance rates declined by nearly two thirds. Use of universal service mechanisms softened the impact of local rate increases, however, especially among those located in rural areas. Today we find that lower long distance rates boost social cohesion, as the modern economy requires increasing geographic mobility of our work forces. Less expensive long distance service is becoming as important to families and workers as it is to business, and the advent of the Internet offers new opportunities to let communications strengthen community institutions.

The telecommunications and information markets have become significant engines of economic growth in the United States. These industries account for almost US$ 1.00 out of every US$ 10.00 spent in the United States. The information marketplace, broadly defined, now constitutes about ten per cent of the U.S. domestic economy, and is expected to grow to twenty per cent in a decade. These businesses now support more than 3.6 million jobs in the United States.

The sweeping new telecommunications legislation signed by the President of the United States on 8 February 1996 will further stimulate competition and universal service in the United States. The Telecommunications Act of 1996, among other things, i) allows local telephone companies, long

distance companies, and cable companies to enter each other's businesses and compete against one another; ii) helps connect all classrooms, libraries, and hospitals to the information superhighway by the end of this decade; iii) will help families gain control of the programming that comes into their homes through television; and iv) reduces limits on television and radio ownership while preserving the diversity of voices and viewpoints that flourish in the United States. As a result of this new law, consumers will benefit from greater choice and lower prices, workers will gain from the new, high-wage jobs, and American entrepreneurs and businesses will benefit both here and abroad as new markets open up for their products and services. This legislation creates in the United States the most open and competitive telecommunications marketplace in the world.

Equally important, the new legislation reflects Congress' and the Clinton Administration's clear intent to protect, preserve and advance universal service for the benefit of all Americans, including those with low income, those living in rural communities, and those with disabilities. The ultimate objective of this portion of the new statute is to make available advanced telecommunications and information services to all regions in the United States. Not only does the law preserve the concepts of quality service at just, reasonable and affordable rates, it expands the U.S. definition of universal service to include advanced telecommunication and information services. Special provision is made for schools, healthcare facilities, and libraries to obtain access to advanced services at a discount rate. Telecommunication service providers must also assure that service is usable and accessible by those with disabilities, if 'readily achievable' as defined by statute. Recognizing that the definition of universal service will be evolving, the law directs the Federal Communications Commission to issue an initial definition of the services that will be financially supported by Federal universal service support mechanisms, and to revisit this definition periodically in the future taking into account the public interest and the current state of telecommunications.

The current, dynamic state of technological development and its advanced applications, represents a fundamentally changed global environment. The African region can participate in and reap the benefits of this revolution in a way that the United States in the early stages of its development could not have contemplated. It is possible, then, for this and other developing regions to design a telecommunications policy based on competitive principles from its very inception. These benefits can be very substantial even in countries with low population densities and income levels. The costs of installing wireline networks are often two to four times higher than they might be if competition existed to lower cost incentives. Competitive cellular and wireless services are also rapidly becoming the norm, not the exception, in South America and Asia. Wireless networks have build-out costs that may be fifty per cent less than for wireline networks, although costs to subscribers are somewhat higher than for wireline. There is a large unserved demand in Africa. Expanding both wireless and wireline networks is a key to advancing universal service.

Several African nations have officially declared their commitment to privatize their state-owned telecommunications services providers, including some which have proposed specific plans to liberalize their telecommunications sectors and institute legislative reform. The United States stands willing to lend support on technical and regulatory policy matters to nations which have embraced or taken steps to implement such initiatives.

2 Establish a timetable for introducing competition

We recommend that developing countries first consider establishing a defined time-frame for introducing full competition in telecommunications network, services, and equipment. To ensure that participants have the incentive to structure their operations in preparation for the change, we suggest that the date set be realistically near, such as within five years. We recommend that the

general terms of a future competitive regime be set out as soon as possible because long periods without competition weaken a carrier's incentives for efficiency.

3 Allow competition in wireless services

Second, irrespective of the timetable for general competition, we urge nations in the region to consider permitting immediate, extensive competition in wireless services. Given the mix of technologies and services that could be employed, and their potential to provide substantial network capacity relatively inexpensively, wireless solutions, particularly when coupled with existing wireline facilities, may well present the greatest potential for reaching a given nation's service goals rapidly.

Even if limited forms of monopoly for voice services over wireline networks must remain during an interim period before full competition, we recommend that competition for wireline voice services nonetheless be permitted to the maximum extent possible. Realistically, for a variety of reasons, state-owned firms are often unable to fully meet the existing demand for telecommunications services. Thus, we recommend that other network and service providers have the opportunity to help close this gap.

4 Permit resale

Permitting resale of network services is an effective prelude and complement to full competition. Resale can usher in competition by promoting more efficient use and management of communications networks, as well as growth of customer networks for particular applications. Moreover, resale can lower rates for small and medium-sized network customers.

5 Allow privatization

Privatization is very important. We believe the goal of privatization should be to enable the existing state-owned firms to function like commercial enterprises. The ability and incentive to function as a commercial entity should permit more effective financing, foster creative ways of carrying out mandated universal service obligations, and may result in partnering with other service providers in innovative ways. Privatization is compatible with commitments to workers' welfare.

6 Mandate interconnection

Without interconnection requirements, it will be impossible to achieve the benefits of competition. If one network supplier can use the facilities of another network on a cost-based basis, a given nation can benefit from many innovative approaches to developing networks without forcing each new entrant to establish a complete national network.

Incumbent carriers usually enjoy dominant status, and can effectively deny entry to new service providers if they enjoy market power with end users, substantial control over key inputs, (e.g., a monopoly on gateway switches for international traffic), or if they impose disproportionate costs on new entrants for interconnection rights. Our experience has shown that interconnection safeguards are necessary to protect against such abuses. We recommend that interconnection to the state-owned firm or dominant network operator be at transparent, nondiscriminatory, cost-based rates, and on terms and conditions that are reasonable and nondiscriminatory. We also recommend that the regulator require interconnection to be equal in type and quality to that provided to the dominant

public network operator for competitive services, and that interconnection be priced no higher than that provided to the dominant carrier. The dominant carrier should also be prevented from cross subsidizing competitive services with revenues from services in which it retains a monopoly or dominant position. Finally, because access to numbering resources is so important to the success of new infrastructure and service providers, we suggest that new entrants be provided with access to these resources on the same terms and conditions as the state-owned firms. All of these tasks require rulings and enforcement by a strong and independent regulator.

7 Lower prices for international services

International services that are priced efficiently and provided competitively will be critical to full participation in this information intensive economy. We recommend that low prices for international services be established as quickly as possible, that revenues from international services not be used to subsidize local services, and that international investment in new providers of advanced global services be permitted. In addition, we suggest that the accounting rates maintained with foreign correspondents be published.

8 Establish an Independent Regulatory Authority

An efficient and well-focused regulatory structure is critical to the success of telecommunications reform. In order to establish trust in the agency and stability in the policy process, the regulatory entity should be endowed with clear general objectives, adequate financial resources, and professional staff trained in regulatory policies and theory, with substantial discretion to make regulatory policy decisions. We also recommend that open administrative decision-making occur.

9 Participate in multilateral trade negotiations

Finally, in order to further attract international expertise and resources, we strongly recommend that countries in the African region participate in the trade processes of multilateral fora that are leading efforts at reform, e.g. the World Trade Organization's Negotiating Group on Basic Telecommunications (NGBT). Although the deadline for participating in the NGBT multilateral agreement passed on 30 April 1996, we encourage African countries to become full participants in future efforts by the WTO or similar groups. Pledging reform through this process will give participating countries the maximum benefit for those hard won initiatives through added credibility in international markets and with financial investors.

CHAPTER 2

Financing new infrastructure investment

The ideas and recommendations set forth in this submission only begin to address how telecommunications operators and policy makers can confront the monumental task of raising investment capital to expand telecommunications infrastructures.

Our analysis stems from the recognition that telecommunications infrastructure development is central to social and economic growth and development, including the creation of opportunities for investment for operators and investment institutions.

Our basic conclusions are that capital requirements over the next decade for telecommunications development are enormous for individual countries. Also, capital sources, both public and private, will become increasingly difficult to access as privatization in telecommunications and other sectors continue. This is particularly true as all forms of infrastructure development worldwide gain even higher priority. Telecommunications operations, whether in privatized or state-owned markets, will be forced to compete for scarce financial resources, and the success of these efforts will be due in large measure to the attractiveness of the operation to investors in terms of management effectiveness, operational efficiency and stability of the regulatory and business environment.

Recommendations

Each country will have to find its own solution to these various issues. Countries at different stages of development will require a different mix of policies and strategies. We believe that the following general steps could markedly enhance the attractiveness of telecommunications operations for both debt and equity financing for any country establishing these policies and strategies:

1 Sector structure

Separation of the telecommunications operation function from the policy-making, regulatory and oversight responsibilities of the government is essential to creating a more favorable investment climate by indicating to investors the willingness of the government to conduct its responsibilities in a fair and equitable manner.

2 Regulatory body

The regulatory function of the government should ensure transparency of decision making, so as to promote the confidence and the participation of the operators, investors and subscribers in the regulatory process, and thus encourage greater investment in the sector.

3 Regulatory framework

A regulatory framework that allows fair competition and reliance on market forces can attract domestic and foreign investment as well as new sources of expertise.

Liberalization and privatization efforts, as well as the promotion of a competitive marketplace, should be guided by the objectives of enhancing efficiency both within the government and in the business community, increasing accessibility to a variety of services, and improving the quality of those services.

Authorization of the competitive provision of terminal equipment, value-added services, and other services, particularly those based on new technologies, should be pursued to enhance investment and income opportunities.

Telecommunication earnings, especially by government-owned carriers, should be reinvested into the sector, rather than diverted into other sectors of the economy.

4 Pricing policies

Operating entities should be encouraged to set efficient prices for services and equipment offerings in order to attract investment in this sector.

Price reform, especially adoption of service tariff rates that are more closely aligned with actual costs, can generate more services traffic due to price efficiencies, thus producing additional sources of revenue as well as generating more communications alternatives for diverse parts of the domestic industrial sector, making these parts more competitive domestically and internationally.

Priority should be given to realignment of local service tariffs with international tariffs, and to the redress of the imbalance between local and long distance rates. Basing tariffs on factors such as national income levels instead of true costs can only lead to price distortions, thus discouraging investment opportunities.

As necessary, mechanisms may be developed to target subsidies to low income subscribers and high cost exchange areas to reduce the overall level of subsidy required to promote efficiency.

Accounting rates for international services should be cost-oriented and should take into consideration relevant cost trends. Each administration should apply these principles to all relations on a non-discriminatory basis, that is, the same rate should be available to each operator on the same terms and conditions.

Because the general costs of providing telecommunications capacity have decreased significantly, Administrations should seek to achieve accounting rates orientated towards costs in an expeditious manner, recognizing that lesser developed countries that need to make significant reductions in their accounting rates may need to do so over a period of one to five years. Failure to reduce rates may drive likely investors to more attractive markets.

5 Other measures to attract investment and financing

Liberalized foreign investment policies, such as lifting restrictions on foreign ownership, eliminating restrictions on repatriation of profits and on establishment requirements, and removing currency controls, are key to promoting the efficient development of the telecommunications infrastructure.

6 Sources of financing

Operating entities that seek financing alternatives should take into account the wide variety of bilateral and multilateral sources of funding, such as the donor agencies in developed countries, the IBRD, and the Asian Development Bank. Those countries with high levels of external debt should consider debt-for-equity swaps.

These principles are intended to stimulate discussion and focus attention on the need for a comprehensive strategy on how to finance the future telecommunications needs.

CHAPTER 3

Network harmonization

The emerging Global Information Infrastructure (GII) will depend upon the efficient integration of an increasingly broad range of products and related services. Without compatible systems countries cannot communicate. Without standardization international communication and even national communication is hindered. It is imperative that the private sector, governments, and international bodies make every effort to ensure that an effective, cooperative standardization process keeps pace with the rapid evolution of technologies.

Assuring continued participation in the expansion of the GII may also be bolstered by applying a variety of broad policy prescriptions in the context of a country's particular economic situation. These include encouraging private investment, promoting competition, providing open access, creating a flexible regulatory structure, and ensuring universal service.

A growing menu of technologies and services are able to advance the development of telecommunications. These include public digital telephone networks, VSAT networks, fibre optics, private land mobile radio, and basic exchange telecommunications radio service, international transmission systems, cellular telephony, universal personal telecommunications systems, private networks, cable, paging, protocol conversions, electronic mail, database access, toll-free services, store-and-forward fax, electronic data interchange, videoconferencing, and a host of satellite services. Application of the aforementioned principles to individual countries will facilitate the introduction of these new services.

With respect to global satellite services, however, the United States has identified several other factors that can help bring about the early introduction of these systems - and their efficient and economical operation - on a worldwide scale. These factors are:

1 **National sovereignty.** Each country has the right to regulate its telecommunications and to control access to and from its territory with respect to satellite systems. Each national authority must make decisions about licensing the services to be provided, the gateways, and the user terminals, including handsets.

2 **Market access.** There must be open access to the provision of space services, subject only to spectrum availability and other limited resource factors. There should be competition among space systems, and multiple service providers within each country in order to ensure lower costs and a broad choice of services for users. There should be a level playing field for all systems.

3 **A simple and predictable process.** Predictable and transparent regulation is essential for delivering early service to the public, and for helping to enhance a competitive environment.

4 **Global roaming.** Worldwide mobility is essential to achieving the full benefit of new technologies and services. A framework that provides for widespread acceptance of user terminals is necessary to provide for transborder roaming.

5 **Financial aspects.** Due to the major capital costs of making these new systems operational, global financing is a necessary feature of the new systems. It is equally important that national authorities encourage, and that regulators allow, multiple sources of funding for ground segment facilities - especially in those countries wishing to implement global satellite service at an early date.

Increasingly, effective radio frequency spectrum management is needed to address the combination of administrative, legal, economic, scientific, and engineering issues necessary to ensure the efficient and compatible operation of radiocommunications equipment and services. Every nation needs an identifiable spectrum management regulatory authority that has the necessary powers to issue licenses, develop policies, publish rules and regulations, negotiate and coordinate spectrum use with other nations, and engage in bilateral and multilateral treaty development.

The United States believes that Human Resource Management (HRM) is the point of departure for any country, developed or developing, which intends to build and manage a network. The most rudimentary as well as the most sophisticated infrastructures continue to function only through organized management. Proper education, training, and frequent exposure to new technologies and systems are the hallmarks of such management. The United States supports such beliefs with actions, including the U.S. Telecommunications Training Institute, the Regional Telecommunications Restructuring Programme, the Leland Initiative, and numerous industry-sponsored training efforts.

INTERNATIONAL TELECOMMUNICATION UNION
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AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Corrigendum 1 to
Document 47B-E
6 May 1996
Original: English only

For Information/Support

Agenda items: 1.1, 2.1, 2.4 and 3.1

PLENARY MEETING

SOURCE: UNITED STATES OF AMERICA

TITLE: CONTRIBUTION TO THE ITU AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE

Replace page 19 by the attached page.

dictate to the licensee the content of any program the licensee puts on the air. Section 326 of the 1934 Act strictly forbids the FCC from censoring programs broadcast or proposed for broadcast by licensees and from otherwise interfering with the right of free speech by means of radio communication. Under the First Amendment, a broad range of comment on politics and public affairs is protected, including political dissent and criticism of the performance of incumbent politicians.

Certain forms of speech are not protected, however, and may not legally be included in broadcast programming. Obscene language, disclosure of classified military information, identification of intelligence community agents operating covertly or of their methods of operation, and incitements to riot and other acts of civil disorder are illegal. Moreover, certain types of indecent language, though not illegal, may be broadcast only at certain times, i.e., between Midnight and six AM, when children are unlikely to be in the audience.

- Recent Developments

Recent developments of significance in the U.S. broadcasting industry fall into three main categories: (1) changes initiated by Congress in the Telecommunications Act of 1996; (2) actions taken by broadcast licensees themselves; and (3) proceedings initiated by the FCC.

The Telecommunications Act of 1996 eliminates the FCC's national cross-ownership cap for radio stations, and modifies the number of stations a single entity may own in a given market. The Act also increases the national audience reach for TV station ownership to 35% from 25%. The FCC will conduct a rulemaking to determine whether local TV ownership limitations should be modified or eliminated.

The Act eliminates the FCC's previous restrictions on network-cable cross ownership. Now, a single entity may own both a broadcast network and a cable system. It also repeals the statute that prevented a single entity from owning both a broadcast station and a cable system. It retains, however, the FCC rule that bans ownership of a broadcast station and a cable system in the same market. The Act does not alter the FCC rule prohibiting ownership of a broadcast station and a newspaper in the same community, however.

In response to the growing concern of Americans regarding violence and sex on television, the 1996 Act requires that all TV sets larger than 13 inches be equipped with a feature that would enable viewers, including parents or other persons, to block out programs that are rated violent, indecent, or which contain sexual material of a kind potentially harmful to children. This feature is not named or defined in the Act, but is commonly known as the "violence" or "V-Chip". The Act requires the FCC to set up an advisory committee to recommend a system for rating television programming if the private sector does not do so within one year from the date the 1996 Act was passed. Consequently, private sector broadcasters, on their own initiative, have begun to establish a rating system that will be administered by broadcasters themselves.

The FCC has taken action on its own to improve television programming for children. A rulemaking was initiated to define programming that, as stated in "The Children's Television Act of

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AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 47B-E
29 April 1996
Original: English only

For Information/Support

Agenda items: 1.1, 2.1, 2.4 and 3.1

PLENARY MEETING

SOURCE: UNITED STATES OF AMERICA

TITLE: CONTRIBUTION TO THE ITU AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE

Table of Contents

Introduction 6

CHAPTER 1

POLICY AND DEVELOPMENT STRATEGIES

1.1. Telecommunications and Progress 7

1.2. Telecommunications and Development 7

1.3. The U.S. Experience 8

a. Background and History of U.S. Telecommunications 8
- Introduction 8
- Overview 9
- U.S. Terminal Equipment Development 10
- Rural Telephony Development 11

b. Regulatory Philosophy 13

c. Regulatory Structure 15

d. Regulation and Domestic Competition 15

e. International Competition 16

f. Broadcasting 17
- Overview 17
- Background 18
- Recent Developments 19

1.4 Strategies to Promote Telecommunications Development 20

a. Overview 20

b. Recent Trends 22
- General 22
- Rural Areas 22
- U.S. Legislative Reform 25

c. Recommended Strategies 25
1. Establish a Timetable for Introducing Competition 26
2. Allow Competition in Wireless Services 26
3. Permit Resale 26
4. Allow Privatization 26
5. Mandate Interconnection 27
6. Lower Prices for International Services 27
7. Establish an Independent Regulatory Authority 27
8. Participate in Multilateral Trade Negotiations 28

CHAPTER 2

FINANCING TELECOMMUNICATIONS INFRASTRUCTURE DEVELOPMENT

2.1 Investment Considerations and Financing Strategies 29

2.2 The Extraordinary Demand for Capital for New Infrastructure 30

2.3 Options for Financing New Infrastructure Investment 31

a. Rationalizing the Telecommunications Operator's Relationship with the State 31

b. Steps to Increase the Efficiency of the internal Operations of the Telecommunications Operator 32

c. Price Reform: An Essential Step 33
- International Services 34
- Domestic Long Distance Services 35
- Developing a Targeted Scheme of Subsidies for Low-income Subscribers and High-cost Areas 36

d. Alternative Techniques for Attracting Private Sources of Investment Capital 36

e. Encouraging Increased Investment in the Telecommunications 37

f. Encouraging Effective Use of Multilateral, Regional, and National Sources of Financial Assistance 38
- Financing from Multilateral, Regional, and Other Public Sources 38
- Private Financing from International Capital Markets 39

g. Financing Rural Telecommunications Through Cooperatives and Independent Local Service Providers 39

h. Debt for Equity Swaps 41

2.4 Conclusion: Financing New Infrastructure Investment 41

2.5 Recommendations 41
1. Sector Structure 42
2. Regulatory Body 42
3. Regulatory Framework 42
4. Pricing Policies 42
5. Other Measures to Attract Investment and Financing 43
6. Sources of Financing 43

CHAPTER 3

DEVELOPMENT OF NETWORKS

3.1 Network Development 44

3.2 Interoperability is Key 44

3.3 Expanding and Managing the Infrastructure 46

3.4 Technologies and New Services for Development 46

a. Network Systems and the Network 47

1. The Internet and the Intranet 47
2. Public Digital Telephone Networks 47
   - VSAT Networks 47
   - Fiber Optic Backbone Network 48
   - Private Land Mobile Radio (PLMR) and Basic Exchange Telecommunications Radio Service (BETRS) 48
   - International Transmission Systems 48
   - Cellular 48
   - Universal Personal Telecommunications Systems 49
   - Private Networks 49
   - Cable 49
   - Paging 50
3. Network-Based, Value-added or Enhanced services 50
   - Protocol Conversion 50
   - Electronic Mail 50
   - Database Access 50
   - Toll-free Services 50
   - Store and Forward Fax 50
   - Electronic Data Interchange 51
   - Video Conferencing 51
4. Satellite Services from the Low Earth Orbits (LEOs) 51

3.5 Regulating Global Systems 51

1. National Sovereignty 51
2. Market Access 51
3. A Simple and Predictable Process 51
4. Global Roaming 51
5. Financial Aspects 51

3.6 Network Management Systems: A Network That Works 52
a. Network Management Systems 52
b. Intelligent Network 53

3.7 Spectrum Management 53

3.8 Human Resource Management 54

- USTTI 54
- Regional Telecommunications Restructuring (RTR) Program 54
- The Leland Initiative 54
- Industry Training Efforts 55
- Classroom/Instructor-Led 55
- Distance Learning 55
- Mentoring/On the Job Training 55

3.9 Observations • Recommendations 56

Introduction

Let us build a global community in which the people of neighboring countries view each other not as potential enemies, but as potential partners, as members of the same family in the vast, increasingly interconnected human family.

Al Gore, Vice President of the United States
Ronald Brown, Secretary of Commerce, 1993-1996
Global Information Infrastructure:
Agenda for Cooperation
February, 1995

Many governments have decided to change the structure of the telecommunications sector of the national economy in order to keep pace with the socio-economic and commercial-technological needs of their country. The dynamic reorganization of a sector as important as telecommunications deserves regional and global cooperation, and merits reflection, because telecommunications is crucial both as a service and revenue generating sector in its own right. It is also a support sector for all other parts of the national economy.

As a country whose philosophies, markets and opportunities rely upon optimally functioning regional and global systems, the United States is pleased to participate in the present ITU Regional Telecommunication Development Conference for the Africa. Perhaps the largest contribution that the United States can make is to share our extensive experience on the many issues facing all telecommunications administrations.

These experiences are elaborated upon more fully in the three chapters that follow. Ultimately, we hope this can help lead to the successful development of all telecommunications systems in the Region.

CHAPTER I

POLICY AND DEVELOPMENT STRATEGIES

1.1 Telecommunications and Progress

Telecommunications services are an important element of economic and social development. As more businesses become global and people more mobile, there are increasing demands for a variety of telecommunications services worldwide.

The world's current telecommunications infrastructure must be improved and expanded to meet increased demand. More importantly, failure to meet that demand jeopardizes not only telecommunications, but all other industry sectors that rely on communications as essential to investment and growth. Ultimately, how well a country or region succeeds in achieving economic, social, and political goals depends on improvement in its telecommunications infrastructure.

But the problem of how to improve telecommunications infrastructure is not easily solved. The capital needed for infrastructure development is enormous. Economic development grants or subsidized loans can provide seed money, but they are not sufficient to sustain needed development. Because of increasing demand, the bulk of the required capital will have to be raised from the private sector. The amount of capital available from the private sector, whether through debt or equity, is related to a country's willingness to move towards a market-based economy.

These forces -- the growing and diverse demands for telecommunications services worldwide; the linkage of modern communications infrastructure to a country's or region's broader economic, social and political goals; and competition among countries for capital that can only be met through support by the private sector -- have been widely recognized. Moreover, the commitment to preserve and improve universal service is also recognized as a leading priority as we enter the information age. In the midst of these forces, the critical question, we believe, is how to make a successful transition toward market-based, customer-focused, privately financed development. We recommend this course of action because the basic principles of marketplace forces and privately developed services can be managed to serve not only the interests of the investor, provider and user, but also, due to the synergies created, the broader interests of society. These interests can and should be shared across our national borders. There are marked economic and social benefits of diverse and lower-cost international telecommunications between countries. The economic benefits of international trade and international investment are stimulated by reducing the regulatory impediments and cost of entering and operating in a country. The social benefits accrue from encouraging the exchanges between people that ultimately contribute to international understanding and progress.

