15th World Telecommunication/ICT Indicators Symposium (Hammamet, 2017)

Transforming emerging technologies into economic opportunities with better data

Presentations – Part IV

OECD DIGITAL ECONOMY OUTLOOK 2017

WTIS 2017, TUNISIA

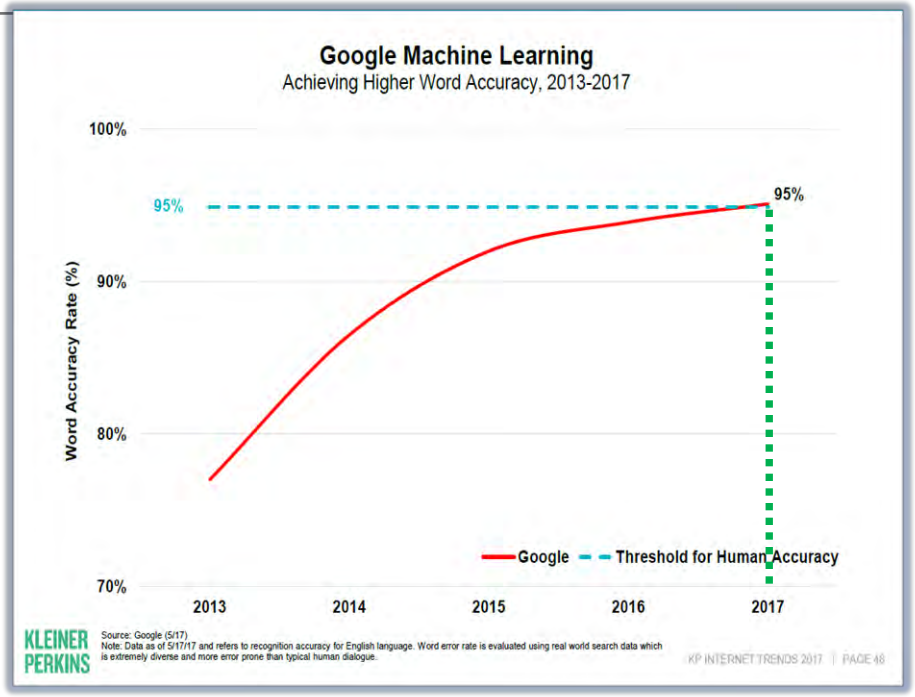
Elif KOKSAL-OUDOT,
OECD
Directorate for Science, Technology and Innovation

BETTER POLICIES FOR BETTER LIVES

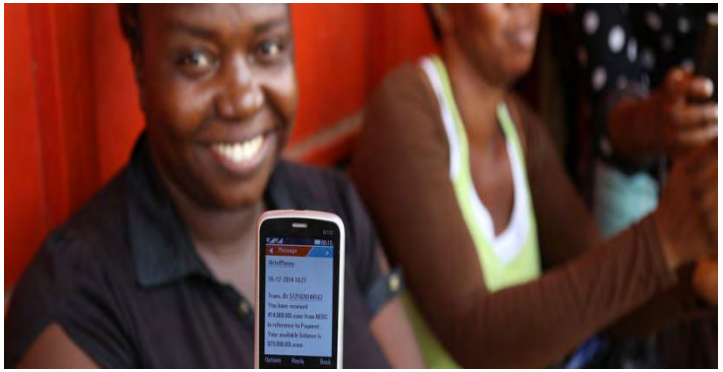

OECD
BETTER POLICIES FOR BETTER LIVES

… with new opportunities for greater wellbeing.

Telemedicine in Rural Canada



Open and Distance Learning in South Africa



Better-than-Cash Alliance at UNCDF

http://www.kpcb.com/internet-trends; https://www.digitaltrends.com/home/everything-that-works-with-amazon-echo-smart-home/;; http://blog.caranddriver.com/

Key building blocks for a digital transformation that supports well-being

Connectivity

Effective use

Skills

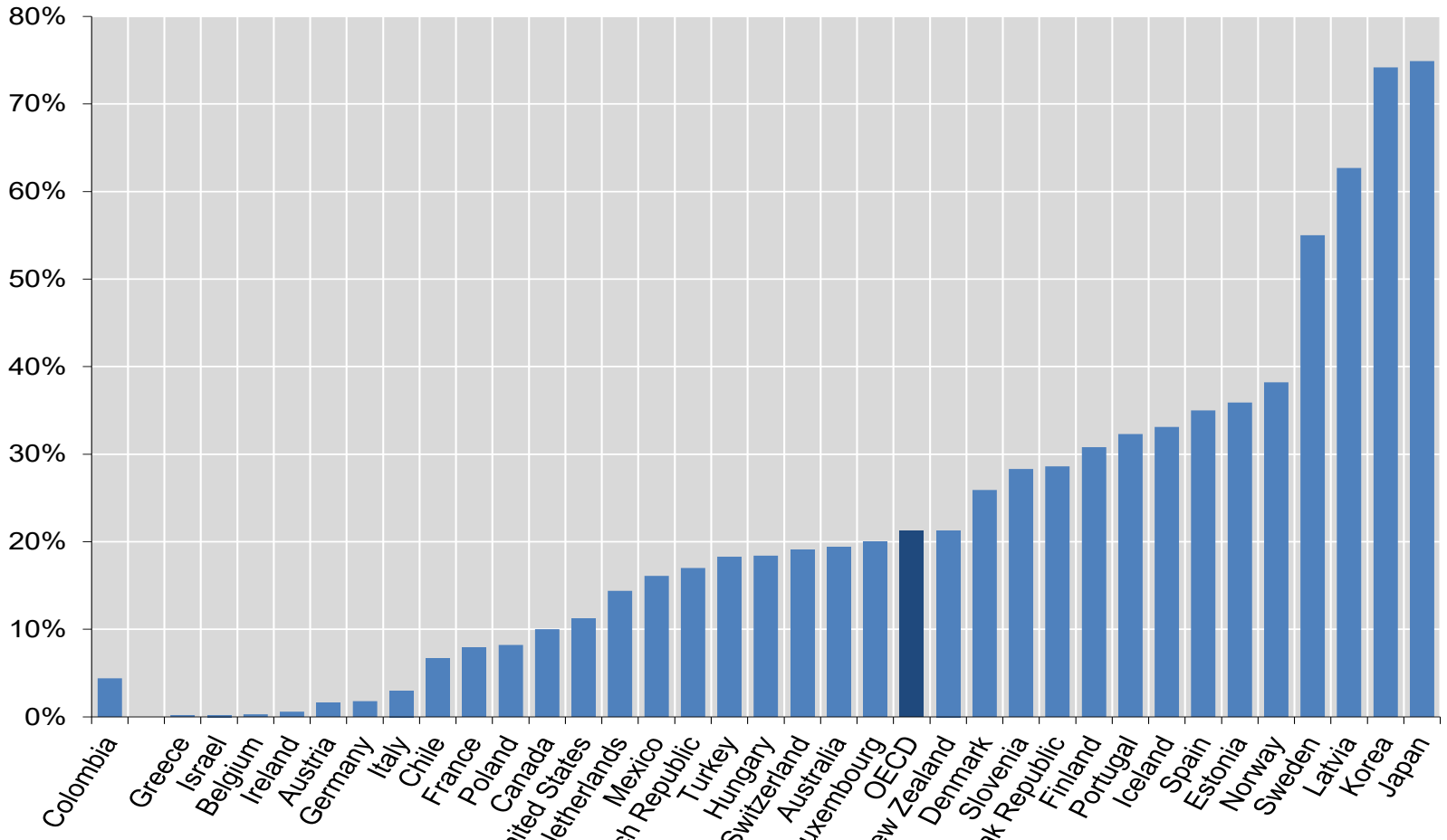
Review of Policies

Security and Privacy