1.2 Telecommunications and Development

The U.S. telecommunications industry has experience with developing and deploying telecommunications facilities and services in a wide variety of geographic, economic, and demographic environments. For example, the United States has large rural and agricultural zones, remote arctic regions, and off-shore island areas, as well as highly concentrated industrial urban areas. During certain periods in U.S. history, varying methods to achieve telecommunications

development have been employed in the 50 states and at the federal level depending on political needs, technological applications, and the existing level of economic development. These approaches vary in circumstances ranging from highly urban to rural areas, from sparsely to densely populated environments, from conservative to liberal political philosophies, and from relatively simple to sophisticated enhanced (or value-added) services.

The trend in the Americas region is toward liberalizing telecommunications, with the goal of introducing competition while remaining attractive to foreign investment. Several countries in our region have taken steps to restructure their telecommunications sectors to encourage domestic and foreign private capital investment.[1] While countries have gone about it in different ways, the common thread of success in all cases is sustained political commitment to privatization and liberalization. The common challenge, however, seems to be to refine and support the regulatory structure of the industry.

An efficient and well-focused regulatory structure is critical to the success of telecommunications reforms. It is the regulatory agency that ultimately establishes regulations, works with carriers, assesses developments in the marketplace, and develops or modifies telecommunications services trends for the future. The regulator measures the behavior of all sector participants, to ensure continuous movement toward government policies and goals. Therefore, it is not sufficient to merely determine what is reserved for a monopoly, what is competitive, and to identify the social obligations to be met. From the outset, it is necessary to have a strong and effective regulatory entity that continually evaluates practices and calibrates policy as circumstances warrant.

1.3 The U.S. Experience

a. Background and History of U.S. Telecommunications

- Introduction

To place the most recent experience in the United States and the suggestions contained in this submission in context, it may be helpful to explore how the U.S. telecommunications industry developed in its early stages. Due to the current, dynamic state of technological development and its advanced applications, however, a fundamentally changed global environment now exists. The African region can participate in and reap the benefits of this revolution in a way that the United States in the early stages of its development could not have contemplated. It is possible, then, for

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[1]The cases of Chile and Mexico provide well-known, successful examples of liberalization policy in the Americas. For more information, see *Telecommunications Trends in the Americas*, International Telecommunication Union, Development Bureau, Report presented at the Americas Regional Telecommunication Policy Meeting, Montevideo, Uruguay Dec 5 - 8, 1995, Document 6-E. Additionally, Peru and Venezuela have committed to liberalizing these sectors in 1999 and 2000, respectively. Peru has partially privatized its state-owned monopoly and established a financially autonomous regulatory agency called the Organismo Superior de Inversion Privada en Telecomunicaciones (OSIPTEL). OSIPTEL has moved from overseeing a highly successful privatization campaign to developing an evenhanded and pro-competitive regulatory regime.

this and other developing regions to design a telecommunications policy based on competitive principles from its very inception. These benefits can be substantial even in countries with low population densities and income levels. The costs of installing wireline networks are often two to four times higher than they might be if competition existed to lower cost incentives. Competitive cellular and wireless services are also rapidly becoming the norm, not the exception, in South America and Asia. Wireless networks have build-out costs that may be fifty percent less than for wireline networks, although costs to subscribers are somewhat higher than for wireline. There is a large unserved demand in Africa. Expanding both wireless and wireline networks is a key to advancing universal service.

- Overview

The structure of the U.S. telecommunications industry has been set largely in the marketplace. On July 9, 1877, the Bell Telephone Company was formed. Its chief rival, Western Union, provided competitive services through its American Telephone Company subsidiary. In November 1879, Western Union abandoned the telephone business; Bell Telephone subsequently purchased Western Union's telephone network. With the departure of its major competitor, the Bell Telephone Company began to expand across the country and became a near-monopoly supplier of telephone services. In 1881, Bell Telephone extended its control by purchasing the Western Electric manufacturing company from Western Union.

The Bell System operated a virtual monopoly over telephone service until its patents expired in 1894. Subsequently, a proliferation of competitive systems provided duplicate levels of service in many communities, due in part to Bell Telephone's refusal to allow interconnection of competing systems with its network. Users, state public utility commissions, and the telephone companies began to press for consolidation to foster greater efficiency.

In 1910, American Telephone and Telegraph (AT&T) and its subsidiaries and affiliates combined to form the Bell System. They offered a range of telecommunications services, including research and development, equipment manufacturing and sales, local and long distance services, and international transmission services. Regulatory authority was exercised to control any adverse effects that a private monopoly supplier of services could cause. Under a 1913 Agreement with the U.S. Department of Justice, the new AT&T agreed to stop purchasing independent telephone companies, sold its interest in Western Union, and agreed to interconnect lines freely with any and all non-Bell companies requesting access to its network in return for the right to be the exclusive service provider. AT&T's vertical integration was subsequently sanctioned by the Graham-Willis Act of 1921.

Between 1949 and the early 1980's, a number of developments occurred that undermined AT&T's monopoly. The major factors were the technological and economic changes taking place in the marketplace, which, in turn, spurred regulatory change.

These factors led the Department of Justice to institute in 1974 the now well-known antitrust action against AT&T, its wholly owned manufacturing subsidiary (Western Electric) and its jointly owned research and development arm (Bell Laboratories). In its challenge to AT&T's de facto monopoly,

the government alleged that the company had illegally manipulated its dominant position in all three segments of the industry (telecommunication equipment, local exchange services, and long distance services) in order to monopolize the industry.[2]

The negotiated settlement of the suit, which included a modification of a 1956 Consent Decree against AT&T, resulted in a new Decree known as the "AT&T Consent Decree" ("Modified Final Judgment," or "MFJ"), announced in 1982 and implemented in 1984. The MFJ allowed AT&T to retain its nationwide and international communications network, its manufacturing and supply functions, and its research subsidiary, Bell Labs. The MFJ also restored AT&T's right to enter into unregulated non-common carrier activities, including data and information services, a right that AT&T had given up in the 1956 Consent Decree.

AT&T, however, was required to divest its local telephone operations, which comprised about three quarters of its assets. Under other provisions of the consent decree, AT&T was barred for seven years from providing "electronic publishing" services over its own transmission facilities. This prohibition has now expired.

The 22 divested Bell Operating Companies were consolidated to form seven regional holding companies (RBOCs or RHCs). These were prohibited from offering information services and interexchange services between local access transport areas (LATAs) In addition, they were barred from manufacturing telecommunications equipment, or with some limited exceptions from engaging in any activity other than local exchange services within the LATA, without the express permission of the court overseeing the MFJ. Recognizing that telecommunications was in a state of flux, the MFJ established a waiver procedure as well as a process for reevaluating the structure of the market triennially. Due to various changes in the Decree, the RBOCs were later permitted to provide information services and non-telecommunications services through a separate subsidiary.

- U.S. Terminal Equipment Development

One of the most significant developments in the early stages of the United States' telecommunications regulatory experience was the decision to open the terminal equipment market to competition. For most of the first eighty years of the U.S. telephone industry, the service tariffs filed by the telephone company, which had the force of law, bundled terminal equipment into the service offering. In 1956, that control was challenged by an appeals court ruling allowing the Hush-a-Phone company to sell an acoustic coupling device.

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[2]It is important to note that, except for the restrictions imposed on the regional bell operating companies (RBOCs) under the settlement of the antitrust suit, U.S. telecommunications law does not restrict the kinds of services a properly-licensed carrier may provide. In fact, as a result of legislation adopted in February 1996, all carriers including the RBOCs may provide local exchange and long distance services subject to certain conditions.

The principle of this decision was affirmed and expanded in 1968 when the FCC ruled that people have a right to use telephones in ways which are "privately beneficial without being publicly detrimental." This decision paved the way for the FCC Registration Program of 1977 which unbundled telephone terminal equipment from telephone service and eliminated the telephone company's control over the attachment of terminal equipment to the network. To satisfy the telephone company's legitimate concern over potential harm to the network, the Registration Program established technical criteria to preclude such harm, but sets no further restrictions on what can be sold or installed.

These developments have had a dramatic effect in stimulating the U.S. market for terminal equipment. Consumers, having been given a choice in terminal equipment, have spurred manufacturers to accelerate innovation while also keeping prices in line. Consumers now have choices in advanced technologies in PBXs, key systems, faxes, mobile communications, data communications, and voice processing. Most of these technologies would have developed eventually but at a much slower pace, were it not for competition in the terminal equipment market.

The deregulation of the terminal equipment marketplace in the U.S. has been an overwhelming success, and has assisted in developing an advanced telecommunications infrastructure. Furthermore, it has dramatically lowered price, and given business and consumers the freedom to choose the technologies that make the most economic sense, thereby ultimately assisting in the long term competitiveness of the domestic industry. It has also stimulated a huge and growing terminal equipment market, and a robust industry producing the equipment.

- Rural Telephony Development

Rural telephony in the United States owes its current state of development and high penetration (94 percent of rural households have telephone service (1995); 96 percent of U.S. farms have telephone service) to a combination of subsidies built into the pricing system of all telephone companies, the organization of cooperatives, and vigorous government technical support, leadership, and financing.

Certain aspects of the U.S. experience in rural telephone development can be useful, particularly how technical advice and coordination can allow countries to use multiple small carriers to build out rural networks quickly. The experience of Finland is instructive in this respect. Experience has also taught us that heavy reliance upon subsidies can be expensive and inefficient. Moreover, there are other ways to achieve development in rural areas. Peru, for example, recently issued a competitive tender offer to provide telecommunications service in all its rural areas. While this course of action may not eliminate the need for subsidies altogether, it is more likely that subsidies that follow competitive provision of service will tend to be more competitively efficient. Fundamentally, we suggest that a country uses competition to expand the network under the cost disciplines created by competition to achieve universal service. For one, there is a substantial level of unmet demand in African countries that is not sensitive to price. Meeting this demand quickly would expand service and boost the local economy. For another, using competitive incentives to lower costs in building and using the network lowers the cost of service even without subsidies (and lowers the level of necessary subsidies). Finally, competition itself can lead to more innovative uses of universal service funds, as the Peruvian undertaking suggests. Against this background, and with this caveat, we discuss the history of rural telephony.

The growth of telephony in the United States parallels the history of introduction of electricity to rural areas of the country. In the mid 1930's, only about 11 percent of U.S. farms had electric service. Most utilities served high population areas because they were considered more profitable.

To extend access to the national infrastructure, the Rural Electrification Administration (REA) was established by Executive Order in 1935. Its mission was to develop a program that would extend electricity to rural areas.[3] Initially established as part of an unemployment relief program, the REA became part of the U.S. Department of Agriculture in 1939. REA managed a loan program that provided funds for rural electrification at low interest rates (an initial 2 percent fixed rate mandated by Congress).[4]

After being confined to cities during its first two decades of existence, telephony proliferated in rural America following the release of the Bell patents in 1894. Independent companies sprouted throughout rural America. Farmers developed their own systems on a cooperative basis. By 1927, there were some 60,000 telephone companies in the United States, most of them with incomes of less than $5,000 per year. In many instances, the services were provided by very small ("Mom and Pop") operations, where the operator, in addition to providing connectivity, also provided message services, weather forecast reports, and news reports.

The state of rural telephony reflected that of rural electricity in that utilities were reluctant to invest in sparsely populated areas, mainly because a telephone network in a low customer density area was more costly to support and maintain than in a city or densely populated area. Thus, a similar solution to that of rural electrification was devised. In 1949, the Rural Electrification Act was amended to authorize the REA to lend funds for telephony. Subsequent amendments to the Act raised the interest rates, established a revolving fund as a source for loans, and authorized REA to guarantee loans made by commercial lenders. In 1971, the Rural Telephone Bank was established as a supplemental source of financing for rural telephone systems.

In designing a development approach for rural telephony, the REA telephone program took advantage of the electrification program's experience and staff. The agency sought common ground among the diverse companies in order to establish overall guidelines. This resulted in a series of steps as pivotal to the success of the program as was the availability of low interest financing:

> Borrowers' service territories were considered as a whole, and a standard rate for the lowest grade of service was offered in place of mileage charges.

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[3]The program was successful in improving penetration of rural electrical service:

Year	Percent of Farms with Electric Service
1935	11.6%
1953	90.8%
1990	98.8%

[4]Today carriers borrow at rates that are slightly below the market rate.

The agency established an eight-party line service minimum standard. Many of the systems, too small to handle the changeover to dial operations, merged with other systems of similar size to form cooperatives and commercial entities to gain economies and efficiencies of size.

A Telephone Operations Manual was developed (with assistance from the Bell System) and distributed to all borrowers. This proved to be a critical step in standardizing service and interconnection between systems.

An engineering methods and construction standards manual was introduced.

Materials and Central Office Equipment standards were published.

The agency worked closely with manufacturers and borrowers to improve equipment performance.

Organizational assistance was provided to help rural customers establish cooperatives or companies to qualify for REA loans.

Loan applications required market and legal survey of target service areas.[5]

In 1994, REA's name was changed to the Rural Utilities Service ("RUS"). The RUS has brought progressive change to many aspects of rural electrification in the United States.

Rural telephony in the United States has had an interesting and successful developmental mix, as pricing subsidies, cooperatives, and governmental financial and leadership support coalesced toward a common goal of bringing telephony infrastructure to the rural areas of the country.

b. Regulatory Philosophy

The United States' overall regulatory philosophy is built on the principles and traditions of a 200+ year democracy, including: 1) the right to free speech and self-determination; 2) the right to own property, with a tradition of private enterprise; 3) the duty to share national resources, including the radio spectrum; 4) diversity of views, and the belief that the public knows best what it wants; 5) that government should regulate in those limited instances where the market cannot; 6) that government belongs to the people; and 7) U.S. citizens are responsible members of the world community.

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[5]As in the case of the electrification program, the REA telephone program has been very successful.

Year	Percent of Farms with Telephone Service
1940	25%
1949	36%
1953	45%
1990	96%

The U.S.' general approach to telecommunications regulation is based on four corollary tenets: 1) reliance on private sector companies to provide telecommunications services to the public; 2) open entry policies;[6] 3) removing government regulation where feasible and letting market and technological forces determine industry structure, while retaining regulation necessary to safeguard the public interest in reliable, reasonably priced, nationwide, and world-wide telecommunications services; and 4) adapting the scope of regulation to the economic and technological circumstances of each telecommunications service.

Historically, the United States has adopted a telecommunications policy that emphasizes free and open competition wherever economically feasible. In this context, the United States uses regulation to achieve an environment where the market controls competitive services once it has the sophistication to do so. Where competitive forces in the telecommunications industry are too weak to prevent either anticompetitive behavior or high service rates, the regulatory arm of the government intervenes to protect the interests of the telecommunications user, and of other market participants. Ultimately the goal is to direct the market into a position where market forces become sufficient to substitute for regulatory control. Regulation is primarily focused on ensuring that carriers with market power do not abuse their dominant position, This promotes competition as the best way of helping U.S. telecommunications users. When regulation is necessary the U.S. approach emphasizes tools that do not distort market efficiency. This is one reason why the United States changed from rate of return to price cap regulation for AT&T's long distance service in 1989, and for the largest local exchange carriers in 1991.

This regulatory approach is particularly helpful where there are a variety of technical approaches and where technical solutions are changing rapidly. This permits more experimentation and lets the end-user, through market forces, make the choices.

Finally, over the past decade, the five basic principles of the Global Information Infrastructure (GII) have guided the evolution of U.S. telecommunications infrastructure. These principles are:

- encouraging private investment
- promoting competition
- providing open access
- creating a flexible regulatory environment; and
- ensuring universal service.

The progress and success of the telecommunications sector, discussed more fully in Section 1.4 of this contribution, suggests the efficacy of U.S. telecommunications policy and encourages consideration by countries seeking to attain similar benefits.

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[6]Initially, entry was limited to radio-based private networks and customer premises equipment.

c. Regulatory Structure

Each country's approach to regulation in the telecommunications sector draws upon its own unique history and traditions. It is not our intention to suggest that the approach to telecommunications taken in the United States is perfect or directly transferable. Many of the features are the result of governmental structures unique to the federal system of governance in the United States. With the understanding that some attributes are contextual, the U.S. experience provides, however, instructive guidance for establishing telecommunications development policies and strategies, adapted to the particular circumstances of each country.

The United States' telecommunications regulatory structure includes both federal (national) and local state (provincial) regulatory bodies. The federal authorities have plenary jurisdiction over use of the radio spectrum and have the power to preempt local regulation, where necessary, to implement national policies. This system permits local and national interests to be reconciled, and allows the efficiencies associated with decentralization where appropriate.

Telecommunications regulation (whether federal or local) involves the legislative, executive, and judicial branches of government. At the federal level, a hallmark of the system is an agency, the Federal Communications Commission ("FCC"), that is separate and independent from executive branch departments (ministries) and that operates in quasi-legislative and quasi-judicial modes. The FCC operates pursuant to published procedures, issuing written decisions, with a high level of public participation in the decision-making process.

d. Regulation and Domestic Competition

In practice, the FCC regulates interexchange common carriers (IXCs) on a "streamlined" basis, and applies what is known as the "competitive carrier policy." Under this policy, carriers are classified as either "dominant" or "non-dominant."

A dominant carrier is one that has market power, i.e., the power to control prices.

A firm can obtain market power as a result of its status as the monopoly service provider or supplier, or because it controls a substantial share of the market, or controls important inputs in the market. Within the United States, the only U.S.-owned telephone carriers classified as dominant are the seven Bell local exchange carriers, GTE Hawaii, and COMSAT (due to its exclusive position under the Communications Satellite Act). Dominant carriers are regulated under Title II of the Communications Act. Among other things, they are required to file tariff schedules, justify their rates, and obtain authorization to acquire new facilities. In addition, as discussed more fully in Section 1.4, interconnection safeguards necessary to check anticompetitive behavior by dominant carriers have been imposed.

In general, the United States takes the position that "non-dominant" carriers should be regulated less rigidly than "dominant" carriers because they do not hold a market position that would permit them to control prices. Similarly, carriers that depend upon others to transport their services (i.e., "non-facilities-based" carriers providing value-added services), do not present a threat of control over the market, and may be regulated less rigidly than those service providers who control the transport path or "highway." Accordingly, virtually no regulation is required for these carriers.

All carriers, both dominant and non-dominant, are required to charge reasonable rates, and refrain from undue discrimination in supplying services to customers.[7]

With regard to services, the FCC has created two categories: "basic" and "enhanced." The competitive carrier policy does not apply to enhanced services. In its 1980 Computer II decision, the FCC declared that enhanced services need not be subject to regulation. Consequently, enhanced interstate services are not regulated by the FCC, except to ensure that the Bell Operating Companies offer access to the local loop to competitive providers of enhanced services on terms equal to those they provide themselves.

e. International Competition

Like the United States, Africa's economic future is part of a new world economy built on information networks for production, distribution, and sales. We know from the experience of countries with successful development strategies that intense involvement in international commerce is essential to achieving high growth rates. Efficiently priced international services that are provided competitively will be critical to full participation in this information intensive economy. Moreover, doing so will help advance overall development, and will open opportunities for more efficient regional economic relationships.

The variety of technologies available for international telecommunications is increasing while costs are declining. These include terrestrial wireline (including fiber optic and other cables), submarine cables, satellite, and radio facilities. There are also mobile and fixed communications solutions. Indeed, significant debates arise over which solution is "best" in various applications. What is clear is that technological changes have significantly increased capacity and reduced unit costs for all media. This technological environment makes it even more beneficial to have multiple providers so that a variety of viewpoints will be brought to bear in selecting the best technical approach.

For international telecommunications facilities and services, the United States pursues the same general philosophy it applies to domestic telecommunications. Of course, implementation of this philosophy accommodates multilateral and bilateral international agreements that include the views and philosophies of the other signatories.

The United States is a party to many multilateral arrangements. For example, within the ITU the United States has worked to lessen restrictions on international traffic. The International Telecommunications Regulations (Melbourne, 1988) preserve the ability of countries to pursue liberalized arrangements. The ITU-T (formerly CCITT) Recommendation on Leased Lines eliminates restrictions on resale and shared use, while preserving the primacy of national law. The United States worked toward and supported approval of both of these instruments.

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[7] In 1992, the FCC reexamined the foreign-ownership basis and changed the criteria for dominance. Currently, the test is not based on foreign ownership per se, but rather on the ability of a U.S. international carrier that is affiliated with a foreign-owned entity to exercise bottleneck control in the overseas destination market and thereby discriminate against U.S.-owned carriers. (See In the Matter of Regulation of International Common Carrier Services, 7 FCC Rcd 733 (1992).

Similarly, within the Organization of American States, Inter-American Telecommunications Commission (OAS/CITEL), the United States has been a strong advocate for telecommunications liberalization and privatization within and between the countries of the Americas. The United States has also worked towards restructure of the CITEL itself in order to enhance the accomplishment of these goals.

Giving due regard to the legitimate concerns of other nations, the United States has applied its domestic regulatory policies to international telecommunications wherever feasible. These policies include:

a) encouraging direct, complete competition on both ends of an international circuit.

b) seeking to reduce high, above-cost accounting rates for international services;

c) encouraging reductions in the U.S. collection rates, directly and through the use of market forces;

d) seeking to remove limits on the resale and shared use of services;

e) licensing multiple facilities-based providers using both submarine cable and satellite facilities;

f) encouraging, through lessening or eliminating regulation, enhanced (value-added) services and according enhanced service providers the status of Recognized Operating Agency (ROA) where such status is requested; and

g) varying the level of regulation of U.S. international providers based their market power.

These policies are similar to those employed in regulating U.S. domestic telecommunications providers. The differences reflect international market factors and the fact that there is shared regulatory responsibility for international telecommunications. This philosophy has served U.S. companies and their telecommunications trading partners well, as facilities and services proliferate and unit costs for traffic fall.

f. Broadcasting

- Overview

Historically, most governments have separated the regulation of broadcasting from telecommunications. As multimedia technologies develop and converge, however, nations must face the dilemma of how to accommodate disparate interests. They must learn to accommodate political, economic, and social interests as well as incumbent carriers and broadcasters.

Nations have witnessed the growth of state-owned terrestrial broadcast systems that formerly provided relatively limited services. Technological innovation complemented by international regulatory change over the past two decades has transformed many nationally dominated broadcasting environments. Today, television and radio services are available to consumers in many countries through distribution systems that include terrestrial broadcasting, cable systems, multichannel multipoint distribution systems, and direct broadcast satellite services. Among these

distribution systems, satellite transmission systems have greatly facilitated the transmission of television, cable, and to a lesser extent, radio programming.

Many of the countries in the process of restructuring their mass media are moving toward mixed broadcast environments, in which state-owned broadcasters coexist with private broadcasters. Other countries are completely privatizing their mass media industries or awarding more concessions to commercial television and radio networks. Where privatization is occurring, it is generally creating new business opportunities for both domestic and foreign television and some radio program providers, and thus, expanding the viewing and listening choices of consumers. Although this new environment has generally led to more competition and less regulation on a global basis, it has also created problems of enforcing intellectual property rights, and caused some governments to pursue restrictive policies based on cultural and economic arguments.

- Background

The 1934 Communications Act gave the FCC jurisdiction over all interstate and foreign communications by wire and radio, including telecommunications services generally. Consequently, this law established the power of the FCC to regulate telegraph, telephone and broadcast services.

Television, radio, and cable, much like the telecommunications industry, have developed in a commercial environment. Compared to other parts of the world where broadcasting is typically national, state-financed, and less sensitive to audience preferences, broadcasting in the United States is primarily commercial, privately owned, and audience driven.

In its early stages, regulation of broadcasting involved allocating radio frequency spectrum for broadcast services; assigning stations in each service within allocated frequency bands, with specific location, frequency, and power; and regulating existing stations to ensure that they complied with a variety of technical, financial, and other requirements imposed by the Commission.

The relative uniqueness of the U.S. broadcast system can be explained by concerns for the rights of free speech and expression contained in the First Amendment of the U.S. Constitution. Moreover, a policy supporting localism (locally-owned and operated broadcast outlets) was established to ensure that as many communities as possible could benefit from the advantages made possible by local broadcast stations. Under this policy, each local broadcaster has a duty to serve the needs and interests of the community it is licensed to serve. Typically, this is accomplished by broadcasting news and public affairs programming which address events and issues of interest to the members of that community

The First Amendment is also a source of fundamental values guiding the FCC. This amendment protects a broadcast licensee's right to select and broadcast programs without guidance or permission from the government. Thus, neither the FCC nor any other government agency may

dictate to the licensee the content of any program the licensee puts on the air. Section 326 of the 1934 Act strictly forbids the FCC from censoring programs broadcast or proposed for broadcast by licensees and from otherwise interfering with the right of free speech by means of radio communication. Under the First Amendment, a broad range of comment on politics and public affairs is protected, including political dissent and criticism of the performance of incumbent politicians.

Certain forms of speech are not protected, however, and may not legally be included in broadcast programming. Obscene language, racially offensive material, disclosure of classified military information, identification of intelligence community agents operating covertly or of their methods of operation, and incitements to riot and other acts of civil disorder are illegal. Moreover, certain types of indecent language, though not illegal, may be broadcast only at certain times, i.e., between Midnight and six AM, when children are unlikely to be in the audience.