Strategic coordination

1. Connectivity has grown, but access to fibre networks is lagging

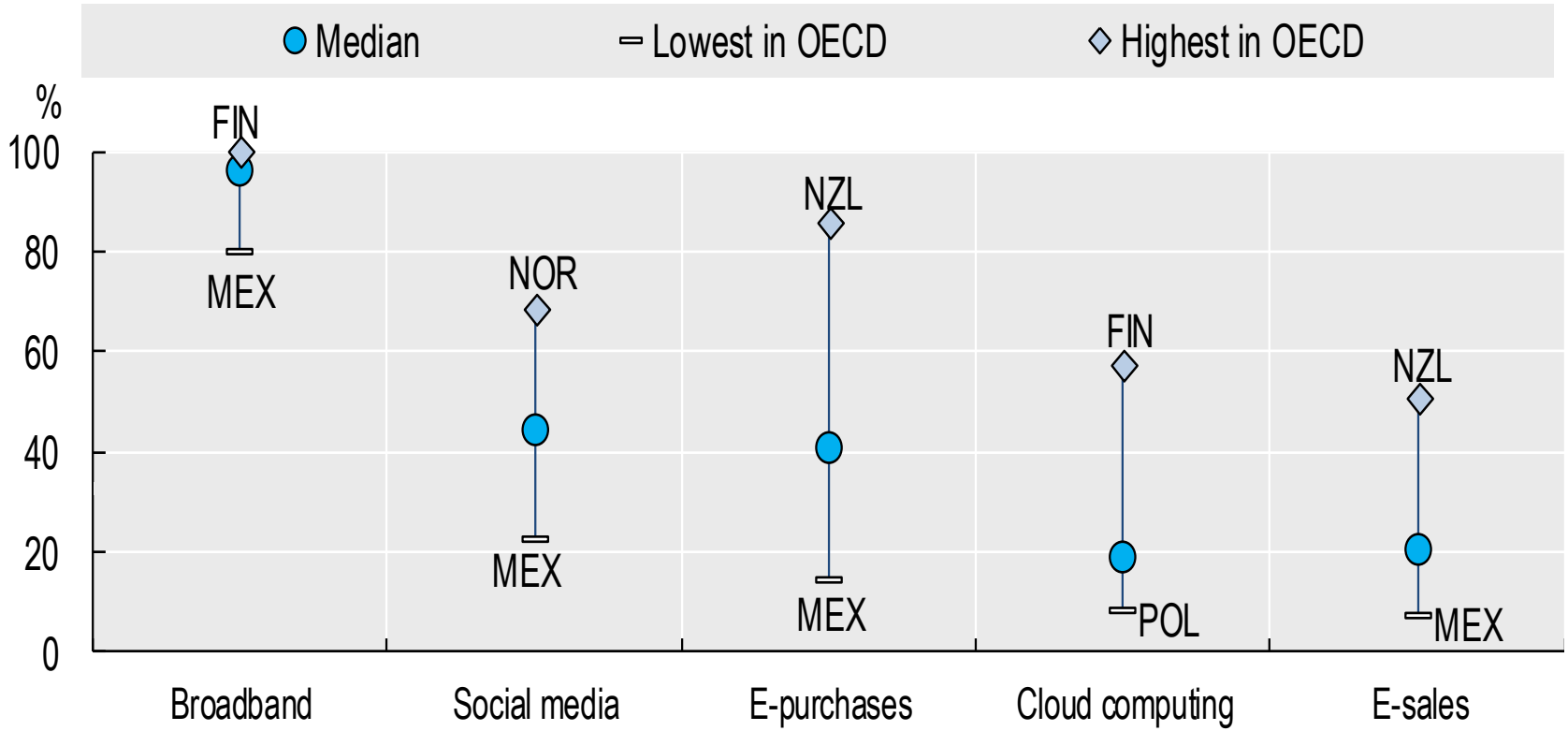
Share of Fibre in Fixed broadband subscriptions, in %, December 2016