- Recent Developments

Recent developments of significance in the U.S. broadcasting industry fall into three main categories: (1) changes initiated by Congress in the Telecommunications Act of 1996; (2) actions taken by broadcast licensees themselves; and (3) proceedings initiated by the FCC.

The Telecommunications Act of 1996 eliminates the FCC's national cross-ownership cap for radio stations, and modifies the number of stations a single entity may own in a given market. The Act also increases the national audience reach for TV station ownership to 35% from 25%. The FCC will conduct a rulemaking to determine whether local TV ownership limitations should be modified or eliminated.

The Act eliminates the FCC's previous restrictions on network-cable cross ownership. Now, a single entity may own both a broadcast network and a cable system. It also repeals the statute that prevented a single entity from owning both a broadcast station and a cable system. It retains, however, the FCC rule that bans ownership of a broadcast station and a cable system in the same market. The Act does not alter the FCC rule prohibiting ownership of a broadcast station and a newspaper in the same community, however.

In response to the growing concern of Americans regarding violence and sex on television, the 1996 Act requires that all TV sets larger than 13 inches be equipped with a feature that would enable viewers, including parents or other persons, to block out programs that are rated violent, indecent, or which contain sexual material of a kind potentially harmful to children. This feature is not named or defined in the Act, but is commonly known as the "violence" or "V-Chip." The Act requires the FCC to set up an advisory committee to recommend a system for rating television programming if the private sector does not do so within one year from the date the 1996 Act was passed. Consequently, private sector broadcasters, on their own initiative, have begun to establish a rating system that will be administered by broadcasters themselves.

The FCC has taken action on its own to improve television programming for children. A rulemaking was initiated to define programming that, as stated in "The Children's Television Act of

1990, is "specifically designed" to meet children's needs. The Commission has also undertaken a rulemaking proposing that television stations broadcast a minimally acceptable number of hours of children's programming. At this writing, no official action has been taken on this issue.

1.4 Strategies to Promote Telecommunications Development

a. Overview

Telecommunications liberalization, privatization, and competition, are key tools for a nation's progress and integration into the global economy.

Liberalization is a policy shift that allows increased private participation in the telecommunications sector in an environment where a state-owned monopoly had previously existed. Since an open regulatory process is key to the success of this policy, liberalization is increasingly characterized by a separation of the government's regulatory and oversight functions from the telecommunications company's operating functions. Transparency of a government's actions permits input and review of regulatory decisions by the public, encourages increased participation by both providers and customers, results in a greater focus on demand factors, and offers increased flexibility to meet customer and market needs.

Privatization is the total or partial transfer (usually via a sale) of state ownership in a telecommunications operating company or manufacturer. Privatization may or may not involve transfer of control, and can be accomplished in a number of ways: 1) single auction; 2) gradual sale; or 3) offering shares on public exchanges. Each of these methods has been used successfully in the Americas region, in the Asia and the Pacific region, and in Western Europe. The choice depends on the socio-economic factors within the country and the goals of the national government.

Privatization is not, however, a solution in itself; rather, it is one objective. The actual transfer of ownership is only the beginning of a complex process. Industry structures that determine when and how private ownership and competitive entry may be best introduced should be continually adjusted and refined through the regulatory process. On the other hand, failure of the regulatory process may limit the success of privatization.

Following privatization, the trend has been that the market contains a mixture of monopolistic and competitive elements for some period. In the mixed markets that follow privatization, regulatory issues are most complex. Questions of cost accounting, price structures, technical interconnection standards, subsidies for universal service, rights of users to access network facilities, and relationships to the international marketplace require sophisticated solutions. All of these issues place a great burden on the regulatory process.

Competition occurs when the regulatory environment allows more than one telecommunications service or equipment provider to compete for the same users. It is usually characterized by the number of providers active in the market place or the number of licenses permitted.[8] In the United States, the range of licensing varies, from two providers in the case of cellular franchise areas, to

[8]The number of licenses permitted may be determined by technology or resources.

over 500 providers of interstate long distance services, to unlimited numbers of providers of public telephony, resellers, certain equipment providers and others.

Neither liberalization nor privatization necessarily ensures or results in competition, nor even in competitors. Competition must be fostered by a regulatory structure that minimizes regulation, thereby allowing market forces to become the key decision-making criteria.[9] This approach will result in increased consumer demand for a variety of offerings at the lowest possible price.

In our view, introducing competition and private investment provides the best means of spurring telecommunications development and attaining nationally defined universal service goals rapidly. Competitive provision of services can accelerate the development of sophisticated networks and attract investment. In virtually all countries with emerging economies, restructuring of the telecommunications sector involves some aspect of competition. It is important, however, to recognize the difference between merely authorizing competitors and actually designing a regulatory infrastructure that permits competition.

In the United States, we have found that competition both disciplines and stimulates innovation in technology, cost management, pricing, and marketing strategies. Between 1980 and 1993, concurrent with the break-up of the monopoly service provider, domestic long distance traffic more than doubled, while international long distance traffic quadrupled. This reflected the new uses that businesses found for competitively supplied and priced telecommunications services and equipment to lower production costs, speed the delivery of products to customers, and improve customer services. The corresponding decrease in prices resulted in a dramatic increase in carriers' revenues. In 1993, carriers revenues totaled $112.6 billion, with net operating income of $17.1 billion. This represented an increase of 90 percent and 59 percent, respectively, over 1980 figures.

But, equally important, we discovered that competition also advanced universal service. Between 1983 and 1993, for example, a period of intense competition in certain sectors in the U.S. telecommunications market, e.g., long distance services, the percentage of households with telephones in the United States increased from 91.4 percent to 94.2 percent as 14.6 million households were added to the nation's telephone system. During this period, local rates increased by 10 percent, while long distance rates declined by nearly two thirds. Use of universal service mechanisms softened the impact of local rate increases, however, especially among those located in rural areas. Today we find that lower long distance rates boost social cohesion, as the modern economy requires increasing geographic mobility of our work forces. Less expensive long distance service is becoming as important to families and workers as it is to business, and the advent of the Internet offers new opportunities to let communications strengthen community institutions.

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[9]To this end, the regulatory entity should be endowed with clear general objectives, adequate financial resources, and professional staff trained in regulatory policies and theory, with substantial discretion to make regulatory policy decisions. Moreover, in order to establish trust in the agency and stability in the policy process, open administrative decision-making should occur.

b. Recent Trends

• General

The telecommunications and information markets have become significant engines of economic growth in the United States. These industries account for almost $1.00 out of every $10.00 spent in the United States. The information marketplace, broadly defined, now constitutes about ten percent of the U.S. domestic economy, and is expected to grow to twenty percent in a decade. These businesses now support more than 3.6 million jobs in the United States.

In 1993, Congress passed legislation giving the Federal Communications Commission (FCC) authority to conduct spectrum auctions in cases of mutual exclusivity. The Commission's use of spectrum auctions for domestic wireless services has promoted economic and spectrum efficiency, increased the speed of licensing and competition, and raised revenue for the public. As of April 1996, the FCC raised $20 billion for the national treasury in total auction revenues.

The United States currently permits two cellular carriers to operate in each market. One of the systems in each market is operated by the local telephone company, and the other is operated by an independent provider. The FCC is currently in the process of licensing up to seven new personal communications service (PCS) providers to compete with the existing cellular carriers in these markets. Since 1994, the FCC has awarded 139 licenses for personal communications services, and 2 broadcast and 549 licenses for interactive video and data services.

Auctions coupled with resale rights and the increasing competition in domestic wireless services have made possible a larger and more diverse set of suppliers than anyone imagined. Prices for these services are declining and network investment and build-out are increasing. Consequently, a wider range of competitive choice now exists for U.S. consumers and businesses, and more infrastructure for rural areas is being made available.

• Rural Areas

There are approximately 1,200 small, independently-owned, rural telephone companies in the United States. Groups of these companies have organized into 260 cooperatives. Most of the cooperatives are owned by their members, i.e. the people to whom they provide service. In a smaller, separate group of cooperatives, the companies are owned by commercial companies, each of which is usually owned by one family.

In 1949, only 60% of rural households had phone service, and the majority of those users lived on farms or ranches, By 1995, 94% of rural households had phone service; the majority of these users now live in small towns.

In recent years, telephone companies in rural areas have made progress in providing rural areas with modern, efficient telecommunications services. As of late 1995 for example, more than 200

rural telephone companies were providing Internet access to their communities, the majority charging local service rates.

The availability of modern, efficient telecommunications services makes location of new businesses in rural areas a viable and desirable alternative. By creating or keeping jobs in places other than large cities, rural telecommunications services reduce rural to urban migration pressures.

In the past, small businesses in remote locations were able to thrive on the local economy and did not need much contact with the urban world. Increasingly, however, small and medium businesses require high quality telecommunications, e.g., voice, facsimile, data, and video. Their survival and growth are now supported by modern and efficient telecommunications, and by access to the global network, which supports the general economic development of the remote areas served. Inexpensive long distance service, flexible 800 service, and flexible private networks are the technological tools that permit this to thrive. In addition to playing a primary role in business location decisions, modern telecommunications infrastructures also have a significant impact on other factors that attract jobs and businesses, and thus people, to remote areas.[10]

While advanced technology can allow businesses to be located in rural or remote areas, it can also permit employees of businesses located in urban areas to work in less congested, more remote areas. In a growing number of instances in the United States, telecommuting is providing the best of both worlds for these employees. Telecommuting, a generic term coined some twenty years ago, allows an employee to work at an alternative site one or more days each week instead of at the corporate or agency office. High technology computers and telephone systems are used to connect the employee with supervisors and clients. While most people who telecommute -- "telecommuters" -- work from home offices, more and more are using telecommuting centers.[11] According to one source, some 8 million Americans link up to the office from home now,[12] and

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[10]Calling an 800 number, e.g., to make a hotel reservation, most likely connects callers today to Nebraska, the 800 service center of the United States. Additionally, South Dakota is home to "Gateway Computers," a company totally reliant on telemarketing.

[11] Telecommuting centers typically provide services and equipment that enable workers to engage in a full range of duties. These include: computer workstations with modems, network and computer technical support, telephone, fax, voice mail, copying service, and UPS and FED-EX delivery services. Some of the Telecommuting centers located in the United States include: Ventura County, California, Oklahoma City, Oklahoma, Winchester, Virginia, Waldorf, Maryland, Antelope Valley, California, and Hagerstown, Maryland.

[12] See, *Making Telecommuting Happen,* Jack Niles, 1994, Van Nostrand Reinhold.

that number is growing by some 20 percent a year according to New York City market researchers IDC/Link Resources.[13]

In education, telecommunications-based information services reduce the negative effects of distance on rural schools by providing access to databases, electronic libraries, instructional software, and a broad range of courses and teachers from other educational institutions in the region and nationwide through interactive video. Such applications may prove illustrative for countries in the African region where the rural population is substantial.

The chronic lack of health services in rural areas can also be relieved by improved telecommunications. Health care can now be delivered to rural areas and work locations using new telecommunications offerings, such as remote X-ray or remote electro-cardiogram (EKG) analysis and other diagnostics. In the United States, telemedicine projects are creating unions among large hospitals, major universities with medical research centers, and small and rural telephone companies. As a result, areas with low incomes, a lack of capital resources, smaller patient bases, and a lower rate of health insurance are beginning to receive better care. Telemedicine facilitates quicken consultation, pinpointing a medical condition before it worsens. Telemedicine also allows a patient's medical records to be transcribed by e-mail or fax, allowing diagnosis and treatment to occur much more rapidly because referring physician, consulting specialist, and patient are able to confer simultaneously.

Cultural offerings, delivered via such media as cable television or satellite TVRO antennae, are now directly available because of modern telecommunications, and supplement other benefits of rural life such as reduced traffic and pollution. The benefits of improved telecommunications in rural areas are powerful components of a better quality of life. This in turn contributes to a reduction in massive population moves to urban centers caused by the search for jobs and the dream of a better life. Advanced telecommunications can assist rural communities in improving the literacy and training of the local workforce that attracts other businesses.

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[13]Telluride, Colorado holds a notable number of telecommuters. In 1993, the State spent $130,000 to bring in a high performance computer to handle global Internet traffic. Citizens of Telluride can now send data around the world for the cost of a local call, and can also access the World Wide Web. Telluride telecommuters live in Colorado while working for companies located in California, New York, and Northern Virginia, among others.

Chandler, Arizona, formerly a farming community and later a popular winter resort area, has become one of America's first telecommuter-based "televillages." National and international telecommuting have become a way of life. Employees are drawn to Chandler from the United States, and other countries such as Ireland, China, Malaysia, Vietnam, and the Philippines. Specialized professionals' home-based computer activities connect them with research communities and data bases all over the world, and enables them to reduce or eliminate lengthy commutes from their homes to distant workplaces.

• U.S. Legislative Reform

As a result of sweeping new telecommunications legislation signed by the President of the United States on February 8, 1996, competition and universal service will be further stimulated in the United States. The Telecommunications Act of 1996, among other things, (i) allows local telephone companies, long distance companies, and cable companies to enter each other's businesses and compete against one another; (ii) helps connect all classrooms, libraries, and hospitals to the information superhighway by the end of this decade; (iii) will help families gain control of the programming that comes into their homes through television; and (iv) reduces limits on television and radio ownership while preserving the diversity of voices and viewpoints that flourish in the United States. As a result of this new law, consumers will benefit from greater choice and lower prices, workers will gain from the new, high-wage jobs, and American entrepreneurs and businesses will profit both here and abroad as new markets open up for their products and services. This legislation creates in the United States the most open and competitive telecommunications marketplace in the world.

Equally important, the new legislation reflects Congress' and the Clinton Administration's clear intent to protect, preserve and advance universal service for the benefit of all Americans, including those with low income, those living in rural communities, and those with disabilities. The ultimate objective of this portion of the new statute is to make available advanced telecommunications and information services to all regions in the United States. Not only does the law preserve the concepts of quality service at just, reasonable and affordable rates, it expands the definition of universal service to include advanced telecommunication and information services. Special provision is made for schools, healthcare facilities, and libraries to obtain access to advanced services at a discount. Telecommunication service providers must also assure that service is usable and accessible by those with disabilities, if 'readily achievable' as defined by statute. Recognizing that the definition of universal service will be evolving, the law directs the Federal Communications Commission to issue an initial definition of the services that will be financially supported by Federal universal service support mechanisms, and to revisit this definition periodically in the future, taking into account the public interest and the current state of telecommunications.

c. Recommended Strategies

Several African nations have officially declared their commitment to privatize their state-owned telecommunications services providers, including some which have proposed specific plans to liberalize their telecommunications sectors and institute legislative reform. The United States stands willing to lend support on technical and regulatory policy matters to nations which have embraced or taken steps to implement such initiatives for two reasons: (i) these goals are consistent with the Global Information Infrastructure policies that drive U.S. telecommunications policy; and (ii) we are encouraged by the benefits sustained in the Americas region by nations that are similarly situated to the African nations that have passed similar reform initiatives.

In this regard, the United States respectfully offers the following recommendations and observations towards the goal of telecommunications development in the African region:

1. Establish a timetable for Introducing Competition

We recommend that African countries first consider establishing a defined timeframe for introducing full competition in telecommunications network, services, and equipment. To ensure that participants have the incentive to structure their operations in preparation for the change, we suggest that the date set be realistically near, such as within five years. In fact, we recommend that the general terms of a future competitive regime be set out as soon as possible after the decision to permit competition is made because long periods without competition weaken a carrier's incentives for efficiency.

2. Allow Competition in Wireless Services

Second, irrespective of the timetable for general competition, we urge nations in the region to consider permitting immediate, extensive competition in wireless services. Given the mix of technologies and services that could be employed, and their potential to provide substantial network capacity relatively inexpensively, wireless solutions, particularly when coupled with existing wireline facilities, may well present the greatest potential for reaching a given nation's service goals rapidly. Authorizing a duopoly in cellular voice services alone may not provide the full range of wireless delivery technologies.

Even if limited forms of monopoly for voice services over wireline networks must remain during an interim period before full competition, we recommend that competition for wireline voice services nonetheless be permitted to the maximum extent possible. Realistically, for a variety of reasons, state-owned firms are often unable to fully meet the existing demand for telecommunications services. Thus, we recommend that other network and service providers have the opportunity to help close this gap.

3. Permit Resale

Permitting resale of network services is an effective prelude and complement to full competition. Currently, there are more than 700 entities in the United States that rent bulk transmission capacity from major carriers and then resell communications service at a discount to small businesses and households. Resale can usher in competition by promoting more efficient use and management of communications networks, as well as growth of customer networks for particular applications. Moreover, resale can lower rates for small and medium-sized network customers.

4. Allow Privatization

Privatization is very important. We believe that the goal of privatization should be to enable the existing state-owned firms to function like commercial enterprises. The ability and incentive to

function as a commercial entity should permit more effective financing, foster creative ways of carrying out mandated universal service obligations, and may result in partnering with other service providers in innovative ways.

5. Mandate Interconnection

Without interconnection requirements, it will be impossible to achieve the benefits of competition. If one network supplier can use the facilities of another network on a cost-based basis, a given nation can benefit from many innovative approaches to developing networks without forcing each new entrant to establish a complete national network.

Incumbent carriers usually enjoy dominant status, and can effectively deny entry to new service providers if they enjoy market power with end users, substantial control over key inputs, (e.g., a monopoly on gateway switches for international traffic), or if they impose disproportionate costs on new entrants for interconnection rights. Our experience has shown that interconnection safeguards are necessary to protect against such abuses. We recommend that interconnection to the state-owned firm or dominant network operator be at transparent, nondiscriminatory, cost-based rates, and on terms and conditions that are reasonable and nondiscriminatory. We also recommend that the regulator require interconnection to be equal in type and quality to that provided to the dominant public network operator for competitive services, and that interconnection be priced no higher than that provided to the dominant carrier. The dominant carrier should also be prevented from cross subsidizing competitive services with revenues from services in which it retains a monopoly or dominant position. Finally, because access to numbering resources is so important to the success of new infrastructure and service providers, we suggest that new entrants be provided with access to numbering resources on the same terms and conditions as the state-owned firms. All of these tasks require rulings and enforcement by a strong and independent regulator.

6. Lower Prices for International Services

International services that are priced efficiently and provided competitively will be critical to full participation in this information intensive economy. We recommend that low prices for international services be established as quickly as possible, that revenues from international services not be used to subsidize local services, and that international investment in new providers of advanced global services be permitted. In addition, we suggest that the accounting rates maintained with foreign correspondents be published.

7. Establish an Independent Regulatory Authority

An efficient and well-focused regulatory structure is critical to the success of telecommunications reforms. From the outset, it is necessary to have a strong and effective regulatory entity that continually evaluates practices and calibrates policy as circumstances warrant.

The United States suggests that the regulatory authority be provided with sufficient power to enforce laws and regulations necessary to safeguard competition, e.g., publicly tariffed interconnection arrangements, and to resolve disputes. We recommend that interested parties be accorded a fair and equal opportunity to participate in the development of rules and regulations governing licensing, rate regulation, and enforcement. To provide legal stability, and to facilitate public trust in the fairness of the regulatory process, we suggest that policies, laws, and regulations be made public so that they are available to consumers, new entrants and incumbents. In addition, we suggest that records of proceedings affecting the issuance, content, and modification of the authority's regulations be published so that the reasons for decisions and rulings are available to interested parties. We suggest that the regulator be given the power to impose sanctions for violations of its rules, including monetary penalties, and other measures such as suspension or revocation of licenses. Finally, we recommend that the authority be subject to judicial review, and that it be authorized to become a litigant in the court system to prosecute and defend its rules, regulations, and other interests.

8. Participate in Multilateral Trade Negotiations

Finally, in order to further attract international expertise and resources, we strongly recommend that countries in the African region participate in the trade processes of multilateral fora that are leading efforts at reform, e.g. the World Trade Organization's Negotiating Group on Basic Telecommunications (NGBT). Although the deadline for participating in the NGBT multilateral agreement passed on April 30, 1996, we encourage African countries to become full participants in future efforts by the WTO or similar groups. Pledging reform through this process will give participating countries the maximum benefit for those hard won initiatives through added credibility in international markets and with financial investors.

CHAPTER 2

FINANCING TELECOMMUNICATIONS INFRASTRUCTURE DEVELOPMENT

2.1 Investment Considerations and Financing Strategies

Governments have long recognized the pressing need to attract large-scale and relatively immediate capital into the telecommunications sectors of their national economies. While privatization of state-owned operators, as discussed in the Policy portion of the United States contribution, is an important and increasingly accepted vehicle for raising funds to finance telecommunications infrastructure development, it is not the only vehicle. The focus of this portion of the United States contribution is to identify, in general, a variety of options available for financing telecommunications development.

Demand for major investment arises in the privatization of state-owned telecommunications operators. Further, demand is generated by the expansion of the telecommunications infrastructure. For countries that have privatized, telecommunications operators and regulators still are burdened by the need to generate huge amounts of capital to meet unfulfilled existing demand and new demand that will be stimulated by new growth of the telecommunications infrastructure. The successful expansion of infrastructure is likely to increase demand for, and the supply of, new telecommunications and information services. It is likely to generate new pressures for competition and diversity, thereby increasing the demand for capital by new entrants in the telecommunications sector.

However, capital resources, from both the public and private sectors, are becoming increasingly strained. Within a country, telecommunications projects vie for capital with a country's other infrastructure development projects. Attracting foreign capitol means competing with telecommunications development projects in other countries and regions. In an era of many competing opportunities for foreign direct investment, telecommunications operators must strive to become more attractive, and thus more competitive, for such resources. To be more competitive requires being better managed, more efficient, and thus more profitable so as to be more attractive to potential investors and lenders, and to be able to be more rapidly and feasibly self-funding.

Limitations on direct investment, unstable economic conditions, low levels of national income, and an uncertain political climate may all create barriers to investment. Thus, government officials and telecommunications operators will have to remain open to new ideas and approaches to attracting investment in the sector.

The discussion below outlines a variety of different techniques, some well-established and others less well-tested, that may be considered in attracting financing to equalize the 7infrastructure investment throughout the region. Different factors will be weighted according to the unique needs of each country.

First, and perhaps most important, the telecommunications system and network should be viewed as a critical "enabler" of general economic growth. The telecommunications infrastructure must be ubiquitous, modern and efficient.

Second, the overall regulatory climate will remain a critical element in attracting new investment. Regulation must continue to be viewed pragmatically -- not as an end in itself but as an essential framework for attracting investment capital. Regulatory schemes intended to promote investment increasingly will have to take account of pressures for new entry and competition.

Price reform, including, in particular, steps toward more cost-based pricing and implementation of targeted subsidies, will be essential in establishing the preconditions for the more competitive market structures of the future. Without cost-based rates, decisions about new entry will not be taken on the basis of proper pricing signals, and the move toward efficient operation will not be adequately based on incentives. However, cost-based pricing will require some potentially disruptive increases in local tariffs. Policy makers will have to explore the use of more precisely focused subsidy mechanisms targeted at low income subscribers and areas where subscribers can only be served at high cost. On the positive side, there exist customers who can afford higher rates but are currently underserved. Thus if local rate increases allow supply to increase, as is normally the case, then the total level of service will increase.

Price reform also will mean reductions in international tariffs to accommodate broad economic pressures in the international telecommunications arena to implement cost-based accounting rates. Lower international tariffs will also become essential to ensure that telecommunications users have access to international telecommunications services at internationally competitive price levels. Telecommunications operators will thus have to adopt facilities planning and marketing initiatives targeted to increase calling volumes so as to maintain historic levels of revenue contributions from international services. They should also look to the area of "Value Added Services" as a potentially large source of new revenues. Historically, reduction in long distance rates produced a sufficient increase in tariff volume so as to equal or exceed prior revenue levels to the operator in very short periods of time.

2.2 The Extraordinary Demand for Capital for New Infrastructure in the Telecommunications Sector

Investment in the telecommunications sector is a matter of extraordinary strategic importance. To add to the dilemma is the increasing statistical record that reinforces the direct relationship between the development of telecommunications infrastructure and level of economic development of the country, via key economic indicators. For example, lower income groups (under US$610 of income per year) have an average of .6 Access Lines In Service (ALIS) per 100 people, while high income groups (over US$7,620 of annual income) have 43.9 ALIS. Similarly, the Gross National Product (GNP) of a country is directly related to the development of the telecommunications sector.[14]

[14]See Appendix A for a graph showing the relationship between the number of ALIS per 100 people and the GNP for 178 countries.

In order to achieve the rapid and massive build-out necessary to satisfy unmet demand, stimulate economic growth, and compete successfully for additional investment capital, the countries with historically low infrastructure investment will have to tailor their ownership arrangements and price structures to balance the interests of numerous constituencies, i.e., not only the consumer and commercial users of the telecommunications system, but also the employees, managers, suppliers, taxpayers, investors, and regulators involved. The aggregate capital required by the 150 developing countries surveyed to support their projected investments in the telecommunications infrastructure could exceed $200 billion through the balance of this decade of which slightly more than 1/2 must be obtained from external sources. This amount reflects aggressive increases in telecommunications penetration among middle income countries and modest efforts by low income countries.