2. Most firms are connected, but few make effective use of advanced ICT

Diffusion of selected ICT tools and activities in enterprises, 2016

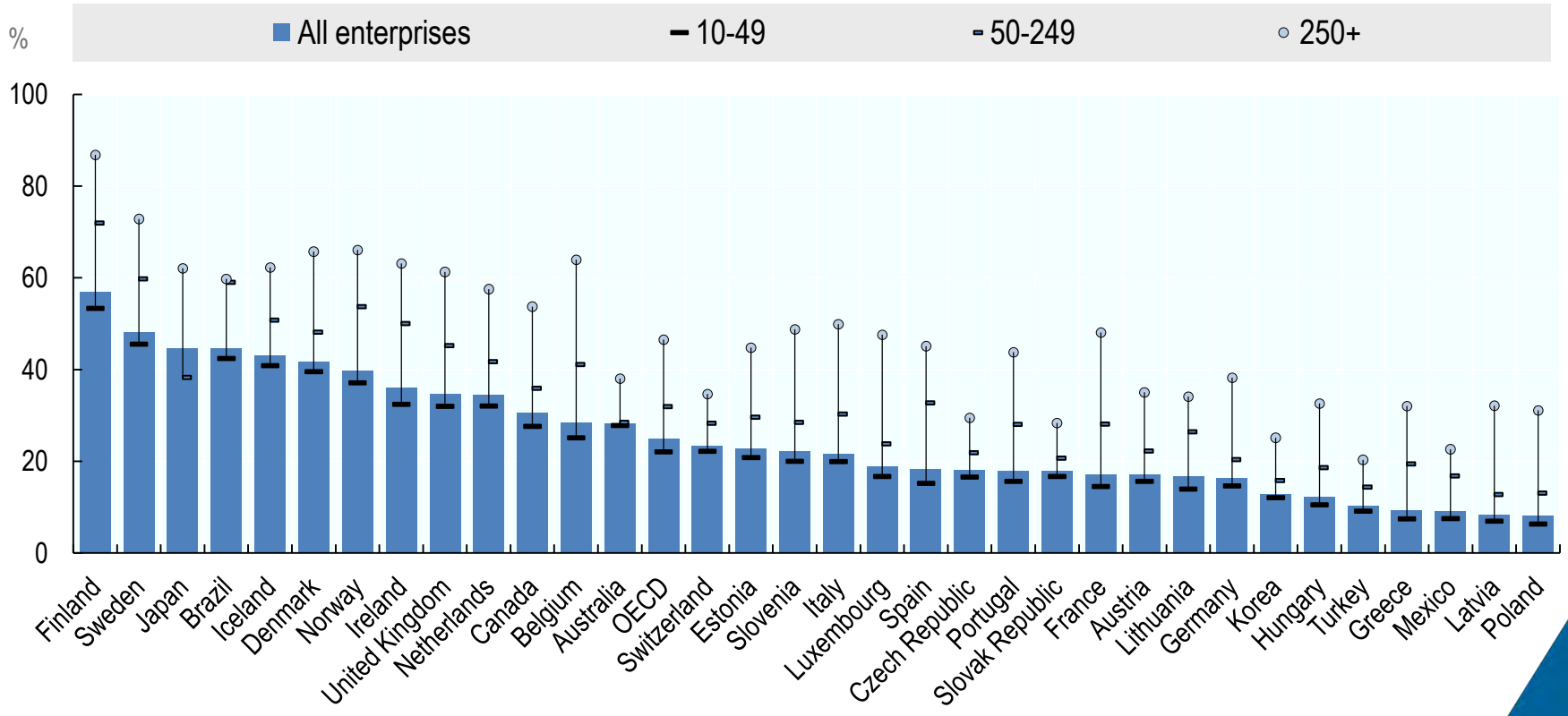
As a percentage of enterprises with ten or more employees