Thus, development of the telecommunications infrastructure will require marshalling an enormous amount of investment capital over the next decade. The enormous need for additional capital has generated a requirement for creativity in financing structures. Some of these creative approaches are discussed in this paper.

2.3 Options for Generating Financing for New Infrastructure Investment

The following discussion reviews a cluster of strategies and techniques to improve the potential for attracting investment to the telecommunications sector that will be required in the decade ahead.

a. Rationalizing the Telecommunications Operator's Relationship with the State

Many telecommunications operators, especially those that remain under exclusive state ownership, are subject to arbitrary and unreasonable constraints that limit their autonomy and efficiency.

Within the experience of countries thus far, steps that have proved to be essential to the rationalization of the telecommunications operator's relationship with the state in order to attract increased investment are:

- Telecommunications operators must be relieved of obligations to finance other state activities (e.g., postal services). Instead of considering the telecommunications operator as a "cash cow," government policy-makers should view reinvestment of telecommunications earnings in further infrastructure development as a critical strategy for promoting economic growth and the emergence of a market economy.

- Transfer payments between the telecommunications operator and the state should be limited to market-based dividends on the state's equity stake, market-based interest payments on loans and credits advanced by the state, and reasonable business taxes with general applications.

• Telecommunications operators, whether private or state-owned, should pay taxes on the same basis as commercial or private corporations (although countries might provide for investment incentives via the tax system. See discussion in Section "c" below concerning the need for rebalancing existing price structures).

• Telecommunications operators should be relieved of obligations to subsidize state-owned telecommunications manufacturing activities and should be expected to procure equipment and services on an arms-length and fully competitive basis.

• The state's role as owner of the telecommunications operator should be restructured. Oversight of its investment stake in the telecommunications sector should be commercially oriented, and at arms length.

-- In principle, the state should place in different hands responsibilities for corporate governance of the telecommunications operator and for setting telecommunications policy and regulation. The roles of controlling shareholder and regulator are different and competing, and should be kept separate.

-- The state should agree to a long-term management contract that delineates exactly the financial constraints applicable to the telecommunications operator. Recurrent intervention into the affairs of the telecommunications operator essentially renders impossible long-term planning and the efficiencies that result from increased efficiency.

-- Assuring that regulatory functions are handled through an independent body subject to public scrutiny (i.e., transparency) will reduce the tendency to confuse past government-directed management techniques with a necessary new emphasis on market forces and regulatory incentives.

-- Reduction or, ultimately, divestiture of the state's equity stake will infuse private sector management expertise and new sources of capital into the telecommunications operator.

b. Steps to Increase the Efficiency of the internal Operations of the Telecommunications Operator

Implementing internal efficiencies can be a daunting task for a telecommunications operator whose management was shaped by centralized planning or a government agency rather than by a market-driven philosophy. The following steps have served to increase the efficiency of the internal operations of the telecommunications operator.

• The telecommunications operator should replace traditional functionally-oriented accounting systems with accounting systems that permit assessment of the operator's profitability on a line-of-business basis.

• Managers should be given incentives to increase revenues and reduce costs in their operating groups. Management compensation should be better related to performance.

• Subsidiaries or separate business groups can be utilized to establish better structured staffing arrangements and performance benchmarks for the telecommunications operator.

• Unprofitable or inefficient business activities should be abandoned when service can be offered more efficiently by independent or private operators.

• Managers should be encouraged to establish transparent transfer prices for services rendered between different internal business units. Contracting with third parties for services and competitive bidding should be used to assure that internal transfer prices are market-related and not merely based on the operator's existing cost structure.

• Decentralizing management responsibility within the telecommunications operator and basing employee compensation on individual and group performance may also result in important operating efficiencies.

• Management contracts with outside firms -- especially telecommunications operators from market economies that have been through a process of restructuring and institutional reform -- can be usefully employed to manage existing assets, as well as attract new investments, as outlined in further detail below. Management contracts may also be used by the telecommunications operator as a device to manage facilities or assets that are provided or owned by third parties, especially foreign investors. The U.S. experience, and that of other countries is that competition is a vital boost to all these management reforms. It is the practical incentive created by commercial rivalry that forces managers to make meaningful choices about pricing, costs and investments.

c. Price Reform: An Essential Step

Undergirding an aggressive set of measures to reduce costs and increase operating efficiencies (and revenues) must be a major initiative to restructure the telecommunications operator's pricing. In a market-driven economy, price reform is the key to generating needed future investment funds. Where prices are better aligned with costs, competitive pressures can lead to improved efficiency.

Traditionally, the pricing of telecommunications services in many countries has not been well aligned with the cost of providing service; in particular, local exchange services have been priced well below their costs. Aligning prices more with costs will generate new revenue sources and protect all operators in the country from the inevitable collapse of "artificial" pricing schemes that have cross-subsidized infrastructure development in the past, but that are not likely to survive market-based competition in the future.

The revenue streams most likely to be sharply affected are domestic long distance and international service.

(a) International Services:

International services have in the past generated a very substantial portion of the profits of telecommunications operators. In many cases, a significant proportion of these operator's profits are generated from settlement revenues, that are in turn based on high accounting rates. However, there are now at work strong pressures to reduce international accounting rates. Telecommunications operators can insulate themselves from such pressures only at the price of severely damaging domestic and foreign firms dependent on telecommunications services.

During the past few years a great deal of attention has been placed on international accounting rates with a recognition that they should be lower to reflect the decreasing cost of providing international telephone service. The ITU-T and the OECD have been actively pursuing this issue in an attempt to reach consensus among their respective memberships to begin a process of rebalancing international accounting rates. The ITU has made successful inroads by adopting Recommendation D.140 which establishes the principles (transparency, cost-oriented pricing, and non-discrimination) for accounting rates for international telephone service, and Recommendations D.150 and D.155 which cover practical applications of these principles in the tariff context.

Additionally, in January 1996, the FCC issued a policy statement on international accounting rate reform outlining its new approach to these issues. The new policy is designed to encourage both emerging competition in foreign markets and technological innovation. The FCC will now tailor its accounting rates policies to reflect different market conditions, e.g., (i) monopoly or highly concentrated markets; (ii) effectively competitive markets; and (iii) developing country markets. In the latter case, the FCC will explore mechanisms designed to assist developing countries during the transition to more competitive markets and lower accounting rates.

The United States believes that all administrations should have costing methods that provide a reasoned basis for determining the costs associated with providing international telephone service. The goal should be to reduce international accounting rates so that they include only those costs associated with providing the service. Consistent with these views, the following principles are being urged as a basis for reviewing and revising accounting rates according to cost trends.

- Paying due attention to the need to establish, develop, and improve telecommunications in countries still developing their infrastructures, it is important that all administrations build upon and improve existing mechanisms to facilitate an improved assessment of costs associated with international telephone service.

- Accounting rates for international services should be cost-orientated and should take into account relevant cost trends. Each administration should apply these principles on a nondiscriminatory basis, that is, the same rate should be available to each operator on the same terms and conditions.

- Administrations should periodically review accounting rates to ensure that they are reduced so as to reflect current cost trends.

• Administrations and operators should make their international telephone accounting rates available so as to allow for an informed analysis of accounting rates in relation to current cost trends and to guarantee that nondiscriminatory treatment is the rule, not the exception.

• International services can continue to contribute significantly to revenues and foreign exchange reserves needed for new investment. Existing levels of contributions may be maintained by substituting existing high margins for higher volume through more efficient pricing. In a global economy with competitive forces, it is no longer financially prudent or feasible for telecommunications operators to rely upon the present level of foreign subsidies. Increased volume based upon market pricing and infrastructure build-out, instead, is a more solid base upon which to build future revenue streams.

(b) Domestic Long Distance Services:

With respect to domestic long distance service, telecommunications operators are likely to encounter enormous pressures for the installation of "parallel" backbone capabilities -- special networks to link and serve cellular systems, fiber optic links installed by other utilities (railway or power companies), or VSAT connections. Rather than attempt to hold back the tide, telecommunications operators may be better served by realigning their pricing and even by seeking to exploit infrastructure investment provided by others to serve their own customers' needs.

Maintaining artificially high prices as a means of generating surpluses for reinvestment will be a counter-productive strategy in the long run. It discourages development of the domestic national market and restricts large commercial enterprises to the major urban centers. There is no evidence that building out the long distance network fails to pay for itself, although efficient procurement and construction practices lower the cost and shorten the payback period.

Comprehensive price reform, if undertaken too quickly, is, however, a politically explosive subject in countries where price increases are required for many basic necessities and overall income levels are low by comparison with developed market economies. Further, where lack of infrastructure is a limiting factor another consideration is the ability to meet the increasing demand that is stimulated by price reform. The latter, however, may be off-set by a balanced system of access charges between the interexchange and local exchange networks.

One solution that has worked successfully in some countries is exploiting opportunities to structure price reform around intensified efforts to differentiate customer requirements.

Rate differentiation might be based on the type of facilities used in offering a service, i.e., whether services are provided as part of a new digital service offering or new overlay network. Differentiation is also possible between business and residential customers.

Domestic long distance rate increases could be linked with upgrading service. They could be targeted at customer groups with the greatest capability and willingness to pay higher prices for more and better service. Price reform would be an essential element of efforts described in Section "d" below to attract new sources of financing.

(c) - Developing a Targeted Scheme of Subsidies for Low-income Subscribers and High-cost Areas:

As subsidies embedded in traditional price structures are reduced, they can -- and should -- be replaced by direct mechanisms for ensuring access to telephone service by very low-income subscribers and in very high-cost areas.

The experience of the United States in implementing such subsidy schemes, suggests that there are a number of options available depending upon where a country is in the telecommunication s development process. The structure of any subsidy scheme must reflect the attributes of the country. Examples of subsidies that have worked are useful, as are the basic principles.

First, targeted subsidies should be used to reduce the overall cost of subsidization while helping those who need it the most. Second, a definition of "universal service" should be developed that identifies a minimum acceptable level of basic service (such as shared-line or "life-line" service) so that the expense of subsidized service is kept low. Third, subsidies should be aimed at two groups: (1) individuals with the lowest incomes; and (2) subscribers of telephone exchanges in geographic areas with the highest costs. There is always a need to find practical incentives for operators to have efficient cost and supply practices for subsidized regions. Otherwise, the operator may profit by inefficiency or needlessly overbuilt infrastructure. (Scholars refer to this problem as "goldplating the system.") Finally, sources of subsidy funding should be developed that minimize burdens on message charges for international and interexchange revenues. Subsidies should be derived from contributions from flat fees paid by all subscribers, special separately identified surcharges on general telephone revenues, and low interest rates on government loans for plant construction in high cost areas. Subsidy funds should be separated for the operator and be kept competitively neutral.

For example, subsidy funds to achieve wider access to telephone service may be used to support public call boxes or types of telephone facilities serving community needs. As the true cost of serving rural areas becomes more visible, policy-makers as well as telecommunications operators will have increased incentives to utilize emerging technologies for new wireless-based services in remote areas.

d. Alternative Techniques for Attracting Private Sources of Investment Capital

An already well-accepted approach to attracting new investment capital is to permit joint ventures between telecommunications operators and foreign investor/telecommunications operators to develop special services like cellular or paging services, as well as overlay networks for business users.

The challenge facing policy-makers is how to encourage more direct investment in the core infrastructure of telecommunications operators, (i.e., basic service) -- especially in exchange switching facilities. One approach is to encourage more direct investment in the telecommunications operator through sale of a significant equity stake in the operator.

The need for capital may also require that other options be examined. Alternative techniques may be used to establish the groundwork for a later effort to sell control or a significant ownership stake in the telecommunications operator. Moreover, even in countries that have already been privatized, such techniques might provide a useful additional means of raising capital necessary to develop more fully the national telecommunications infrastructure.

Alternative financing techniques might include asset-based financing and what might be described as a "franchising" scheme. Asset-based financing could involve creating entities to acquire and lease assets to telecommunications operators. Such entities could be financed by debt or equity raised in domestic and international capital markets. Assets would be acquired and perhaps installed by a financing entity and then leased to the telecommunications operator. The lease might be structured to reflect the operating results of the part of the telecommunications operator in which the assets were deployed. In a sense, investors would be offered a *de facto* equity stake in the telecommunications operator.

Under a franchising scheme, telecommunications operators might establish a business arrangement under which private entities would be authorized to construct segments of the local network and connect these facilities with the telecommunications operator in accordance with a "franchise" agreement. This agreement would establish technical standards for franchisees as well as a formula for dividing revenues. More importantly, under the agreement the operator might have the option of acquiring its franchisees through exchanging its stock for that of the franchisee. This proposed financing technique may permit increased access to capital and foreign exchange resources held by telecommunications users -- both residential and, more particularly, business users.

This concept shares some attributes with other schemes that have been examined, such as Build-Operate-Transfer; Build-Operate Own; or Build-Transfer-Operate. While they are intended primarily to attract new sources of money, franchising and other options may also encourage small scale entrepreneurship.

e. Encouraging Increased Investment in the Telecommunications Sector

A balanced and effective strategy for attracting new investment in telecommunications infrastructure cannot focus only on steps to reform the existing telecommunications operator and improve Its self-financing capabilities. As described above, it should also acknowledge the benefits flowing from permitting increased private sector participation in the telecommunications sector. Such a strategy should encourage telecommunications users, to the maximum extent feasible, to invest in facilities and services needed in conducting their businesses.

Services provided using the telecommunications operator's facilities should be fully liberalized. Restrictions on the use of leased circuits should be imposed only in exceptional circumstances.

Given the poor condition of the existing infrastructure in many parts of the world, service-based competition cannot flourish without increased investment in infrastructure. Thus, policy-makers could take steps to facilitate infrastructure investment by entities other than the telecommunications operator in appropriate circumstances.

For example, the use of VSAT stations for domestic public switched telephony should be permitted in order to facilitate rapid establishment of communications links. VSAT links might be used liberally with a "franchising" scheme, a "build-operate own/transfer" scheme, or other financing mechanism.

As a general matter, it may be expedient and pragmatic for telecommunications operators to be prepared to accept an open environment for new investment in telecommunications facilities. Rather than attempt to block new investors in infrastructure, telecommunications operators might seek avenues for leasing back transmission or switching capacity installed by others, particularly other public utilities or railway companies. However, they should also be open to new structures and business arrangements that mobilize new sources of investment capital to construct basic infrastructure.

f. Encouraging Effective Use of Multilateral, Regional, and National Sources of Financial Assistance

There are numerous sources of financial assistance available to reconstruct telecommunications infrastructure from multilateral, regional, and national development banks and aid institutions. The diversity of sources of development assistance and commercially provided financing creates its own special demands and challenges.

(a) Financing from multilateral, regional, and other public sources:

Donors and lenders should seek to identify effective means of coordinating their advice and financial assistance. Some overlap in areas of technical assistance and some differences in advice and perspective are inevitable, and may be desirable. Telecommunications policy-makers and operators need the benefit of differing points of view.

It would also be useful to establish more formalized channels of communications among those institutions offering technical and financial assistance to telecommunications operators. In this way, the contributions of one development institution can build on those of others that are rendering assistance in a particular country. Ideas and work product can be more productively shared.

Lending institutions should not focus their efforts merely on financing infrastructure projects; they should also concentrate on encouraging institutional and sectoral reforms that will ensure that available financial resources will be effectively utilized. Large-scale financial assistance should be, and increasingly is, linked with the adoption of regulatory, structural, and sectoral reforms.

Significant resources should be focused on developing new business or financing mechanisms -- as well as new business structures -- that create opportunities for self-sustaining growth. International financing institutions that have the capability to lend large amounts of money can also make an important contribution by facilitating the creation of smaller scale financing and entrepreneurial developments.

(b) Private financing from international capital markets:

Increasingly, some telecommunications operators will be seeking long-term capital from the international financial markets. The amount of funding available and terms upon which it can be obtained will vary over time and from country to country depending on the specifics of the situation. For a general description of likely sources of funding, see Appendix B.

Appendix C describes some typical forms of financing available to telecommunications operators: 1) debt financing; 2) equity financing; 3) project financing; 4) joint ventures; and 5) vendor credits. The amount and type of external funding available to telecommunications operators will depend upon conditions in the international capital markets. For example, at present, international financial investors find that high growth prospects for telecommunications operators in developing countries make equity investments very attractive.

However, such investors are prepared to acquire only marketable shares that can be easily traded as either market conditions change or as a significant portion of the growth potential is realized. This implies a very clear limit on the amount of financing that can be secured from international equity markets over time. Developing countries' telecommunications will be required to balance their funding among various sources with a mix of debt and equity.

The relative scarcity of funding compared to the visible and latent demand for services means that every dollar expended should achieve the maximum benefit. That is, countries must carefully plan the types and level of services being provided to achieve an optimal level of penetration and capacity.

g. Financing Rural Telecommunications Through Cooperatives and Independent Local Service Providers

Through telecommunications cooperatives (independent local service providers), governments can deliver to their rural citizens modern, affordable telecommunications service in a reasonable period of time even though the national telephone company does not have sufficient resources to modernize and extend their existing networks.

Independents are sometimes regarded as a threat to the state company. However, they are exactly the opposite. As more people are connected to the national network, traffic and revenue grows. Independents and state companies do not compete - they enhance one another and contribute to each other's growth and profits.

In allowing independents to serve rural areas, the national company benefits in several important ways:

1) It will have assistance with the difficult and expensive job of creating a rural network, and is able to free up some of its revenues to invest in more profitable urban areas and long distance service or to extend service to additional rural areas.

2) It receives significant financial benefits by:

- Collecting revenue from the independents for long distance and international traffic originating in the independents' service areas, and

- Enabling its own subscribers to call into the independents' service areas, thus generating for itself more originating traffic; and

3) It receives positive local and national publicity for its work to bring modern telecommunications services to its rural citizens.

Another way to meet the needs of rural areas is through community-owned rural telephone cooperatives. Community-owned telephone cooperatives have been used successfully to serve rural areas in a number of countries where the governments lacked the resources to do so, or where large private companies were not interested in serving rural areas because greater profits could be made in urban areas. Such countries include the United States, Canada, Finland, Poland, Bolivia, the Philippines and Micronesia. Electric cooperatives, which are often the precursors to telephone cooperatives, serve huge populations in such countries as Bangladesh, India, El Salvador, Honduras, Bolivia, and the Philippines.

The term "cooperative," as used here, differs from many countries' experience of cooperatives. A cooperative is owned and controlled by the members, not its management or any government offices or officials. It is responsive to local interests because the people its serves own it. It is dedicated to providing those member-owners with the best possible service at the lowest possible price. It prohibits investment and thus control by outsiders. It is run on democratic principles -- membership is open to all, and each member has one vote toward electing a board of directors from among the membership. The management works for the people of the community and reports to the board of directors.

It is extremely desirable -- and actually necessary -- for the community itself to provide a significant share of financial resources and labor to establish the cooperative. When local people are involved in the planning, design and execution of infrastructure development, and in particular when they believe the cooperative is theirs and exists to benefit them, common problems become minor or non-existent -- for instance, vandalism, theft, and non-payment of bills.

As there are no outside investors, the cooperative does not have to make a large profit. Of course, as a business it must make a profit, but that profit remains in the community by being re-invested into the cooperative's plant, facilities and personnel.

The physical plant of such systems should be as modern as possible. Good telecommunications service plays an essential role in stimulating the development of local small businesses; agricultural production, processing and marketing; tourism; and local resource-based industry, such as mining or logging.

Yet another form of independent provider is the investor-owned rural telephone company. It may be difficult to attract this sort of company to sparsely populated rural areas because it will be more difficult to achieve an acceptable rate of return. In order to attract an investor to an area with a low rate of return, it may be necessary to grant the investor an extended franchise and to allow it to serve all or part of the urban area nearest the rural area, so as to ensure that the provider achieves an acceptable rate of return.

h. Debt for Equity Swaps

For those countries with large external debt, the innovative approach of debt-for-equity conversions, or swaps, could provide needed capital for telecommunications projects. Under these conversions, corporations purchase external debt of a country from a bank at less than its face value and exchange the debt for government-owned equity in a local company. In the mid 1980's environmental conservation groups adapted this technique to conduct "debt-for-nature" swaps. In these swaps, debt was exchanged for local currency to finance conservation projects. "Debt-for-development" variants of the debt-for-nature transactions have since been employed to provide local currency funding for educational, health and social welfare projects throughout the developing world. This approach could be used in debt-for-telecommunication swaps to provide local currency portions of investment projects, providing an increased rate of return which could make rural projects more attractive.

The economic rationale for debt-for-equity/development conversions is based on the willingness of commercial bank creditors to discount debts they are owed by developing country governments. Debt-for-development transactions benefit all parties involved in the transaction.

2.4 Conclusion: Financing New Infrastructure Investment

The ideas and recommendations set forth above only begin to address how telecommunications operators and policy makers can confront the monumental task of raising investment capital to expand telecommunications infrastructures.

Our analysis stems from the recognition that telecommunications infrastructure development is central to social and economic growth and development, including the creation of opportunities for investment for operators and investment institutions.

Our basic conclusions are that capital requirements over the next decade for telecommunications development are enormous for individual countries. Also, capital sources, both public and private, will become increasingly difficult to access as privatization in telecommunications and other sectors continue. This is particularly true as all forms of infrastructure development worldwide gain even higher priority. Telecommunications operations, whether in privatized or state-owned markets, will be forced to compete for scarce financial resources, and the success of these efforts will be due in large measure to the attractiveness of the operation to investors in terms of management effectiveness, operational efficiency, and stability of the regulatory and business environment.

2.5 Recommendations

Each country will have to find its own solution to these various issues. Countries at different stages of development will require a different mix of policies and strategies. We believe that the following

general steps could markedly enhance the attractiveness of telecommunications operations for both debt and equity financing for any country establishing these polices and strategies:

1. Sector Structure

1.1 Separation of the telecommunications operation function from the policy-making, regulatory and oversight responsibilities of the government is essential to creating a more favorable investment climate. This indicates to investors the willingness of the government to conduct its responsibilities in a fair and equitable manner.

2. Regulatory Body

2.1. The regulatory function of the government should ensure transparency of decision making, so as to promote the confidence and participation of the operators, investors and subscribers in the regulatory process, and thus encourage greater investment in the sector.

3. Regulatory Framework

3.1. A regulatory framework that allows fair competition and reliance on market forces can attract domestic and foreign investment as well as new sources of expertise.

3.2. Liberalization and privatization efforts, as well as the promotion of a competitive marketplace, should be guided by the objectives of enhancing efficiency both within the government and in the business community, increasing accessibility to a variety of services, and improving the quality of those services.

3.3. Authorization of the competitive provision of terminal equipment, of value-added services, and for other services, particularly those based on new technologies should be pursued to enhance investment and income opportunities.

3.4. Telecommunication earnings should be reinvested into the sector, rather than diverted into other sectors of the economy.

4. Pricing Policies

4.1 Operating entities should be encouraged to set efficient prices for services and equipment offerings in order to attract investment in this sector.

4.2 Price reform, especially adoption of service tariff rates that are more closely aligned with actual costs, can generate more traffic due to price efficiencies, thus producing additional sources of revenue as well as generating more communications alternatives for diverse parts of the domestic industrial sector, making these parts more competitive domestically and internationally.

4.3 Priority should be given to realignment of local service tariffs with international tariffs, and to redressing the imbalance between local and long distance rates. Basing tariffs on factors such as national income levels instead of true costs can only lead to price distortions, thus discouraging investment opportunities.

4.4 As necessary, mechanisms may be developed to target subsidies to low income subscribers and high cost exchange areas to reduce the overall level of subsidy required to promote efficiency.

4.5 Accounting rates for international services should be cost-oriented and should take into consideration relevant cost trends. Each Administration should apply these principles to all relations on a non-discriminatory basis, that is, the same rate should be available to each operator on the same terms and conditions.

4.6 Because the general costs of providing telecommunications capacity have decreased significantly, Administrations should seek to achieve accounting rates orientated towards costs in an expeditious manner, recognizing that lesser developed countries that need to make significant reductions in their accounting rates may need to do so over a period of one to five years. Failure to reduce rates may drive likely investors to more attractive markets.

5. Other Measures to Attract Investment and Financing

5.1 Liberalized foreign investment policies, such as lifting restrictions on foreign ownership, eliminating restrictions on repatriation of profits and on establishment requirements, and removing currency controls, are key to promoting the efficient development of the telecommunications infrastructure.

6. Sources of Financing

6.1 Operating entities that seek financing alternatives should take into account the wide variety of bilateral and multilateral sources of funding, such as the donor agencies in developed countries, the IBRD, and the Asian Development Bank. Those countries with high levels of external debt should consider debt-for-equity swaps.

These principles are intended to stimulate discussion and focus attention on the need for a comprehensive strategy on how to finance future telecommunications needs.

CHAPTER 3

DEVELOPMENT OF NETWORKS

3.1 Network Development

Implicit in any discussion of the Global Information Infrastructure (GII) is the need for the technological convergence of previously distinct facets of the telecommunications, information, and mass-media industries. Multiple networks, composed of various transmission media, are increasingly forming the basis of evolving national and international infrastructures. These infrastructures, to a large extent, are being designed with the intention of forming a seamless web of communication that will serve as an engine for economic development.

The emerging Global Information Infrastructure will depend upon efficient integration of an increasingly broad range of products and related services, beginning with telephones, and developing with fax machines, computers, switches, digital recordings, audio and video services, wires, coaxial cable, fiber cable, and, particularly in the developing world, a host of wireless technologies.

The Internet, which has been described as a "network of networks," can be viewed as a microcosm of the international network the GII is capable of becoming. From its inception in 1969, the Internet sought to link disparate networks. In the 1970's a system of protocols was developed to enable data to be exchanged among different programs, forming the basis of Internet today. Internet protocols can route packets over a wide variety of networking technologies, making it particularly useful in an environment in which no one transmission technology is likely to dominate.

Approximately 100 networks formed the Internet in 1985. By 1990 the number had increased to 2,200 networks, and by 1991 the Internet was estimated to comprise 4000 networks. More recent estimates indicate that the Internet has over 30 million users, and connects more than 159 countries through more than 11,000 networks. Progressing from three host computers in 1969 to 3.8 million host computers in 1994, the Internet has experienced an annual growth rate of approximately 80 percent. In exploring the various technological developments described below, one should bear in mind the growth of the Internet as a striking example of rapid network evolution made possible by interaction between massive computer power and flexible packet switched networks. In creating information infrastructures, we encourage policy makers to consider the benefits of this model, and seek to duplicate its capabilities for achieving consumer oriented results.

3.2 Interoperability is Key

The multiplicity of products and services that characterize the Information Age does not necessarily promise broad access to the GII. Without compatible systems, countries cannot communicate. Without standards that ensure interconnectivity, reliability and interchangeability, international communication and even national communication is lost, and with it much of the value of living in the Information Age. It is imperative that the private sector, governments, and international bodies make every effort to ensure that the standardization process does not stifle creativity, nor serve as "technical" barriers to trade. The lost economic growth that would ensue as a consequence of such imprudence, and the related slow-down in the pace of development, is too great a cost for any country to incur.

National methods for standard-setting vary widely according to the particular structure of a nation's economy. In the United States, for example, the standard-setting process for telecommunications networks and equipment is cooperative. This means that among the private sector entities that build networks and equipment, there is a voluntary effort to ensure that products and services are as useful as possible to as many people as possible.

The cooperative standardization of the U.S. telephone system serves as an example of how such a system can benefit all parties involved. The voluntary development of telecommunications standards was essential to the successful construction of U.S. telephone networks. Many analysts have concluded that the failure to require interconnection among independent networks, not a conflict of standards, was the biggest weakness of early network development in the United States before the consolidation of the AT&T monopoly. Today there are more than 1200 independent phone companies in the U.S. serving one half of the land mass and 20 percent of the population, all of which are connected to the Bell System network. Even very rural states, which once would have up to 28 telephone companies, today have as many as 150. The national and state networks were able to grow because the Bell System and the independent telephone industry cooperated to develop common operational standards that permitted them to develop without excessive burdens. A mixture of voluntary industry standards and broad governmental policy guidelines on standards continues today, with an even greater emphasis on keeping the standards voluntary and keeping them in the hands of those who build the network.

In the United States, The American National Standards Institute (ANSI), a non-profit organization with broad membership from industry, provides the structure for developing voluntary national standards. Many organizations are involved in the development of telecommunications standards, primarily through their membership in ANSI. The Exchange Carrier Standards Association (ECSA), for example, sponsors committee T1, which develops numerous telecommunications standards. Standards developed by Committee T1 are accredited by the ANSI, in the way a national laboratory might certify the public use of a pharmaceutical.

The Telecommunications Industry Association (TIA) and the Institute of Electrical and Electronic Engineers (IEEE) also publish standards on their own. However, both TIA and IEEE are ANSI-accredited and may submit their standards to ANSI for publication as American national standards, after publishing in an "official gazette." These arrangements have worked well and have produced a vibrant mix of products and services in a setting characterized by a proliferation of service providers, and product and network element suppliers.

It is important to understand that the participants in standards setting expanded as a result of the FCC decision to allow freedom of choice in terminal equipment. This set the stage for the development of office networks for data that was led by the computing industry, rather than traditional telecommunications suppliers of services or equipment.

More recently, however, the United States chose not to impose mandatory standards for the new Personal Communications Services (PCS) technology. The FCC determined at the outset not to pick technological 'winners' or 'losers' particularly given the ongoing and widely known dispute about the proper technical standards for this new service. The FCC's goal was to facilitate deployment of this new technology, and avoid placing unnecessary regulatory burdens which could stifle its development.

Each country's relationship to the telecommunications industry is unique, however, and where some produce many national standards, all must be mindful of the international standard-setting arena. Committee T1 is a major contributor to the ITU standardization process through the Federal

Advisory Committee of the U.S. Department of State. As the leading international body for worldwide telecommunications standards coordination, the ITU should continue to seek ways to facilitate the fastest possible deployment of the technologies which will enable all countries to upgrade their networks.

3.3 Expanding and Managing the Infrastructure

Members of the ITU are well-served by their vigilant and active participation in the ITU's technical committees. The ITU-R Working Group 8, for example, recently recommended digital tracking and cellular standards that will help all countries profit from the affected technologies. Certainly, many African countries have already been able to take advantage of the new technologies that add value and capacity to the region's networks.

Assuring continued participation in the expansion of the GII may also be bolstered by applying a variety of broad policy prescriptions in the context of a country's particular economic situation. Given that worldwide investment in telecommunications infrastructure alone is expected to exceed $200 billion by 2004, it is clear that every country must try to attract some part of that investment. Those that do will be able to expand service and gain still greater access. Therefore, countries are well-served by policies that encourage private investment through such frameworks as joint-ventures or other revenue-sharing initiatives.

A flexible regulatory environment that is characterized by open, transparent and predictable processes, and which effectively separates the telecommunications regulator from the network operators, is a hallmark of many countries that have been most successful at attracting private investment. Such a regulatory regime might be encouraged or given the authority to begin implementation of universal service provisions. It could also work towards ensuring open access to networks, which is vital to attracting investment.

These policies also point to the general importance of promoting competition. The benefits of promoting competition speak for themselves in many nations. Evidence of positive results, seen first and most notably in lower costs of services, and later in a bigger and better-integrated basket of services, grows daily.

Such policies, in combination with other actions taken in pursuit of network connectivity and interoperability will facilitate the development of an information infrastructure on a global basis. It is the work of ITU Member Administrations to see to it that these policies are suitable for individual countries.

3.4 Technologies and New Services for Development

The following section surveys the present status of emerging technologies and services that have the potential to enhance telecommunications development. These descriptions suggest the line of development of current technologies and services, which if deployed under an Internet-like framework, permit us to contemplate unprecedented network growth. Further, under such a framework for deployment, as with the Internet, individuals could become producers as well as consumers of information.

a. Network Systems and the Network

1. The Internet and the Intranet: The Internet is an outgrowth of U.S. government-supported research and development in networking. The number of users on the Internet is expected to grow from the current estimate of 30 million today, to 200 million by the year 2000.[15] The World Wide Web, the fastest growing segment of the Internet, has an estimated 13 million Web sites, and 1 million new ones are being added each month.

In the United States and other countries, commercial network service providers are connecting individuals and firms to the Internet, and using the revenue to invest in highspeed networks. Important research results included a set of networking standards (TCP/IP) that allowed an assortment of computers to communicate with each other. Researchers and firms all over the world are working to enhance the capability of the Internet. Innovation diffuses rapidly over the Internet because users also develop and disseminate applications. For example, in 1993, the National Center for Supercomputing Applications (NCSA) released Mosaic, a popular feature that allows individuals to navigate through text, graphics, audio, video, and hypertext links. By the end of 1994, traffic had grown to over 2 terabytes per month. The Internet represents a new model for organizing telecommunications services. There is no service provider who controls the Internet.

The Internet is a viable, open, low-cost data network which can relieve otherwise large disparities in access to information. Its counterpart, the Infranets, are private, web-based internet networks used to connect employees and business partners to corporate information.[16] When tied to unrestricted use of VSAT terminals, it is possible to deploy Internet data services quickly and inexpensively to rural areas, for example. Such low cost uses of these technologies could bring tangible benefits to farming communities, for example, where better pricing information could be a major advantage for growers.

2. Public Digital Telephone Networks: Whatever technologies are used to build global public digital telecommunications systems, whether the technologies of transmission are fiber optics, satellite, or radio, nations wishing to upgrade and improve their telecommunications infrastructure can benefit fully from the advantages of advanced telecommunications services, including ISDN. Already most of the Member Administrations have turned their attention to discovering how to more fully integrate digital technologies into various components of their public telecommunications infrastructure.

> VSAT Networks: While VSAT systems have been in service for several years throughout the world, the costs associated with ground equipment have dropped by a factor of 10 as micro-electronic components have become less expensive and production volumes have increased. VSAT networks have the advantage of being able to operate with international, regional, and domestic satellite systems. Their deployment within Africa is steadily increasing.

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[15]Source: Input (market intelligence firm) Communications Week, October 30, 1995.

[16]"Digital, MCI, Microsoft to Co-Develop Infranet," Wall Street Journal, April 10, 1996.

VSAT systems are ideal for implementation with private networks. Major technological improvements over the past year now permit both hub-based and hub-less, as well as "meshed," VSAT networks, offering more flexible system development than was previously possible. A major advantage of VSAT networks is that they can offer rapid payback periods (generally less than five years), which makes them an ideal means of quickly establishing digital infrastructure. Moreover, once the general, common user infrastructure is developed, it is easy to transfer much of the VSAT traffic to the network without significant financial losses.

Fiber Optic Backbone Network: The costs of fiber optic transmission have fallen rapidly. The actual cost of the fiber has steadily declined also, and the distance required between repeaters has increased substantially, reducing equipment and installation costs. Fiber is being installed in many countries along protected rights-of-way such as railway lines. In addition, many geographically dispersed countries in different regions of the world have pooled a significant amount of resources to tie together their nations through fiber optic transmission media.

Private Land Mobile Radio (PLMR) and Basic Exchange Telecommunications Radio Service (BETRS): These mobile radio services are finding increased use both as communications links between mobile subscribers and as sources of rural telecommunications improvement. Both radio systems may use trunking techniques and may provide interconnection to the public switched network. Markets that might benefit particularly from this technology include the light industrial sector, construction, mining, small businesses, and tourism. The low costs associated with construction recommend these technologies for consideration as a rapid means of satisfying specialized mobile needs and of improving local services, including public safety, security, and disaster relief. Manufacturing volumes are increasing with consequential reduction in unit costs.

International Transmission Systems: Both fiber-based and satellite-based systems are being extensively deployed to support ever increasing international traffic demands and a variety of traditional and new services.

Cellular: The complete range of uses of cellular technology is still being discovered. The utility of cellular telephony stems from its efficiency and its flexibility. Cellular's ability to use the same radio frequency many times over within a small geographic area allows a small slice of spectrum to carry hundreds of calls simultaneously. The ability to reach end users located outside of the wireline network gives cellular technology a vast number of potential applications. That cellular telephony may often provide a better quality and even less expensive form of communication within wired areas is also true in certain regions of the world.

Universal Personal Telecommunications Systems: Land mobile communications are evolving into a mixture of new wireless technologies. The former CCIR (Consultative Committee on International Radio) envisioned the Future Public Land Mobile Telecommunications Systems (FPLMTS) as offering important infrastructure options. The concept of the Universal Personal Telecommunications Service (UPT) is now evolving from this work. A variety of related radio-based microcell technologies are under development. These promise to provide wireless access to the network for many users in both dense urban areas as well as those in remote areas. The Personal Communications Networks (PCN - voice networks), which provide multiple reuse of radio frequencies, are being developed with the prospects of extensive deployment in developed countries. There are a number of licensing issues associated with certain PCS. See Section 3.5 below entitled "Regulating Global Systems" for further discussion.

Private Networks: There has been explosive growth and innovation in private networks in the United States. Desktop computing has expanded into local area networks (LANs), which further developed into wide area networks (WANs). State and local governments use Municipal Area Networks to enhance their communications effectiveness, and spare capacity is resold to closed user groups, often small businesses. Service providers can provide and manage private networks for growing businesses both domestically and internationally. In addition to reduced costs, these networks offer businesses the ability to deal with a single entity for all data communications needs. These may include global one-stop shopping for service ordering, billing and trouble reporting, the provision of on-going maintenance of complex data communications equipment, or the oversight of data transmissions.

Cable: Wireline cable typically uses coaxial cable to provide communication services to consumers unable to receive over-the-air broadcast transmission. (Coaxial carries up to 900 times the information carried by twisted-pair wire.) Upgrades on traditional cable technology include: the "interleafing" of signals, digital compression of data, development of capacity for two-way transmission, and the replacement of coaxial with fiber optic able. "Wireless cable" (including Television Fixed Service, Local Multipoint Distribution Service, Multipoint Distribution Service and Multichannel Multipoint Distribution Service) is used to transmit satellite cable programming using Super High Frequency (SHF) channels.

Cable television has special value as a versatile tool for development. In addition to serving as a vehicle to deliver broadcast programming, a cable system can transport any combination of audio, video, and data. This flexibility enables a cable system to be used to meet a variety of specialized needs for program content other than news, sports and entertainment. For example, cable systems can be used to provide instructional programming in schools, audio-only information in agricultural settings, or interactive service for data. And since a head-end (the central component of a system) can be supplied with a signal from a distant source, cable systems can operate in rural areas, thus stimulating rural development in ways that fit a nation's specific agenda. In comparison with copper wire for analog-based service, co-axial cable is significantly less expensive to install and maintain. Moreover, when optical fiber is used in a co-axial cable system, the volume and speed of service is greatly enhanced, and costs are reduced.

Paging: Business and government both rely heavily on paging technology for an inexpensive way to communicate instantly with the workforce. New two-way advanced messaging devices will provide the ability to initiate or return messages to one-way pagers or two-way devices such as computers. Other up-coming applications include E-mail, facsimile, and features related to personal security.

3. Network-based, Value-added or Enhanced services: These services are used by a wide range of manufacturing and other businesses, universities, hospitals, libraries, and individuals. A number of these services, which improve business efficiency and competitiveness, support scientific research, and generally improve the quality of life of individuals, are described below.

Protocol Conversion: Protocol conversion permits dissimilar types of computer-based equipment to communicate. As the variety and complexities of computers increase, protocol conversion services will become prerequisites for versatile communications systems.

Electronic Mail: E-mail can be an instantaneous, versatile, reliable, messaging service designed to meet the increasingly complex and time-sensitive interpersonal communications requirements of modern users. Delivery of information via E-mail to any number of people can be made simultaneous, no matter where they are located, in a cost-effective manner. Connection between mailboxes on a private system is possible, as is interconnectivity between dissimilar private and public systems. E-mail saves time and money by reducing the need both for paper forms, and for telephone communication. For example, in a financial setting, E-mail permits the flow of information between headquarters, regional offices, branches, retail outlets, plants, distribution centers, etc.

Database Access: This provides direct and immediate access via many communications services to thousands of public databases around the world that contain voice, data, image or video information. Such databases contain financial, technical, industrial, scientific and educational information. These services are increasing demand by both businesses and individual users.

Toll-free Services: Some countries have extensive services that allow callers to reach business organizations and others without charge. In some countries these are known as 800 or toll-free services. International applications of such services are expected to expand.

Store and Forward Fax: Store and forward international facsimile service may be provided on the public voice network or on what may be a lower cost x.25 data transmission dedicated network. Among available features are broadcast (multiple receipt) delivery, mailboxes, and delivery notification.

Electronic Data Interchange: EDI provides computer-to-computer exchange of business documents using standardized formats. EDI eliminates the paperwork involved in processes such as purchasing, shipping, receiving, inventory, invoicing and payment. Several governments are also adapting EDI applications to their customs clearance procedures.

Video Conferencing: Video-conferencing makes possible full-motion, full-color, person-to-person meetings from locations across the world. Meeting participants can display written documents and graphs, project slides, and videotapes.

4. Satellite Services from the Low Earth Orbits (LEOs): Satellite systems in both geostationary and non-geostationary orbit offer a variety of both fixed and mobile services. Those systems that operate below 1 GHz, the "little LEOs," offer non-voice data messaging to terminals (both mobile and fixed) on national, regional and potentially global bases. The low earth orbit non-geostationary mobile satellite systems operating above 1 GHz, the "big LEOs," provide a menu of services including voice communication, facsimile, paging, tracking, search and rescue, and many types of monitoring, including industrial and environmental. Certain geostationary and non-geostationary fixed satellite service systems will also provide broadband, multimedia services. It is significant that many African Administrations have supported spectrum allocations for such systems at recent World Radiocommunication Conferences (WRCs). Most recently, at WRC-95, Africa emerged as a potent force favoring the introduction of new technologies and services that will be deployed to the benefit of both African economies and their individual citizens.

3.5 Regulating Global Systems

These new technologies will be able to contribute significantly to infrastructure development as they are deployed globally. Regulation of most international services is an extremely complex and often contentious issue that implicitly touches on a set of concerns shared by all administrations. There is, however, broad acceptance among satellite system operators, users, and many national authorities, of the belief that a single global regulatory regime is neither feasible, nor suitable, nor even compatible, with national sovereignty. Conversely, it is important that Africa, like the rest of the world, avoid a multiplicity of incompatible national regulatory regimes that could inhibit early implementation, transborder mobility, and other benefits to be derived from global satellite systems.

The United States has identified several factors that can have a profound impact on the early introduction of global satellite systems and their efficient and economical operation on a worldwide scale. There are five factors which we suggest should form the basis for developing and evaluating a set of voluntary regulatory principles:

1. National Sovereignty. As with other telecommunications applications, each country has the right to regulate its telecommunications and to control access to and from its territory with respect to satellite systems. Each national authority must make decisions about licensing the services to be provided, the gateways, and the user terminals, including handsets. At the same time, cooperative discussion on the basic policies and guidelines will facilitate the speedy availability of these important services for all users, in Africa and elsewhere.

2. Market Access. There must be open access to the provision of space services, subject only to spectrum availability and other limited resource factors. There should be competition among space systems, and multiple service providers within each country in order to ensure lower costs and a broad choice of services for users. There should be a level playing field for all systems, and fair and commercially reasonable access to connecting facilities including the Public Switched Telephone Network (PSTN). The World Telecommunications Development Conference adopted Resolutions that describe a positive regulatory environment which is applicable to forum discussions.

3. A Simple and Predictable Process. Predictable and transparent regulation is essential for delivering early service to the public, and for helping to enhance a competitive environment. The space systems should be licensed and notified by a single administration, whereas each nation's regulator will have to provide for licensing of service, gateways, and user terminals. Blanket licenses for user equipment should be employed, and relevant global recommendations (e.g., numbering) should be uniformly applied as appropriate.

4. Global Roaming. Worldwide mobility is essential in order to achieve the full benefit of new technologies and services, particularly for the growing number of international business and pleasure travellers, and other users of the GII. A critical element will be the ease with which a user may carry a terminal from one region or country to another without restrictive or burdensome conditions. A framework that provides for widespread acceptance of user terminals is necessary to provide for transborder roaming. For example, a mechanism providing for mutual recognition of licenses and equipment certification should be pursued.

5. Financial Aspects. Due to the major capital costs of making these new systems operational, global financing is a necessary feature of the new systems. For example, there is an opportunity to have foreign private investment in U.S.-licensed commercial global satellite systems. New systems are actively seeking global investment partners, and each system may structure ownership to help its competitive position. It is equally important that national authorities encourage, and that regulators allow, multiple sources of funding for ground segment facilities - especially in those countries wishing to implement global satellite service at an early date.

3.6 Network Management Systems: A Network That Works

a. Network Management Systems: The combined impact of technology and competition in the marketplace demands improved levels of network management. Specifically, the complex task of managing an ever-expanding range of services using new and varied technologies requires an integrated approach to network management. Such types of systems are emerging: they are customer-oriented, and they permit rapid responses to changing market conditions, services-on-demand, improved network reliability, faster problem-solving, and even preventive management (identifying trouble before it affects the service). Such network technologies can improve customer service and have the potential to enhance telecommunications development internationally.

b. Intelligent Network: Often thought of as a service, the Intelligent Network is actually an infrastructure that facilitates rapid creation and deployment of new services. By separating the call control functions (for a given service) from the switch, and placing them within a separate entity within the network, new services can be created. Also, existing services can be tailored to meet a specific customer need without switch modification. An intelligent network will therefore broaden the range of new telecommunications services by making it easier, faster, and cheaper to integrate service elements and functions that make up the increasingly complex basket of services demanded by today's market.

3.7 Spectrum Management

Radio frequency spectrum management is the combination of administrative, legal, economic, scientific, and engineering processes necessary to ensure the efficient and compatible operation of radiocommunications equipment and services. Every nation needs an identifiable spectrum management regulatory authority that has the necessary powers to issue licenses, develop policies, publish rules and regulations, negotiate and coordinate spectrum use with other nations, and engage in bilateral and multilateral treaty development. A national spectrum management authority may be organized in many different ways, according to the requirements, interests, and resources of the nation concerned. Recognizing that the domestic and international spectrum management activities are very closely linked, most nations have found it appropriate to establish a single agency whose responsibilities cover both aspects.

The basic functions of a national radio frequency spectrum management authority should include:

- licensing or otherwise authorizing frequency use;
- developing policies, rules, regulations, and technical standards;
- establishing a national table of frequency allocations;
- coordinating national and international frequency usage;
- short and long-term spectrum planning;
- inspecting radio installations;
- resolving interference problems;
- monitoring spectrum use;
- keeping frequency assignment and other records;
- collecting fees where appropriate; and
- exchanging information with spectrum users and technology developers.

A spectrum planning and policy office, as part of the spectrum management authority, is recommended to oversee the development of national plans and policies relating to the use of the radio frequency spectrum. The planning and policy office should consider the social, economic, and political aspects of new technologies, including the merits of market-based mechanisms such as predictable, non-discriminatory procedures to provide fair and equitable assignment of frequencies. Administrations are encouraged to have their spectrum management agencies participate in the International Telecommunication Union's (ITU) world and regional administrative

radiocommunication treaty conferences (and other types of meetings and conferences) to improve international spectrum management relations and their national spectrum management processes.

3.8 Human Resource Management

The United States believes that Human Resource Management (HRM) is the point of departure for any country, developed or developing, which intends to build and manage a network. The most rudimentary as well as the most sophisticated infrastructures continue to function only through organized management. Proper education, training, and frequent exposure to new technologies and systems are the hallmarks of such management. The United States supports such beliefs with actions, as seen in the projects listed below.

USTTI: The United States Telecommunications Training Institute (USTTI) is a joint venture between leaders of the U.S. communications industry and ranking officials from the Federal Government. The goal of the USTTI is to share U.S. advances in communications on a global basis. The USTTI provides a comprehensive array of free telecommunications and broadcasting training courses for qualified women and men who manage the communications infrastructures in developing countries. During its first 12 years, the USTTI has offered a total of 541 different courses, and graduated 3,857 women and men. The USTTI graduates are the principal telecommunications and broadcast managers, engineers, and technical specialists who operate the telephone systems and broadcast networks in 151 countries around the world.

Regional Telecommunications Restructuring (RTR) Program: This program, funded by the U.S. Agency for International Development and managed by NTIA, is a planned project in Southern Africa that will provide management and technical education, resolve policy and regulatory issues, implement sectoral improvement programs in focus countries, and increase U.S. companies' access to information and business opportunities. The training activities of the RTR program will focus on key audiences whose support will be critical to sectoral liberalization and restructuring efforts in the Southern African region. Focussing both on individuals and institutions, the RTR program will hold annual policy symposia, skill-building workshops, and information seminars, as well as internships with U.S.-based telecommunications companies and organizations. Currently, ten training sessions are planned over the life of the project.

The Leland Initiative: This initiative, which is dedicated to the memory of Congressman Mickey Leland, will establish full internet access in a number of African countries. The resulting networks will be run by the private sector and supported by local gateway managers, who will be trained and encouraged to develop and foster regional links that support applications such as telemedicine, distance learning, and agricultural development. The intention of this project is to ensure that the African continent and its constituent economies, institutions, and societies, will benefit from the Internet - from urban and rural locations.

Industry Training Efforts: Businesses have used multifaceted approaches to facilitate human resources development in Africa. The over-riding philosophy is that methodologies will vary depending on the issues to be addressed. One source for human resource development which should not be overlooked is the private firms in international commerce that are developing a cadre of network and information management specialists as a matter of basic operations. This can be the basis for a new supply of network managers for African countries. Other methodologies include:

e. Classroom/Instructor-Led

This approach is most appropriate when the skills, knowledge, and application to be mastered occurs through interaction with others, or when ideas and concepts are complex and require extensive explanation and interaction with an expert. This mode of learning provides a diversity of ideas, challenges existing beliefs, and develops new paradigms. Additionally, this mode serves as a relationship builder - participants acquire a network of resources which can be managed and developed beyond the classroom.

f. Distance Learning

This methodology is primarily recommended to those interested in acquiring information and increasing skills and knowledge. It presupposes that interaction with others is not required to master content. However, given geographic constraints, this methodology can also be used to imitate traditional instructor-led delivery, and disseminate information to large numbers of people dispersed throughout the world.

g. Mentoring/On the Job Training

This methodology is best suited to individuals who possess requisite skills and knowledge but lack application and practice (or need to acquire additional applications and hands-on experience).

These methodologies show that it is possible to provide human resource development and education through all three media: Classroom/Instructor-Led, Distance Learning, and Mentoring/On the Job Training. Below are specific examples of the recent initiatives:

Traditional instructor-led programs and symposiums have been delivered in Nigeria, Egypt, Kenya, and South Africa.

On the job training - Certain firms' individual business units have sponsored summer interns. These interns have held a variety of positions during the summer months. Individuals are usually university students or graduates. They work closely with a mentor to facilitate the transition into the work place. The students are compensated for transportation, housing, and are given salaries comparable to their U.S. peers.

Mentoring and professional development - Functional experts who have been working for several years and who need to enhance their skills, or learn new methodologies and practices, have participated in extensive training programs in the U.S. at the expense of the host company. These programs are followed up by pairing the participant with an expert mentor to advise on the application of new concepts when the participant returns to their country.

Many firms are now developing computer-based training to be used in developing the requisite technical skills to support today's technology.

As firms establish themselves in Africa, local country nationals are hired in both occupational and managerial functions. These individuals are trained using many or all of the aforementioned methodologies.

Other members of industry have established a "university" that designs, develops, and delivers training courses to the mother company, its customers, and its suppliers. A wide range of training programs in the form of open classes or private sessions are arranged to meet the special needs of individual employees and associates of the company.

3.9 Observations · Recommendatons

A recent policy statement made by the President of the United States leaves no doubt about the future course of cooperation:

> "The commitment and right choices now being made by a number of African countries give us ample reason to re-energize our efforts and to join with those countries in partnership to pursue our mutual interests in democracy, political stability, and economic growth." (Source: "A Comprehensive Trade and Development Policy for the Countries of Africa," a report submitted by the President of the United States to Congress.)

From the African side, an effective set of measures might include the following:

- Establish an operating environment characterized by private investment, competition, open access, and a flexible regulatory regime.

- Ensure an open, transparent, industry-sponsored, standards-setting processes.

- Ensure a non-discriminatory approval regime.

- Maintain voluntary, global telecommunications standards that facilitate a maximum of connectivity among networks. Standardization organizations within Africa should be encouraged to coordinate with one another and with the ITU to ensure maximum network and equipment interoperability and to ensure that new technological advances are quickly deployed.

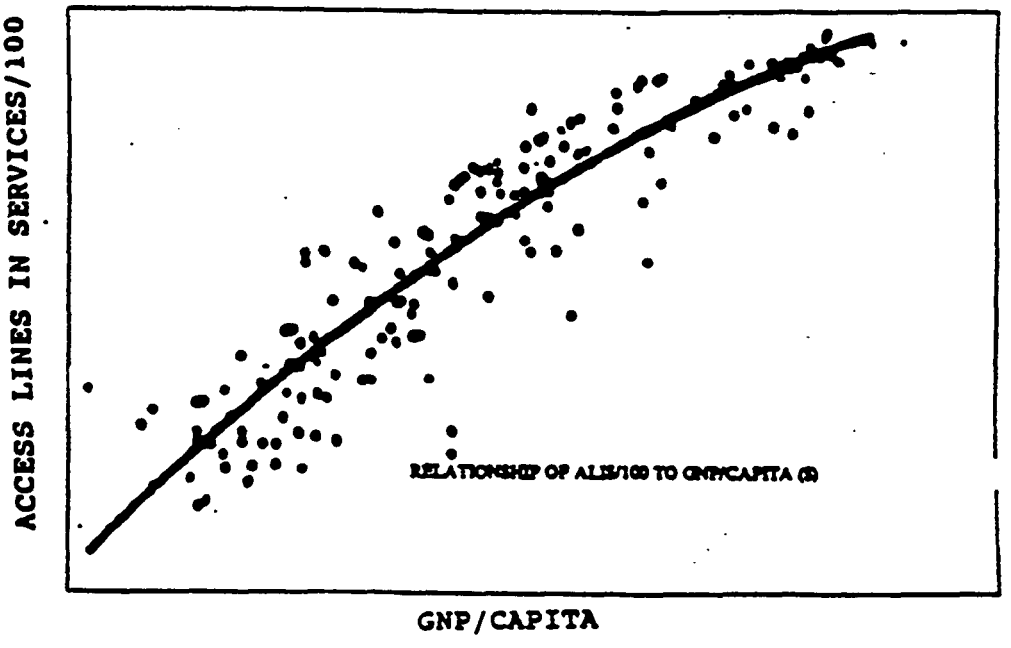
- Participate in the development of, and adhere to guidelines for, licensing of global satellite systems in ways that assure the preservation of national sovereignty, market access, simple and predictable regulatory processes, global roaming, and private investment in systems.

- Coordination of spectrum planning and management should be a priority issue among all countries to minimize radio frequency interference and to secure a competitive marketplace for spectrum-dependent products.

- Consideration by Members and members of the region should be given to the establishment of clear rules for interconnection with the PSTN, tariffing of leased-lines, and access charges to enable service providers to build efficient, complementary networks.

- Adequate protection of intellectual property rights (IPRs) is critical for promoting the transfer of telecommunications technology (patents) and of the information content (copyright and trademarks) that pays for the network. Countries of the region should adopt strong standards to protect and enforce IPRs.

Appendix A



Appendix B

SOURCES OF FUNDING AND AVAILABILITY BASED UPON OWNERSHIP

Type of Funding	*Owned by Government*	*Owned Privately Without Publicly Traded Securities*	*Owned by Private Sector with Publicly Traded Securities*
Multinational Agencies	Generally available on project basis	May be available on project basis	Probably not available for projects but may find funding to enhance credit worthiness of issuer securities
Vendor Financing	Available at pricing generally based upon government pricing with premium	Available but at premium due to private ownership	Available but pricing probably not competitive with other sources
Banks and other financing institutions	Available including: o Project Financing with security over specific projects o Limited availability of general working capital facilities	Available including: o Project Financing with security over specific projects o Possible availability of general working capital facilities. Receivables forward sales.	Available including: o Project Financing with security over specific projects o Likely availability of general working capital facilities
Domestic capital markets (generally only for equity securities)	Not applicable	Limited Market possible	More substantial participation possible; problems of "flowback" and arbitrage
International Debt Markets	May be available but may require direct government participation if telecom not sufficiently seperated	May be increasingly available as company demonstrates capacity to service debt	May be increasingly available as company demonstrates capacity to service debt
International Equity Markets	Not applicable (although non voting capital stock may be marketable)	Available	Available
International Telecom Operators	Not likely to be significant	Significant opportunity to secure participation	Opportunity although pricing may become an issue relative to market prices

Appendix C

FINANCING FOR TELECOMMUNICATIONS PROJECTS

The telecommunications sector in our region is growing at a phenomenal rate. This growth needs to be sustained by support from the world's capital markets. The globalization of those capital markets has resulted in various financing methods. These are:

- Debt financing
- Project financing
- Equity financing
- Joint ventures
- Vendor credits

The important issues in private financing of telecommunications projects are: (1) the number of opportunities is increasing; (2) we are moving beyond privatization; and (3) we need funding for long-term capital programs.

Debt Financing

Debt financing is an integral component of the majority of telecommunications projects. There are two types of debt financing:

- Senior debt, usually in the form of bank loans
- Junior debt in the form of subordinated bank loans or debt securities

Senior debt generally is secured and carries lower interest rates, while junior debt may be secured or unsecured and has higher interest rates. Junior debt offered in private placement helps avoid complicated securities law requirements and can be placed more quickly than public offerings. However, junior debt offered in public offerings carries lower interest rates, has a broader market and has fewer restrictions on its issuer.

Rule 144A and Regulation S are two measures introduced by the United States to facilitate investment in debt securities by foreign issuers in the U.S. markets. Rule 144A eliminates limitations on resale of restricted securities within a secondary market of "qualified institutional buyers," -- institutions which because of their size and experience are deemed to be

capable of evaluating investment opportunities on their own. Rule 144A also gives foreign issuers the ability to have their securities traded among institutions in the United States without the issuer being required to comply with Exchange Act reporting requirements. Regulation S exempts registration under the U.S. securities laws for transactions that occur wholly outside of the United States. This exemption applies where the securities are sold in an "offshore transaction" with no "directed selling efforts" in the United States. The introduction of Rule 144A and other measures by the United States have resulted in an active foreign securities market among large institutional investors, and foreign issuers.

Project Financing

Project financing is an attractive alternative for the financing of international ventures where the introduction of new services to new markets offers investment opportunities but requires large investments of capital at the outset and carries greater risk and uncertainty than the typical domestic transaction. Project financing is advantageous to the borrower because it limits the need for recourse against the project sponsor. Project financing helps relatively weak project sponsors to use the credit of the project to borrow money on more favorable terms than would otherwise be available. The issues to be considered in project financing include:

- The scope and duration of the concession/license
- Operating and market risk
- Employment issues
- Currency controls
- Political risk
- Enforceability of the security interest
- Negative pledges (if government is an owner)

Equity Financing

Typically, equity financing of telecommunication projects occurs through a joint venture in which the joint venture partners themselves have or can obtain the funds needed to invest in the project. Project sponsors can raise capital in the host country, or elsewhere by issuing equity securities.

Equity financing requires an investment policy that favors foreign investment. Favorable foreign investment laws, and the ability to repatriate capital and profits are vital. The

American Depositary Receipts program, the updating of applicable regulations and the introduction of Regulation 144A and Regulation S by the United States have helped increase the offering and sale of equity securities in the international capital markets. This mode of financing is particularly attractive in our region because of relaxed investment and repatriation policies; and the U.S. drive to expand its telecommunications markets and investments.

Joint Ventures

Joint ventures as a form of direct foreign investment, have gained momentum in the telecommunication industry. Joint ventures give members an opportunity to establish a presence in countries with the prospect of early access to a large market of potential customers. Deregulation, privatization of international telecommunications markets and dramatic technological developments in the last decade have led to an increase in joint venture projects in the telecommunication industry.

The popularity of joint ventures lies in (1) the ability to have a mix of partners who may satisfy the political, financial, and technical requirements needed to win the bid; (2) competition is reduced to 2-5 consortia as opposed to 20-25 companies; (3) financial risk is shared between members of the joint ventures; and (4) the strength of each partner complements the other.

For telecommunication operating companies, joint ventures are the solution for securing at least a slice of profits in the fiercely competitive global telecommunications market. Due to the massive amount of capital which is often necessary for global acquisitions joint ventures as strategic offensive tools for telecommunication companies will remain popular through the next decade. Some of the issues to be considered before entering a joint venture are: the objectives of and the competition among the venturers; capitalization; management of the joint venture distribution and other payments; indemnities and risk allocation; and exit provisions.

Vendor Credits

Vendor financing is generally limited to certain categories of capital equipment. The increased demand for equipment has led to a shift in the bargaining power to the vendor. Thus equipment specifications could be subordinated to financing considerations. Therefore, vendor financing may be relatively expensive. Some countries subscribe to a program of mixed credits, whereby national aid is linked to the sale of equipment by vendors of that country. The U.S. does not subscribe to that policy as it exercises control over a nation's use of foreign aid; and limits now and into the future the sourcing options of the recipient country for telecom equipment. This is detrimental because of rapid advances in technology and often, declining prices.

Appendix D

DEBT-FOR-DEVELOPMENT

The developing country debt crisis that began in 1982 with Mexico's default on loan payment obligations caused a number of debtor countries to establish debt-equity conversion programs that, together with debt restructuring and forgiveness programs, were aimed at improving their debt service capability. Creditors strongly supported the debt-equity conversion concept. International financial institutions also endorsed debt-equity conversions subject to their compliance with International Monetary Fund agreements on the money supply and their not adversely affecting the budgets of the debtor countries.

Although debt restructuring documentation allowed debtor countries to establish and operate debt conversion programs, it was not until a relatively active secondary debt market developed in the years following Mexico's default that investors were actually able to purchase and convert debt into local currency for approved investments. Debt conversion activity during the 1980's was concentrated in Chile, Mexico, the Philippines, Nigeria and South Africa and has since spread to several other countries.

THE LOGIC OF DEBT CONVERSION FINANCING

The economic rationale for debt conversions to finance investment in debtor countries is based on the ability to purchase the financial obligations of a developing country from a creditor at a discount. An investor purchases the debt and, by prior agreement with the debtor government, cancels the debt in exchange for receiving local currency, bonds, shares in a local company or another form of agreed payment. Depending on the country, debt conversions can generate between 5% and 200% more local currency for the investor's project than a conventional foreign exchange transaction.

Debt conversion transactions are appealing because all parties involved in the transaction can benefit:

- The investor obtains local currency or assets at a favorable discount because the debt is purchased at a significant discount in the secondary market and redeemed by the debtor country at a value higher than its purchase price. This financial gain allows the investor to leverage the resources available for the investment.

- The debtor country retires debt at a discount in local currency and simultaneously attracts new investment in priority sectors of its economy. The country's debt levels are reduced thereby enhancing its ability to service its remaining debt.

- The commercial bank receives immediate partial repayment on its outstanding loans at a price it believes is equal to its market value. The reduction in the debtor country's external debt improves its ability to service its remaining debt and enhances its ability to eventually return to the credit markets.

NECESSARY PRECONDITIONS

To execute a debt conversion transaction, several preconditions should exist:

- The country's external debt should be available at a discount from its face value.
- Under the prevailing loan agreements and applicable laws and regulations, the debt must be eligible for conversion.
- The debtor government must be willing to convert the debt. Some countries only approve debt conversions on a case-by-case basis, while others have formalized programs that establish debt-conversion terms and conditions.
- The investor must propose an investment project that meets the debtor country's development and debt reduction criteria.

STEPS IN CONDUCTING DEBT CONVERSION TRANSACTIONS

Step #1: Design and Funding of the Investment Project:

The investor decides to invest in a new or existing corporation or project in a developing country and obtains the required funding to effect the investment. The investor determines the funds resulting from the conversion will be utilized and prepares a preliminary budget identifying the amounts to be spent in each expense category. In addition, the investor obtains all government and other required approvals to effect the investment.

Step #2: Feasibility Analysis and Design of the Transaction Structure:

Before proceeding with a potential debt conversion transaction, the investor should determine whether in principle it is feasible to structure the transaction in a way that adequately addresses the investor's funding and project cash flow requirements and provides the investor with a sufficient gain without incurring unacceptable risks. The factors that will be considered in determining the feasibility and structure of the transaction will include, but not be limited to:

- The type of debt conversion proceeds that will be paid to the investor (cash, shares, bonds, real property, commodities, tax credits or exonerations, or other forms of consideration).
- The foreign exchange rate applied to the debt conversion;
- The debt purchase price and debt redemption rate.
- The availability of sufficient amounts of eligible debt.

- The expected time required to close the debt conversion transaction and whether the transaction can be effected in tranches.

- The feasibility of protecting the debt conversion proceeds from the adverse impact of inflation and foreign exchange devaluation.

- The debtor government's performance and payment risk.

Step #3: Application for Government Approval:

The debtor government generally requires that the investor and/or the investor's local counterpart submit for review and approval an application for authorization to convert debt. The Ministry of Finance and/or the Central Bank usually manages the application review process.

The application normally includes a detailed description of the investment project, proposed conversion terms and conditions, copies of the investing company's certificate of incorporation, copies of the debtor government's authorizations for the investment, detailed budget and cash-flow projections for the local company and a description of the benefits to the host country that will result from the investment.

It is important to note that submitting a debt conversion application and receiving authorization to effect the transaction does not obligate the investor to proceed with the transaction.

Step #4: Executing The Debt Conversion Transaction:

Once the investor has received written approval from the government specifying the type of debt eligible for conversion, the transaction(s) can be completed. The investor will then purchase the debt directly from creditors or from the secondary market pursuant to debt purchase and assignment agreements and assign the debt to the debtor government in exchange for the government paying the investor the agreed debt conversion proceeds.

Step #5: Managing the Conversion Proceeds:

To ensure that conversion proceeds are used for the authorized purposes, the debtor government normally requires the investor to prepare and submit reports on the use of the conversion proceeds. If the investor receives local currency bonds, the investor may be permitted to sell these instruments in the local secondary market to obtain funds for the project. Upon receiving the debt conversion proceeds, it is important that the investor undertake appropriate measures to protect the proceeds from the adverse effects of inflation and currency devaluation.

COSTS AND RISKS OF DEBT CONVERSION TRANSACTIONS

In addition to the cost of purchasing eligible debt, transaction costs normally consist of: (i) fees paid for legal and technical assistance; (ii) financial advisory fees; and (iii) debt conversion fees

levied by the debtor government. In the aggregate, these fees should not significantly affect the transaction gain.

The primary risks for the investor in effecting debt conversions are the performance and payment risk of the debtor government and the risk that the debt conversion proceeds will be adversely affected by inflation and foreign exchange devaluation. Transactions can normally be structured to adequately address these risks by purchasing and converting debt in tranches and by using escrow agents, however, if this is not possible, the investor is best advised not to pursue the debt conversion transaction.

SAMPLE TRANSACTION

A U.S. investor decides to capitalize a local company to implement a project in Country X. The investor estimates that under a normal foreign currency exchange transaction, the project would require an investment of US $1,000,000. The current price of Country X's debt on the secondary market is $0.40 per $1.00 of face value. The investor spends $500,000 to purchase debt eligible for conversion with a face value of US $1,250,000. The investor presents the eligible debt to the Central Bank which has authorized the conversion of the debt into local currency at 80% of face value or the local currency equivalent of $1,000,000.

The Central Bank pays the local currency equivalent of 80% of face value into an escrow account with a local escrow bank in the name of the local company and a proportionate number of shares are issued against these funds. The investor simultaneously transfers title to the debt to the escrow bank in favor of the government. The escrow bank, after verifying the amounts and execution of title, releases the local currency to the company and the debt is transferred to the government.

If in this example the investor is required to spend $60,000 on transaction costs and taxes, its total cost of acquiring local currency equivalent of US $1,000,000 is $560,000. The investor therefore leverages its investment funds through debt conversion by generating an approximate gain of 79% over a conventional foreign exchange transaction.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 48-E
29 April 1996
Original: English

For Information/Support

Agenda item: 2.1

PLENARY MEETING

SOURCE: INTELSAT

TITLE: INTELSAT DAMA - A SOLUTION TO RURAL INTEGRATION

Abstract

INTELSAT and the nations of Africa have been partners for more than 30 years, working together to improve and expand African communications. Satellite technology is a vital communications medium for meeting African requirements in a cost-effective, reliable and responsive manner. Satellite digital technology applications bring even greater benefits because of their greater efficiency and reduced cost.

INTELSAT has developed a digital satellite service for thin-route requirements that is very advantageous for use in international and domestic rural communications networks. This service uses one of the most flexible, cost-effective multiple access technologies available on the market today, demand assignment multiple access.

INTELSAT's DAMA service, in combination with INTELSAT's extensive customer support system, is an ideal option for countries establishing or extending rural communications networks. Building upon the cooperative initiatives of INTELSAT and RASCOM, DAMA is an extremely valuable means for enhancing African connectivity.

I Introduction

INTELSAT's mission is the provision of public telecommunications services on a non-discriminatory basis to all areas of the world. In fulfillment of this mission, the INTELSAT system provides capacity for the world's most fundamental public switched and private networks for voice and data services. The connectivity provided by the INTELSAT system makes possible voice/data communications anywhere on the globe, no matter how remote, rapidly and economically. INTELSAT continuously seeks new and better ways for meeting the world's

requirements for basic telecommunications services using the most advanced technology applications available.

Over the past decade, much of the world's telecommunications has evolved from analogue to digital transmission because of the cost and resource savings advantages offered by digital applications. INTELSAT has sought to incorporate digital technology in all of its services for thick-, medium- and thin-route traffic requirements.

INTELSAT now has 138 member-nations. Of these, 38 are African countries, comprising over 27 per cent of INTELSAT's total membership. INTELSAT was the first organization to offer international satellite telecommunications services to Africa, and many African nations have been INTELSAT members for more than 30 years. Africa's partnership with INTELSAT reflects the fact that satellite technology, more than any other medium, has much to offer Africa for improved communications and enhanced regional connectivity.

Since INTELSAT serves the world, the majority of its member-nations are developing countries. Many of these countries lack an existing and pervasive national telecommunications infrastructure and the resources to extend their existing networks into rural and remote areas.

INTELSAT has developed a cost-effective, easy to use, reliable, state-of-the-art service to meet thin-route requirements to rural and remote areas: demand assignment multiple access, or DAMA service. This service provides a valuable tool for establishing rural telecommunications networks and integrating them into existing domestic and international networks. DAMA is a useful option for African nations with rural telecommunications network requirements.

II INTELSAT DAMA service features

Digital technology offers significant advantages for satellite communications because it increases the efficiency of its use. This, in turn, leads to a reduction in transmission costs.

INTELSAT's DAMA service is a digital solution for thin-route public switched network services. It provides dynamic satellite circuit sharing and switching capabilities for greater efficiencies in the utilization of the INTELSAT space segment. These efficiencies are passed on to the user who is charged on the basis of the amount of satellite capacity actually used, on a per-minute basis.

INTELSAT's DAMA service has been developed for thin-route communications. For users with low traffic requirements needing to replace existing single channel per carrier circuits or needing to expand digital services incrementally, DAMA is one of the most flexible multiple access technologies available on the market today. Figure 1 shows the network architecture.

INTELSAT's initial DAMA offers features such as basic telephone service for voice, fax and voiceband data applications. In the future, DAMA will also be capable of providing on-demand 64 kbit/s connections, offering customers higher bandwidth applications such as occasional digital video.

DAMA services will commence via international gateway earth stations on the INTELSAT 605 satellite at 335.5°E in the Atlantic Ocean region. While thin-route customers in over 70 countries in Africa, eastern Europe, and Latin America will be the first to be able to use DAMA, this service is planned to be extended globally to include all of INTELSAT's service regions. Future service coverage enhancements will include multitransponder and beam operation.

III Features and benefits

The INTELSAT DAMA service has the following features and benefits:

A Optimum for thin routes

INTELSAT DAMA is a flexible option for thin-route operators offering services that start as small as one or two 16 kbit/s channel units. It provides instant global access through INTELSAT's global coverage, direct routing which eliminates the need for transit arrangements, and charging on a pay-as-you go basis, based on call duration and resources used.

B Basic international communication services

INTELSAT DAMA provides 16 kbit/s ITU-T G.728 LD-CELP (Low Delay Code Excited Linear Prediction) voice encoding for speech, facsimile and voiceband data. Usage is tariffed on a pay-per-minute basis for answered calls.

C Domestic network services

In a second phase, INTELSAT DAMA may also be used to provide a very flexible and cost-effective solution for domestic telecommunications requirements, including rural and closed networks. Using the DAMA subnetworking capabilities, domestic network operators could save implementation costs for dedicated network management operations.

D Future advanced digital communication services

Future applications of INTELSAT DAMA, available through on-demand "reservation" of bandwidth (n x 64 kbps up to 2 048 kbps) will include digital television, low or high speed data services and the provision of VSAT services.

E Space segment savings

INTELSAT DAMA customers will be able to save on their space segment costs because their charges are based on the time and resources used. This eliminates via-routing charges and space segment inefficiencies typically found on pre-assigned thin-route satellite circuits.

F Compact, less expensive ground equipment

In 1995, INTELSAT made it easier for customers to adapt ground networks for INTELSAT services. A new earth station standard, Standard H, was adopted. This new standard is applicable to C-band VSATs as small as 1.8 metres. Initially, it will be used in connection with INTELSAT's thin-route demand assignment multiple access service, DAMA.

The INTELSAT DAMA terminal is an enhanced version of a mature product already successfully manufactured by Hughes network systems. The new DAMA equipment being manufactured to INTELSAT's specifications can be sized according to the customer's projected traffic and can also be expanded in single channel increments.

The terminal will be installed within existing earth station facilities, such as a Standard A or Standard B. The use of Single Channel Per Carrier (SCPC) access allows operation with a wide range of earth station sizes, and will eventually include the possibility of using small aperture INTELSAT standard, earth stations.

The terminal has a compact, modular design, and consists of a rack-mountable chassis into which "channel unit" cards are placed. The channel unit is completely software configurable, permitting a high degree of operational flexibility in selection of transmission and interface parameters. Figure 2 shows the network features at the user's end.

INTELSAT intends to facilitate a multivendor market for DAMA terminals. A "common air interface" specification, when released, will allow other suppliers to design and manufacture compatible DAMA terminal equipment.

G Ease of operation

INTELSAT's DAMA equipment is simple to install and configure. System operation is centralized and controlled from the DAMA Network Management Control Centre. Network operations are managed from INTELSAT's Operations Centre to ensure a high level of customer support. Once installed and tested, the earth station operator does not need to perform any further testing, monitoring or control functions.

H Pre-negotiated prices

Users will procure equipment, installation and training services directly from the manufacturer at pre-negotiated prices. An Ordering Agreement is in place, guaranteeing prices for a period of seven years. Through the INTELSAT Digital Equipment Implementation Assistance Programme, financial assistance is extended to INTELSAT members.

IV Use of DAMA for rural integration

INTELSAT's DAMA service is an ideal application for countries who need to establish or enhance rural network services. Using a DAMA service configuration, countries can establish rural network nodes on an incremental, as needed basis. One or more DAMA terminals can be deployed to rural and remote areas for voice, fax and data communications services among the remote sites and between the remote site and the network hub.

INTELSAT DAMA's service enables integration of a country's international and domestic rural communications requirements into one, cost-effective, reliable and easy to use satellite network. This network is sufficiently flexible to expand support aggregation and incremental growth of international, domestic, or both, rural communications requirements. Figure 3 shows DAMA applications in all three INTELSAT ocean regions.

INTELSAT's packaging of its DAMA service also provides the valuable option of using the DAMA subnetworking capabilities for dedicated domestic network management operations, making it an even more cost-effective alternative for domestic rural communications systems. Since the intention is to expand DAMA service applications to include digital video and low- and high-speed data services, a DAMA rural network operator will have in place the nucleus for a comprehensive rural services system, capable of supporting basic voice and other applications such as distance learning and telemedicine.

V Using INTELSAT's DAMA service for African rural communications requirements

A INTELSAT's value-added services

INTELSAT's DAMA service is already packaged to create value for customers with low-cost equipment available at pre-negotiated prices, financial assistance to INTELSAT members, and rates

that reflect only call activation duration and capacity used. INTELSAT is considering other initiatives to assist in the acceleration of rural integration, such as the bundling of the cost of the equipment along with the utilization.

B The INTELSAT applications support team

INTELSAT provides assistance with service development and staff training through the INTELSAT Assistance and Development Programme (IADP) and the Signatory Training Programme. These two groups are an important part of INTELSAT's new applications support team.

Over the past year, the IADP undertook development projects for 45 INTELSAT countries and specific DAMA application studies for 55 countries. Service development projects included: feasibility studies of new earth stations; studies on domestic network implementation for VSAT and compressed digital television in C- and Ku-bands; and financial assistance for procurement of digital equipment.

The IADP also conducts seminars around the world. In 1995, for example, the IADP conducted seminars in: the Congo, for French speaking African nations; Turkey, for east European and NIS nations; Brazil for South American nations; Panama, for central American nations; and the central African Republic for African nations. These seminars focused on digital service development including low-cost TDMA, DAMA, digital television and VSAT applications.

INTELSAT's training programme initiatives included course presentations on topics such as traffic planning and forecasting, earth station management and digital service implementation. In addition, INTELSAT continued its on-the-job training programme in conjunction with cooperating signatory and other telecommunications organizations. A total of 88 trainees from signatories have completed this practical training programme since its inception.

A country wishing to establish a rural network using DAMA has the option of utilizing the resources of the IADP from network inception through implementation and operation and the Signatory Training Programme to augment and enhance the skills of its personnel.

These kinds of services are essential for the broadest dissemination of information and know-how so that all nations may enjoy the benefits of the newest satellite service applications.

C Additional customer support

INTELSAT provides each of its customers with the service of a team of dedicated professionals with expertise to match every aspect of their support requirements. From initial contact with the sales account team through service implementation and management, INTELSAT is there with the financial, technical, operational and development resources to ensure customer satisfaction every step of the way.

During the past year, in order to facilitate new business processes and improved customer service, INTELSAT's sales and marketing division has been restructured into telephony and video marketing teams, two new customer support teams and geographically focused sales teams.

The new customer service team has been developed to provide a dedicated single point of contact for all customer requirements and can be reached through a dedicated telephone number. This team will expand the regional focus developed by the regional sales teams and will provide customers with assistance for the full range of commercial enquiries from general information and pre-sales activities to the coordination of highly specialized technical customer specific requests requiring the full range of INTELSAT's resources.

The service implementation team provides tailored technical assistance to customers prior to service activation. The service implementation team may be contacted directly for assistance with transmission planning and approval, capacity allocation, frequency assignments and pre-service testing.

D Regional support centres

Following the launch of its Bombay, India Regional Centre, during the next few months, INTELSAT will be formally announcing the establishment of three additional regional centres to serve Africa and the Middle East; Asia and the Pacific region; Europe; and south Asia. These centres will provide added local geographical focus and support, and increased market awareness and business development.

E INTELSAT's initiatives with RASCOM

INTELSAT and the nations of Africa have a long and successful history of cooperation and accomplishment in meeting Africa's communications requirements. These joint initiatives are currently focused on INTELSAT/RASCOM cooperation. INTELSAT has had the opportunity to work with RASCOM from its inception. INTELSAT firmly supports RASCOM's initiatives and its commitment to African interconnectivity.

INTELSAT's DAMA service can be utilized to enhance African interconnectivity and to extend African domestic and regional communications networks to the most rural and remote parts of the continent. At the third RASCOM/INTELSAT Operations Meeting, held in November 1995 in Cape Town, South Africa, the decision was made to undertake joint INTELSAT/RASCOM marketing activities for services such as DAMA. INTELSAT's future deployment plans provide for the availability of two advanced INTELSAT VIII/VIII-A spacecraft at prime locations for African services, an INTELSAT VIII at 338.5°E and an INTELSAT VIII-A at 33°.

VI Conclusion

As a new digital technology, DAMA offers multiple benefits for African users. It can be used by African countries to help reduce transit costs, to improve interconnectivity across the continent and as a solution for rural integration. It is a service that has INTELSAT's extensive resources, expertise and customer support network behind it. Its use is compatible with INTELSAT's other digital services, and its integration by African users into their networks will represent a significant step toward the goal of full participation by Africa in the emerging global information infrastructure.

FIGURE - 1

Network Architecture

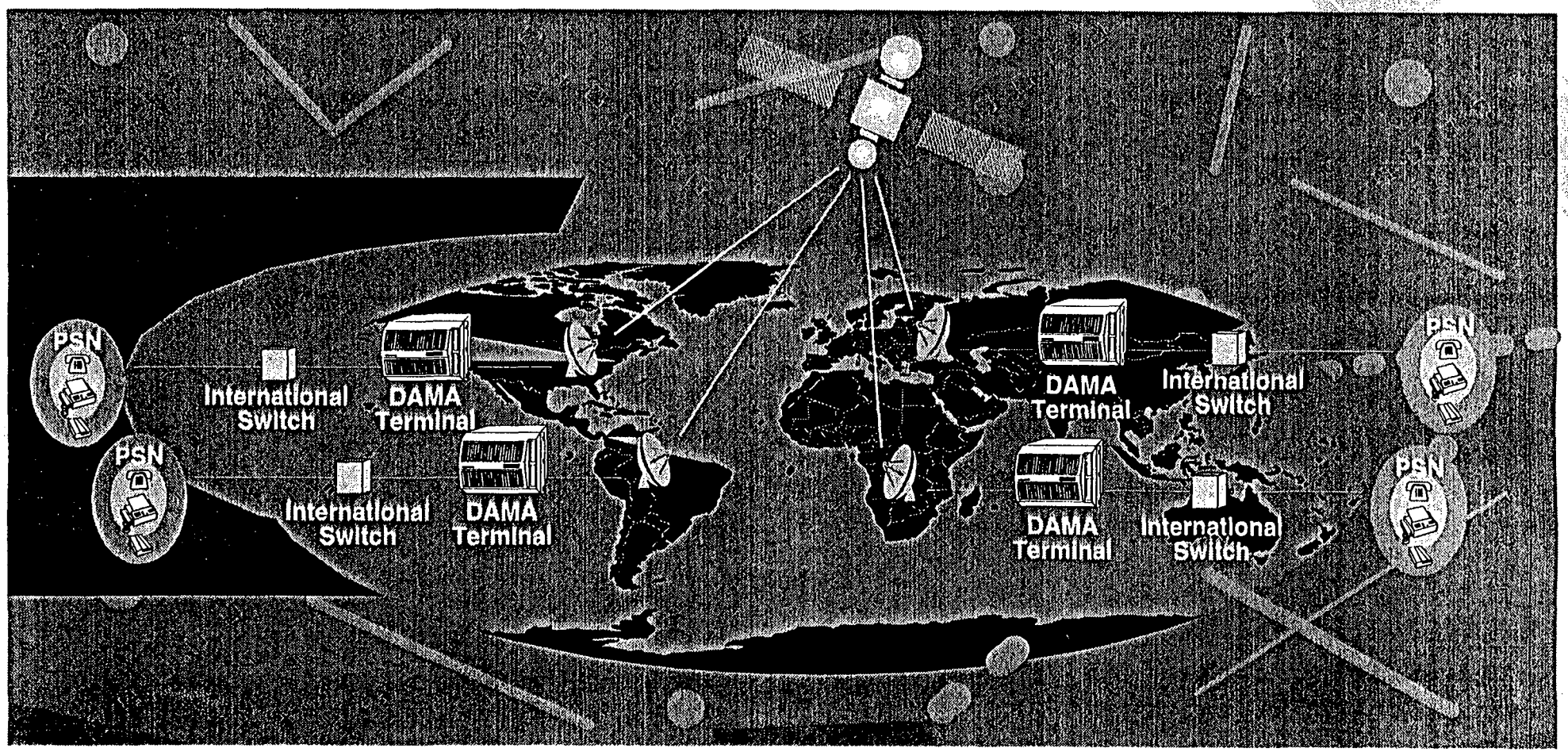
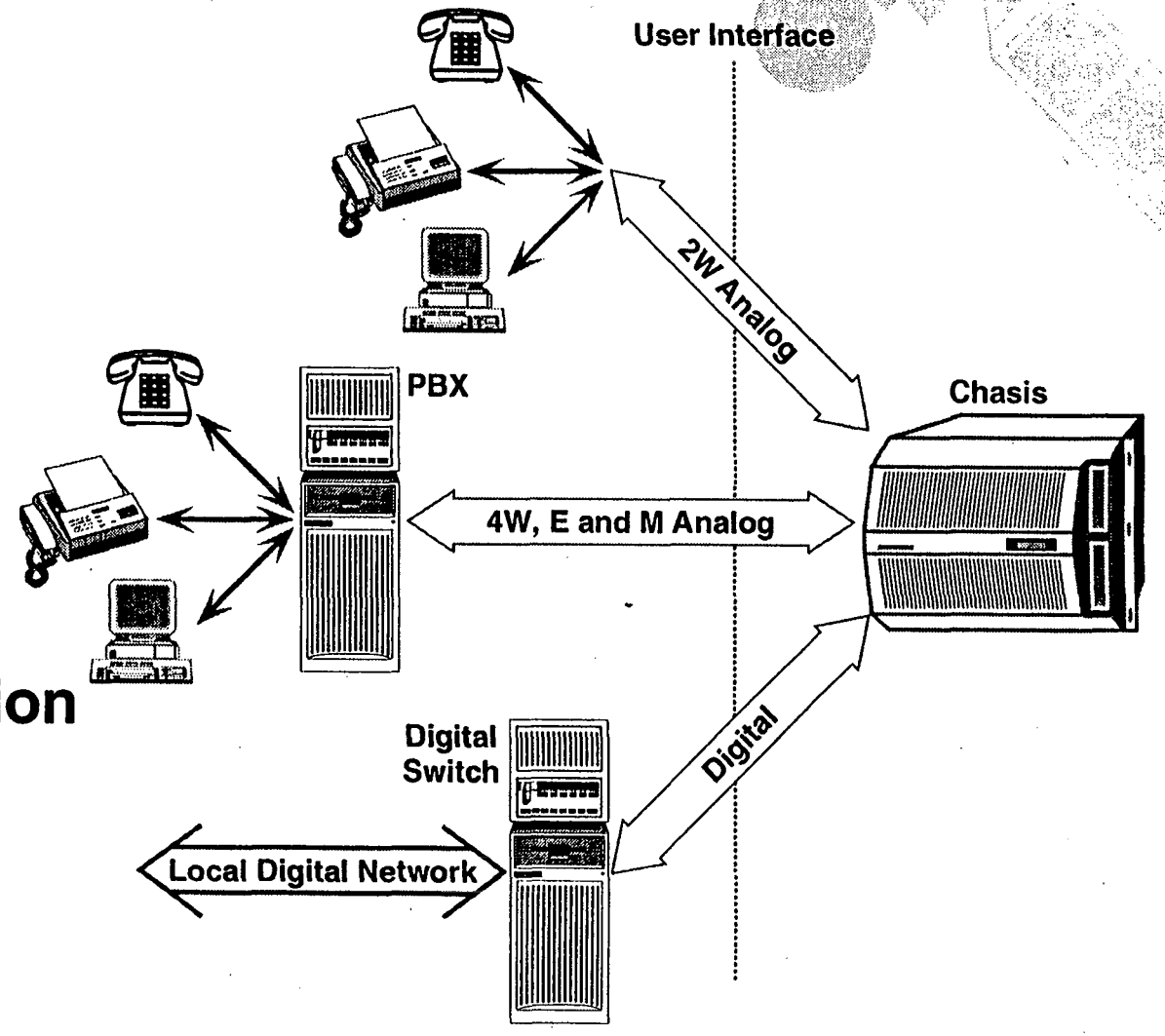


FIGURE - 2

Network Features (At User's End)

- **User Interface**
  - Analog or Digital
  - Two-wire or four-wire
- **Signalling Handling**
  - Protocol Conversion
- **Built-in echo cancellation**



INTELSAT

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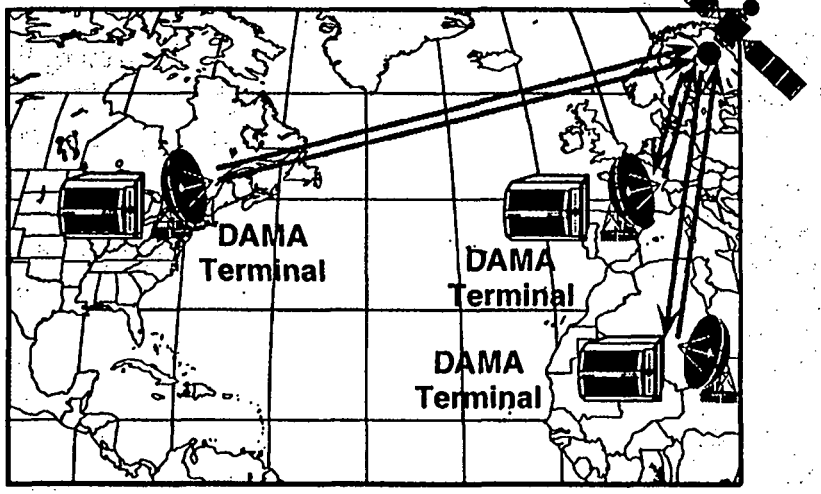
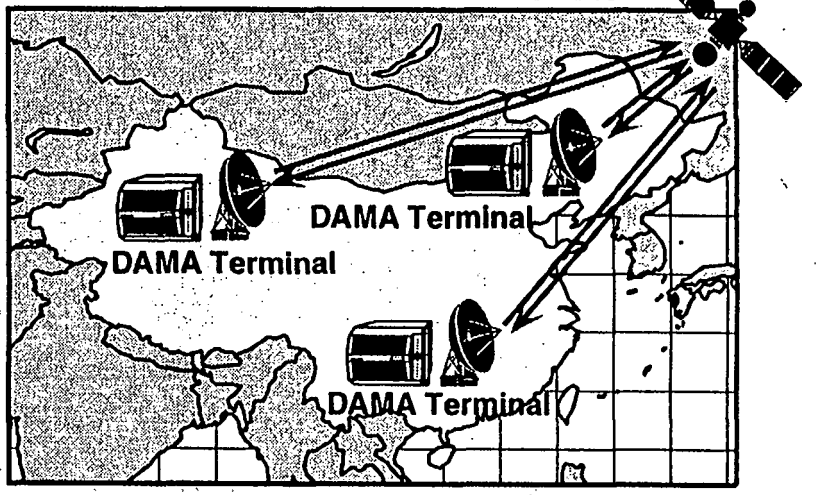
DAMA Applications

International PSN

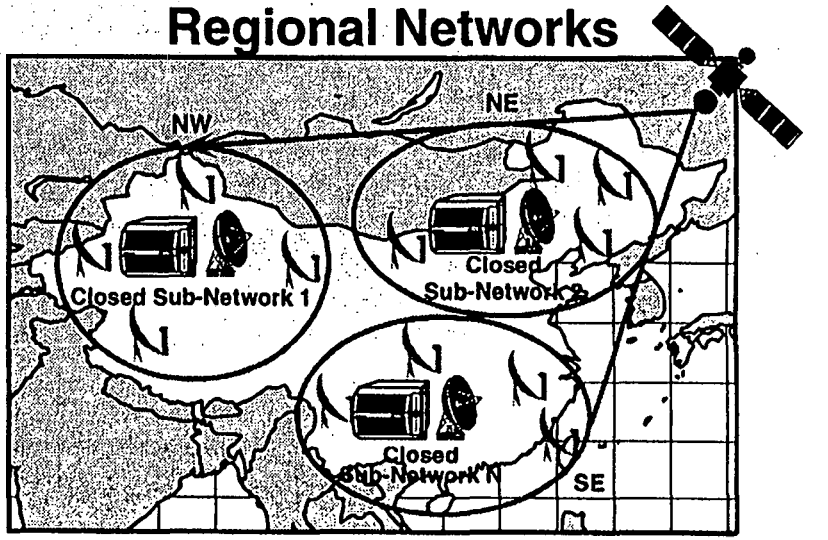


Domestic Networks



- AOR at 335.5°E
- IOR at 60°E
- POR at 174°E

Regional Networks



INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION
DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 49-E
29 April 1996
Original: English

For Information/Support

PLENARY MEETING

SOURCE: RADIOCOMMUNICATION BUREAU/ITU

TITLE: ITU-R ACTIVITIES OF RELEVANCE TO DEVELOPING COUNTRIES WITH EMPHASIS ON WRC-97

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1 Introduction

A major theme running through the current work programme of ITU-R is its supporting role for developing countries. In the first instance, the agendas of the two yearly world radio conferences increasingly have an impact on the development of new telecommunications services which, in turn, play a vital part in the economy and growth of the developing countries. Secondly, ITU-R (and also BR) becomes more involved in the affairs of the ITU Development Sector and in its work programmes and studies emanating from the Buenos Aires Conference.

The paper outlines areas of current work within the Radiocommunication Sector which have particular relevance to developing countries. It firstly addresses those issues arising from decisions of WRC-95 and those which will be dealt with by WRC-97 before going on to describe activities concerning the frequency coordination and planning of space services under Resolution 18 of the Kyoto Plenipotentiary Conference. Finally, mention is made of other areas of liaison between the two Sectors and their respective Bureaux.

2 WRC-95 issues relevant to developing countries

WRC-95 took some far-reaching decisions that are of considerable interest for the developing countries. These decisions, which will have significant impact on the development of the global radiocommunication systems both for developing and developed countries concern, *inter alia*:

- the allocation of additional spectrum to the mobile-satellite services (MSS) in the bands below 2 GHz (small LEO);

- the change of date for availability of the allocations to the mobile satellite service in the bands around 2 GHz (big LEO);
- the new conditions of use for non-GSO fixed-satellite service (FSS) systems in the 19 and 29 GHz FSS bands.

WRC-95 also prepared a proposed agenda for WRC-97 on which are many issues of major importance for developing countries. These concern, *inter alia*:

- broadcast satellite service (BSS) plans (Appendices 30 and 30A);
- high frequency broadcasting (HFBC);
- maritime mobile service and maritime mobile satellite service (MMSS);
- aeronautical mobile services;
- fixed services in bands above 30 GHz;
- adaptive systems at MF/HF;
- MSS and sharing issues with the FSS.

These topics are discussed in more detail below.

3 WRC-97 issues of particular relevance to developing countries

3.1 Appendices 30 and 30A BSS plans (Agenda item 1.10)

In 1977, a frequency-orbital position Plan was established by the ITU (WARC-77) for the broadcasting satellite service (BSS) in the band 11.7 - 12.5 GHz (Region 1) and 11.7 - 12.2 GHz (Region 3). This Plan together with the regulatory provisions and technical parameters was included in Appendix 30 of the Radio Regulations. In 1988, the Plan was completed by the adoption of a plan for the associated feeder links in the frequency bands 17.3 - 18.1 GHz and 14.5 - 14.8 GHz as contained in Appendix 30A of the Radio Regulations.

The Region 2 Plan, in the frequency band 12.2 - 12.7 GHz for the broadcasting satellite service and in the frequency band 17.3 - 17.8 GHz for the associated feeder links was developed during the RARC-83 Conference and incorporated into the Radio Regulations at the WARC Orb-85. Appendices 30 and 30A of the Radio Regulations contain the regulatory provisions and technical parameters of this Plan.

More than fifteen years after the establishment of the first BSS Plan, in a period of strong development of the satellite broadcasting operations outside the above mentioned plans (often called direct-to-home, DTH, service), the two last ITU Conferences (WARC-92 and WRC-95) decided to review the situation and to revise at WRC-97 the Appendices 30 and 30A for Regions 1 and 3. In order to prepare for this forthcoming planning Conference, the Radiocommunication Bureau, in cooperation with administrations and the ITU-R Study Groups, was entrusted to conduct planning exercises.

3.1.1 Planning principles, new technical parameters, procedural matters

The revision of Appendices 30 and 30A should result in the provision of entries for "new" ITU Member countries (or those which have geographically or administratively changed since the establishment of the original Plans) and those countries having less than the minimum number of channels assigned by the 1977 BSS Conference, with an initial capacity equivalent to that which would have been provided to them using the principles adopted at the 1977 BSS Conference. The

new planning should be based on national coverage, should protect the assignments which are in conformity with the Plans, should also ensure that the new plan is established with a view to achieving long-term flexibility and should take account, as far as possible, of systems which have been communicated to the Bureau for modification of the Plans. Through these principles, it is expected that both countries, having actual projects to develop their broadcasting operations, and countries, wishing to preserve their plan capacities included in the Plans, will be satisfied by the revised Plan to be prepared by WRC-97.

The technical parameters laid down for the new plan (i.e. adequate eirp reduction in the downlink path, new receive earth station antenna characteristics, simultaneous planning of feeder links and downlinks, new overall protection ratios (PRs), single entry C/I criteria, possibility of using digital modulations) are given in Recommendation 521 (WRC-95) and will be applied by the BR in performing its planning exercises.

WRC-95 also decided that the procedures associated with the Plans should be studied and requested the Bureau and the Radio Regulations Board to review some of the Rules of procedure applicable to the BSS environment.

3.1.2 Planning exercises by the Bureau

Following the decisions of WRC-95, the Bureau has established a specific work plan to conduct the various steps of the planning exercises in accordance with Resolution 531 and Recommendation 521 (WRC-95). This work plan includes three phases of the planning exercise:

Step 1 for the revision of the existing Plan on the basis of new technical parameters (to be completed by the end September 1996);

Step 2, to provide plan entries for "new" ITU Member countries (or those which have geographically or administratively changed) and for countries having less than the minimum number of channels (to be completed by May 1997);

Step 3, to take into account, as far as possible, those Plan modifications which were submitted to the Bureau (to be completed by September 1997).

To carry out the above tasks, a planning exercise team has been set up which is composed of representatives from the Bureau and experts from administrations, broadcasting satellite operators and international organizations.

In order to provide full transparency on the activities of the Bureau concerning the implementation of Resolution 531 and to establish full cooperation with administrations, regional organizations and broadcasting satellite service providers, the Bureau intends to establish a BSS Planning Consultation Group with the objective of monitoring Plan preparatory activities and advising the Director of the Radiocommunication Bureau. This Group will consist of representatives from Members of the Union and members of the ITU-R Sector. The first meeting of this Group is foreseen to be held in Geneva on 24-25 September 1996 at which the results of Step 1 and the progress on Step 2 of the planning exercises will be presented.

3.1.3 ITU-R Sector activities

As a separate activity, Working Party 10-11S, using information provided by the Bureau, will continue its planning exercises basically applying Resolution 531 (WRC-95) provisions but also considering other technical assumptions in planning and plan optimization. Its report will be submitted to CPM-97.

The Bureau will participate in the activities and studies to be carried out by the various ITU-R groups concerned, namely, Working Party 10-11S, the Special Committee on Regulatory and Procedural Matters, Working Party 10-11S, Special Rapporteur Group and the CPM.

It is to be hoped that the various preparatory activities will provide WRC-97 with the necessary results enabling that Conference to modify the Plan to the satisfaction of all.

3.2 High frequency broadcasting (Agenda item 1.4)

In accordance with Resolution 529 (WRC-95), Task Group 10/5 is developing a new planning method that would improve the present Article 17. At its last meeting, TG 10/5 proposed the following:

- administrations would submit their requirements twice a year, compared with four times as currently done under Article 17;
- the Radiocommunication Bureau would develop appropriate data capture and validation software to help administrations to prepare and test their requirements before their notification;
- the Bureau would also develop a new propagation software based on the latest ITU-R Recommendations on propagation, antennas, protection ratios and reliabilities.

Another software would allow each administration to analyse the results of the propagation calculations in order to assess the various incompatibilities and eventually modify their requirements.

TG 10/5 proposes the organization of regional and inter-regional coordination meetings to resolve the remaining incompatibilities. In response to Resolution 529, TG 10/5 also proposes that the other primary services, in the WARC-92 extension bands, be protected until 1 April 2007 and that administrations be encouraged to deal with the harmful interference problems by direct coordination between their operating organizations. A timetable is proposed for the opening of these extension bands and for the transition from DSB to SSB in the period between 2000 and 2007. The full implementation of SSB for all HF broadcasting in 2015 is still envisaged by TG 10/5.

3.3 Maritime mobile and maritime mobile-satellite service (Agenda item 1.6)

The impact of maritime telecommunications on the overall development of the economy of most countries has been ascertained in many cases and the importance of efficient maritime telecommunications has been put on the priority lists of many countries. The special needs of the developing countries in increasing the efficiencies of their services for safety of navigation and safety of life at sea, as well as the other commercial services (efficient and effective port operations and public correspondence services) have been recognized long ago and had been reaffirmed many times since then. WRC-97 will address important maritime issues. In the first instance, it will address the implementation of the global maritime distress and safety system, which is expected to become fully operational in early 1999. In addition, WRC-97 will pave the way for introducing new technologies and operating methods in the maritime service, such as the new digital technology in the maritime radiotelephony channels and further improvement of the VHF and UHF channels.

3.4 Aeronautical mobile service (Agenda item 1.8)

The aeronautical mobile service has seen considerable development, reflected in an increasing need for frequencies. Although some measures were introduced in 1987, the decisions of WARC-Mob-87 could not be efficiently implemented due to constraints from existing services which prevented the aeronautical mobile (R) service to expand. WRC-97 is expected to improve the situation in the VHF band and to contribute to the improvement of the frequency use for this service, which requires freedom from harmful interference.

3.5 Fixed service in the bands above 30 GHz (Agenda item 1.9.6)

Almost all of the recent sharing studies between the fixed service and various space services in the frequency range above 30 GHz have resulted in a conclusion that no sharing is possible where there is a high density of fixed stations, since there is a possibility that the aggregate signal level at the spacecraft receiver from fixed systems would cause unacceptable interference. A similar conclusion may be drawn in the case of a high density of earth terminals, where sharing with fixed systems may not be practical. As all primary allocations to the fixed service in the bands above 30 GHz are shared with at least one space service, it may be that all frequency allocations to the fixed service in these bands will be subject to sharing constraints or coordination requirements. Given the amount of the available spectrum above 30 GHz, it should be possible to designate bands for fixed service applications, especially for high-density applications, where there will be minimal sharing constraints or coordination requirements with space services. WRC-97 is expected to identify such frequency bands and to make appropriate frequency allocations to the fixed service where this service will have the possibility to develop in an optimal way, without unnecessary constraints.

3.6 Adaptive systems at MF/HF (Agenda item 1.5)

In the MF/HF bands, where congestion and interference have become increasingly severe, new frequency management techniques are becoming available such as frequency agile equipment with digital signal processors for frequency control and error-correction. These techniques, based on block allocations for adaptive MF/HF systems, may contribute significantly to the improved use of the relevant frequency bands which are still of great interest for many developing countries. WRC-97 will consider the results of the latest studies in this domain which may result in a more flexible and improved frequency management of the fixed and some of the mobile services at MF/HF frequencies.

3.7 Issues related to the mobile-satellite and fixed-satellite services (Agenda item 1.9.1)

One of the main tasks of WRC-95 was to endeavour to resolve the complex issues related to the mobile-satellite service (MSS), operated in particular by constellations of low Earth orbit satellites (LEO). After lively discussion and intense negotiation, the Conference reached important decisions concerning:

- allocation of additional spectrum to the MSS below 2 GHz;
- bringing forward of the date of entry into force of some 2 GHz allocations from 2005 to 2000 with parallel measures ensuring ongoing protection of existing terrestrial services and gradual phasing out of these terrestrial services;
- changes in the conditions of non-GSO fixed-satellite usage in the 20/30 GHz spectrum with respect to GSO applications and consequential involvement of these non-GSO systems in the coordination procedure (Resolution 46);

- new allocations to non-GSO MSS feeder links.

The difficulties of the developing countries resided in the technical constraints associated with frequency sharing between the MSS and their terrestrial fixed services, such as rural and remote radiotelephone systems. Agreements on MSS allocations were reached subject to the introduction of provisions and transitional measures ensuring the protection of existing terrestrial services until such time as they had been phased out, transferred to replacement frequencies or replaced by more modern technologies facilitating sharing.

WRC-95 was not able to complete all the studies dealing with the different sharing matters, particularly on satellite/terrestrial sharing, and it included the remaining issues in resolutions and recommendations to be addressed by WRC-97. Item 1.9.1 of the WRC-97 agenda (Resolution 718) covers issues relating to existing and possible additional frequency allocations and regulatory aspects of the MSS and FSS, including consideration of the related WRC-95 resolutions and recommendations.

Under this agenda item (i.e. 1.9.1), the following topics may be identified as particularly relevant to the developing countries:

3.7.1 MSS frequency range below 1 GHz

Additional spectrum on a worldwide basis is needed to meet projected MSS requirements below 1 GHz. These requirements were considered at WRC-95, but their impact was not fully assessed, particularly vis-à-vis the terrestrial mobile and broadcasting services. WRC-97 is invited to consider this issue further and is expected to allocate additional spectrum to non-GSO MSS systems, including feeder links, on the basis of studies on operational and technical means to facilitate sharing. Such studies have been undertaken as a matter of urgency by the relevant ITU-R Study Groups which should bring the results, mainly in term of PFD limits or thresholds, to the attention of WRC-97 and the relevant preparatory meetings.

3.7.2 MSS frequency range above 1 GHz

WRC-95 adopted additional allocations in the 2 GHz range for the MSS and recognized that, while sharing of the MSS with the fixed service in the short to medium term is viewed as generally feasible, in the long term it will become complex and difficult, particularly in the 2 GHz range, and gradual transfer of the fixed service to a non-overlapping segment of the spectrum is contemplated. In order to make the coordination process easier, WRC-95 consolidated all available technical material to cover the possible interference scenarios between non-GSO MSS systems and terrestrial systems in a new Annex 2 to Resolution 46 (Rev.WRC-95), to be applied as of 18 November 1995. In particular, a new concept was included for triggering coordination between digital fixed service stations and non-GSO MSS space stations, namely the concept of fractional degradation in performance (FDP). However, while implementation of most of the criteria and methods proposed in Annex 2 is feasible, there is no agreed calculation method to assess the compatibility situation between space stations and terrestrial stations, nor is there an established and internationally agreed method for calculating the values of FDP. Simulation tools are usually the only way to evaluate accurately the impact of interference between MSS and FS systems. WRC-97 is expected to develop such a methodology and tools for triggering coordination, and subsequently help administrations in the detailed coordination. This is of the utmost importance both for the future of non-GSO MSS and for the development of terrestrial systems.

3.7.3 Feeder links and non-GSO FSS issues

WRC-95 made provision for the use of segments of the 5 GHz, 7 GHz, 15 GHz, 19 GHz and 29 GHz bands by feeder links of non-GSO satellites in the MSS, at the same time inviting ITU-R to carry out urgent studies on the sharing criteria and interference mitigation techniques necessary to permit the continued development in these bands of all services to which it is allocated. WRC-97 will consider the results of these studies in order to harmonise operation of feeder links to non-GSO MSS systems in these bands.

WRC-97 will have to consider the allocation conditions around 19 GHz and 29 GHz applicable to non-GSO FSS networks. Conditions associated with the application of Resolution 46 and the suspension of RR2613 were adopted by WRC-95 (Resolution 118) subject to further consideration by WRC-97 concerning technical, sharing and regulatory solutions (vis-à-vis GSO systems) to achieve the most efficient use of this spectrum and thus pave the way for the development of new, advanced non-GSO space systems. In spite of the urgency attached to the development of such systems, however, due regard for the continued protection of stations operating in existing services, particularly the terrestrial services will have to be considered.

Substantial additional work is to be conducted by relevant ITU-R Study Groups, committees and meetings in order to complete consideration of all the issues in time for WRC-97. The Telecommunication Development Sector was also invited (Resolution 716) to evaluate the financial and economic impact on the developing countries of the transfer of the fixed service in the 2 GHz band. administrations, particularly those of developing countries, are urged to participate actively in the aforementioned fora.

4 Implementation of Resolution 18 of PP-94

The Plenipotentiary Conference (Kyoto, 1994), in its Resolution 18, requested the Director of the Radiocommunication Bureau, in consultation with the Radiocommunication Advisory Group (RAG), to initiate a review of the ITU's frequency coordination and planning framework for satellite networks with a view to submitting a preliminary report to the World Radiocommunication Conference 1995 (WRC-95) and a final report to the 1997 Conference (WRC-97). In considering the matter on the basis of an initial document by the Bureau and contributions by administrations, the Working Group of the RAG discussed the possible issues to be included in the review and identified a list of issues which would be used in the studies organized within the framework of the Resolution.

As requested by the Resolution, the Director, BR, submitted his preliminary report to WRC-95 (Document 27 + Addendum). On the basis of this report, the Conference decided that the following entities should provide input to this important review: the Special Committee on Regulatory/Procedural Matters, ITU-R Study Groups, the Radiocommunication Advisory Group (RAG), the Radio Regulations Board (RRB), the Radiocommunication Bureau and the ITU World Telecommunication Policy Forum (1996). The Director, BR, will collect and synthesise the results of the studies and will submit his final report to WRC-97.

The first meeting of the Special Committee on Regulatory/Procedural Matters was held on 28-29 February 1996 to specifically deal with questions relating to the Resolution 18 studies. The Committee made good progress in considering possible solutions for the issues identified by the Working Group of the RAG indicated above. Two rapporteur groups were established and a detailed work plan was drawn up to meet the deadlines required for the timely submission of the results well before the 1997 Conference. The major questions under study are as follows:

reservation of orbit capacity without actual use ("due diligence", regulatory time limits), un-coordinated use of orbit/spectrum, dispute resolution, the role of Governments, system operators, the RRB and the BR, transfer of orbital locations/spectrum, efficient use of, and equitable access to orbit/spectrum resources, Direct-to-Home (DTH) broadcasting, regional coordination and multiple procedures.

During the last meeting of the RAG (19- 23 February 1996), discussion took place on the specific aspects of Resolution 18 related to its "*resolves 1, i)*" i.e. the linkage between coordination procedures and commitment to take up notified orbital positions. The concepts of "due diligence" and financial deposits and filing fees accompanying a satellite submission were introduced. Both concepts were seen as very interesting. The approach suggesting financial deposits and fees was considered also relevant to the discussions under Resolution 39/PP-94 (Strengthening of the Financial Base of the ITU). A special Rapporteur of the RAG was appointed to consolidate the RAG views on the above questions.

The WG-RAG Chairman's Report (list of "issues") was also submitted to interested ITU-R Study Groups which, with the assistance of the Bureau, are studying the inventory of issues with a view to reviewing existing ITU-R Questions and Study Programs. Work is expected to be focused on the technical subjects falling under the titles: "Efficient use of the orbit/spectrum resources", "Equitable access to orbit/spectrum resources", "DTH use of the FSS bands" and any work that might still be needed concerning "Multilateral Planning Meetings" (MPM) given the decisions of WRC-95. Working Parties 4A and 10-11S and Study Group 8 are expected to contribute to these issues. Study Group 1 is to host any studies on space monitoring.

The Resolution 18 review has been on the agenda of the Radio Regulations Board meetings since June 1995. In-depth discussions are taking place on the issues. The view of the RRB is that notwithstanding eventual simplifications of the Radio Regulations along the lines of the VGE Report, efficient and timely frequency management for space services will require new approaches and alternative steps as compared to the existing principles, facilitating the use of the most recent technology, offering straightforward procedures resulting in timely results and thus avoiding overfilings. This would lead to the desired benefit of user/operators, administrations and the Radiocommunication Sector of the ITU. The RRB will be preparing by November 1996 a contribution to the Director's final Report to WRC-97.

As has been done in the preparatory phase, the Bureau will continue to provide general support (organizational, administrative) to the activities of the different bodies of the ITU-R Sector. In addition, it will organize regional information exchange meetings in the three Regions in 1996. For the organization of these meetings, the necessary partnerships are being established and it is expected that in 1996 such meetings will take place in Regions 1, 2 and 3.

The final report of the Director to WRC-97 is planned to be finalized in early 1997 to allow full discussion of it well before the Conference.

5 Ongoing assistance activities of the BR

5.1 Seminars and training sessions

The Radiocommunication Bureau organizes, every two years, a Radiocommunication Seminar on Spectrum Management. This year, the Seminar will be held in Geneva from 25 to 29 November. In addition, regional seminars are organized in the various regions on a rotation basis. For 1996, a seminar has been organized in Bamako, Mali from 22 to 26 April for French speaking Africa and

one will be held in Sofia, Bulgaria from 3 to 7 June mainly for the countries in Eastern Europe. In 1997, seminars will be held in Regions 2 and 3 and probably one for English speaking Africa.

In order to provide assistance on specific problems, the Bureau also organises training sessions in Geneva, one during the spring and one during the autumn. Administrations proposing to attend a training session usually contact the Bureau with specific requests and the training session is then structured in order to meet these specific requests.

5.2 Areas of liaison

Strong liaison exists between ITU-R and ITU-D through contact-points within the respective Bureaux and via the Advisory Groups (RAG and TDAB). For the RAG, an intersector coordinator has been appointed.

5.2.1 ITU-D Study Groups

The Radiocommunication Bureau (BR) pays particular attention to certain ITU-D Questions currently under study in ITU-D Study Groups 1 and 2, and also to those programmes of the BAAP where ITU-R can contribute. Notable amongst the topics of common interest are:

- spectrum management models for developing countries, where ITU-R has been closely involved in the development and training of BASMS (Basic Automated Spectrum Management System). BDT funded development of the first version of BASMS using specifications developed by a Group of Experts which involved a representative of BR. A BASMS seminar was held in Nairobi, (November 1995), and additional seminars are planned for other parts of the world;
- disaster communications, where ITU-R SG 8 has adopted a Question in response to Resolution 7 (WDTC-94) to consider the contributions of the mobile, amateur and associated satellite services to the improvement of disaster communications;
- identification of those Questions under study in ITU-R *of particular* interest to developing countries, and for which BR submitted a contribution to the Rapporteur Groups of ITU-D SG 2 prepared by the ITU-R SGs and responsible BR Counsellors;
- handbooks of special interest to developing countries; ITU-D has been kept aware of those handbooks available from ITU-R or under preparation, and some material has been provided from ITU-R Study Groups, suitable for inclusion in future ITU-D handbooks.

5.2.2 Radiowave propagation studies

The Radiocommunication Bureau, with the support of ITU-R Study Group 3, has continued to collaborate with the BDT in the area of radiowave propagation, particularly with regard to measurement experiments and the acquisition of data from regions of the world for which adequate propagation information for service planning is lacking. For Africa, several successful experiments have been undertaken over approximately the past ten years, the most recent of which concerned VHF measurements obtained on a long-distance over-land path in Senegal.

5.2.3 Training projects

The Radiocommunication Bureau assists the BDT in supporting certain training projects involving engineers from developing countries, e.g. GTTI and a pilot project for an ABU training course in broadcasting. In addition, BR contributes to ITU's close associations with the International Centre for Theoretical Physics, (ICTP), Trieste, in consultancy/training linked with specialized projects in

developing countries (many being in Africa) - topics frequently relating to aspects of spectrum management and radiowave propagation.

6 Concluding remarks

The foregoing has attempted to indicate those areas where current work within the ITU's Radiocommunication Sector has a major impact on the interests of developing countries. In order to succeed in these tasks, it is essential that the countries concerned are adequately represented at the various ITU-R fora where important decisions are reached which may be carried forward to the major conferences. Involvement of the developing countries is particularly important in the planning exercises concerning the review of the BSS plans, as well as in the principal ITU-R groups preparing technical inputs to WRC-97 via the Conference Preparatory Meeting (CPM). It is only with this participation that ITU-R can appreciate fully the telecommunication problems of the developing countries and respond effectively to their needs.

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

AFRICAN REGIONAL TELECOMMUNICATION DEVELOPMENT CONFERENCE
(AF-RTDC-96)
Abidjan (Côte d'Ivoire), 6-10 May 1996

Document 50-E
30 April 1996
Original: English

For Action

Agenda item: 2.4 **PLENARY MEETING**

SOURCE: TELECOMMUNICATION DEVELOPMENT BUREAU

TITLE: ITU-D TELEMEDICINE PROGRAMME FOR AFRICA (1996-1998)

Introduction

It is stating the obvious to say that many developing countries have inadequate health care and medical services. Developing countries suffer from a shortage of doctors and other health care professionals. The inadequate infrastructures of roads and transport make it even more difficult to provide health care in remote and rural areas. Where clinics and hospitals exist, they are often ill-equipped and, especially, outside urban areas beyond the reach of normal communications.

Developing countries face various problems in the provision of medical service and health care, including funds, expertise, resources, which relate to the lack of facilities and systems. Roads and transportation are inadequate and problems in properly moving or transporting patients are often encountered.

For countries with limited medical expertise and resources, telecommunications can provide a solution to some of these problems. Telecommunications may help alleviate some of the shortages. Telemedicine services have the potential to improve both the quality of and access to health care regardless of geography. They enable medical and health care expertise to be accessed by under-served locations using telecommunications. They offer a number of important socio-economic benefits. Telemedicine offers an effective means to quickly improve the delivery of health care and medical service.

In the developed countries, there has been an explosively growing interest in telemedicine and telehealth as a means to ease the pressure of health care on national budgets. It may well be that some - certainly not all - of the technologies and experiences of the developed countries could be of help to developing countries in their desire to provide, especially, primary health care.

The widespread use of telemedicine services could allow universal health access and consequently facilitate the solution of the principal health problems connected with infectious diseases, paediatrics, cardiology, etc., particularly in areas where medical structures are inadequate or non-existing.

Telemedicine and telehealth have many socio-economic benefits, can generate new sources of revenues for service providers and equipment suppliers and can optimize the use of available human and capital resources in developing countries. Applications such as telemedicine and telehealth should be of interest to telecom operators since they generate additional traffic over existing networks and offer the opportunity to extend limited networks. The telecom and health "industries" can achieve synergies.

For these and other reasons, the World Telecommunication Development Conference convened by the ITU in Buenos Aires in March 1994 recommended that the ITU study the potential of telemedicine to meet some of the needs of developing countries.

In particular, the Conference approved a Question (number 6) on telemedicine which was assigned to ITU-D Study Group 2. A draft report has been prepared which is expected to go through further iterations before being finalized. It is apparent from the work of the rapporteurs group that telemedicine has considerable potential for developing countries. The responses to the Telemedicine Questionnaire which was circulated by ITU and Inmarsat to all member countries make it also clear that there is limited telemedicine experience in developing countries so far and that useful models are needed. With this in mind, the BDT proposes that the ITU and its big M and small m members collaborate further and more extensively to ensure that the benefits of telemedicine are available to developing countries.

Objectives

In conjunction with the work being done in the context of Question 6, it is proposed that a Telemedicine Programme be undertaken with these objectives:

1) Support a limited number of pilot projects in developing countries, the aim of which would be to demonstrate the potential, benefits and different approaches to implementing telemedicine services and, importantly, would show what is do-able using the existing networks in developing countries.

2) Convene a World Telemedicine Conference for Developing Countries in 1997, the aim of which would be to exchange experiences and views in regard to the implementation of telemedicine in developing countries.

3) Act as a catalyst to establish telemedicine collaboration groups or alliances in different regions of the world.

4) Foster the adoption of global standards required for systems and equipment in order to facilitate telemedicine and other social services.

Expected results

Implementation of these objectives is expected to achieve the following results:

- The pilot projects will provide some practical experience for developing countries with regard to how to implement telemedicine services, with a particular emphasis on remote and rural areas.

- The pilot projects will bring together the different players who need to collaborate to ensure the successful implementation of telemedicine services. These include the telecom operator and/or local service provider, local medical services or other health care professionals, equipment suppliers, etc.
- The pilot projects will provide an opportunity to stimulate collaboration between developed and developing countries and to provide a potential market for telemed industries in developed countries, while at the same time building up expertise in the developing countries. Successful implementation of telemedicine requires a win-win situation.
- The pilot projects will help identify any of the pitfalls and possible solutions and different approaches in different regions of the world. The way in which telemed services are implemented in different countries and in different regions may elicit a number of lessons which can benefits in other countries and regions.
- So far, virtually none of the telemedicine conferences have focused on the needs of developing countries. The proposed Conference would be the first major opportunity to focus on developing countries, to provide a venue for the exchange of experiences, results, plans, views, etc. The output from this Conference would form important data for developing countries planning telemed services.
- The ITU's playing a catalytic role in the formation of telemedicine collaboration groups around the world would help ensure that alliances of players from different sectors (government, industry, telecoms, health care, public, private) are formed necessary for provision of telemed services.
- The initiatives undertaken in this Telemedicine Programme would help focus on exactly what standards are necessary for telemed equipment and services, what difficulties exist in establishing such standards and how best to overcome them.

Actions

In order to implement the proposed Telemedicine Programme, the major actions foreseen are identified below. It may well be that other major and minor actions will be identified as work towards the objectives begins.

- Identify a limited number of developing countries from each region where pilot projects could be undertaken. The envisaged pilot projects would be very small scale, involving perhaps three "sites" in each country (an urban hospital, a rural hospital or clinic and a doctor or paramedic who travels from village to village in remote areas). With these three possibilities for each country and with pilot projects in different countries and different regions, it would be possible to have a good understanding of the optimum ways in which to implement telemedicine services.
- Recruit one or more telemedicine consultants for short-term assignments to visit each of the countries to meet with telecom and health care officials to plan the pilot projects.
- The provision of telemedicine services is, by definition, a collaborative activity. Several different companies and organizations need to collaborate in order to implement telemed services. The first steps towards formation of a Telemedicine Collaboration Group in Europe have been taken. Similar actions are needed in other regions of the world. The ITU can play a important catalytic role in this regard, since its membership comprises both governmental administrations and representatives from the telecom industry. It has also

signed a Memorandum of Understanding with the World Health Organization. The task and mandate of the telemedicine collaboration groups would be to ensure the successful implementation of the pilot projects. The pilot projects should be of limited duration say six months and each pilot project should make clear whether such services and viable and sustainable.

- The telemedicine collaboration groups could provide valuable ideas and suggestions for the World Telemedicine Conference for Developing Countries. The agenda would be established and speakers identified by the BDT in conjunction with the collaboration groups, the group of rapporteurs working on Question 6/2, the telematics for health department of the European Commission, the WHO, among others.
- The BDT, with support from the other two sectors, will need to work closely with the ISO and various health organizations, medical associations and the European Commission to review and determine what actions, if any, are necessary to establish appropriate telemedicine standards.

Schedule

June - September 1996	Identification of sites for pilot projects and visits by consultant(s)
September 1996	Draft "final" report of Question 6/2
October 1996 - March 1997	Implementation of pilot projects
June - December 1996	Establishment of telemedicine collaboration groups
September 1997	World Telemedicine Conference for Developing Countries
June 96 - October 1998	Development and proposals for telemedicine standards

Budget

Implementation of this Programme can start with the existing but very limited BDT funds. Wide participation is expected from the members of the ITU Development Sector.

The potential benefits to the participants of the project are considerable and include:

1) an opportunity to participate in the development of cost-effective telemedicine services;
2) an opportunity to provide and test the suitability of products and services for a new telemedicine environment;
3) participation in the development of standards for systems and equipment for delivery of telemedicine services;
4) association with a highly visible and worthwhile cause.