… and SMEs are lagging, even in technologies suited to them

Enterprises using cloud computing services, by firm size, 2016

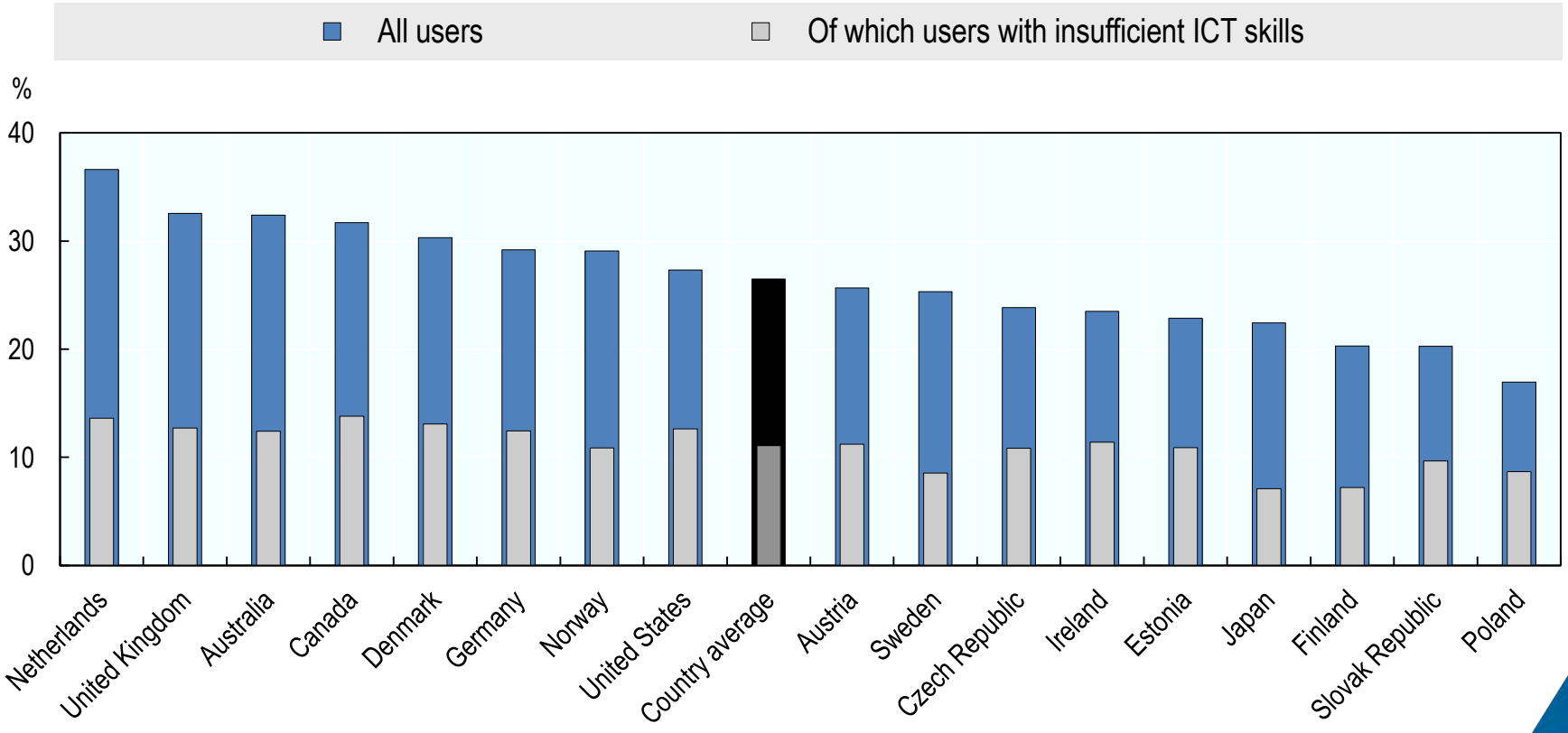
As a percentage of enterprises in each employment size class



3. Skills: too few have the skills for a technology-rich environment

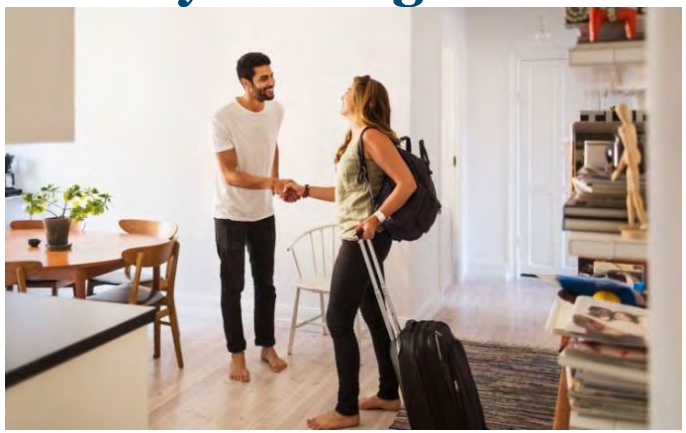
Workers using office productivity software at work every day

As a percentage of total population



4. Policy Review: New business models challenge existing policies

I can afford this house, by renting it out.



I don't need a car, I need mobility.

I don't need a postman, drones can do the job.

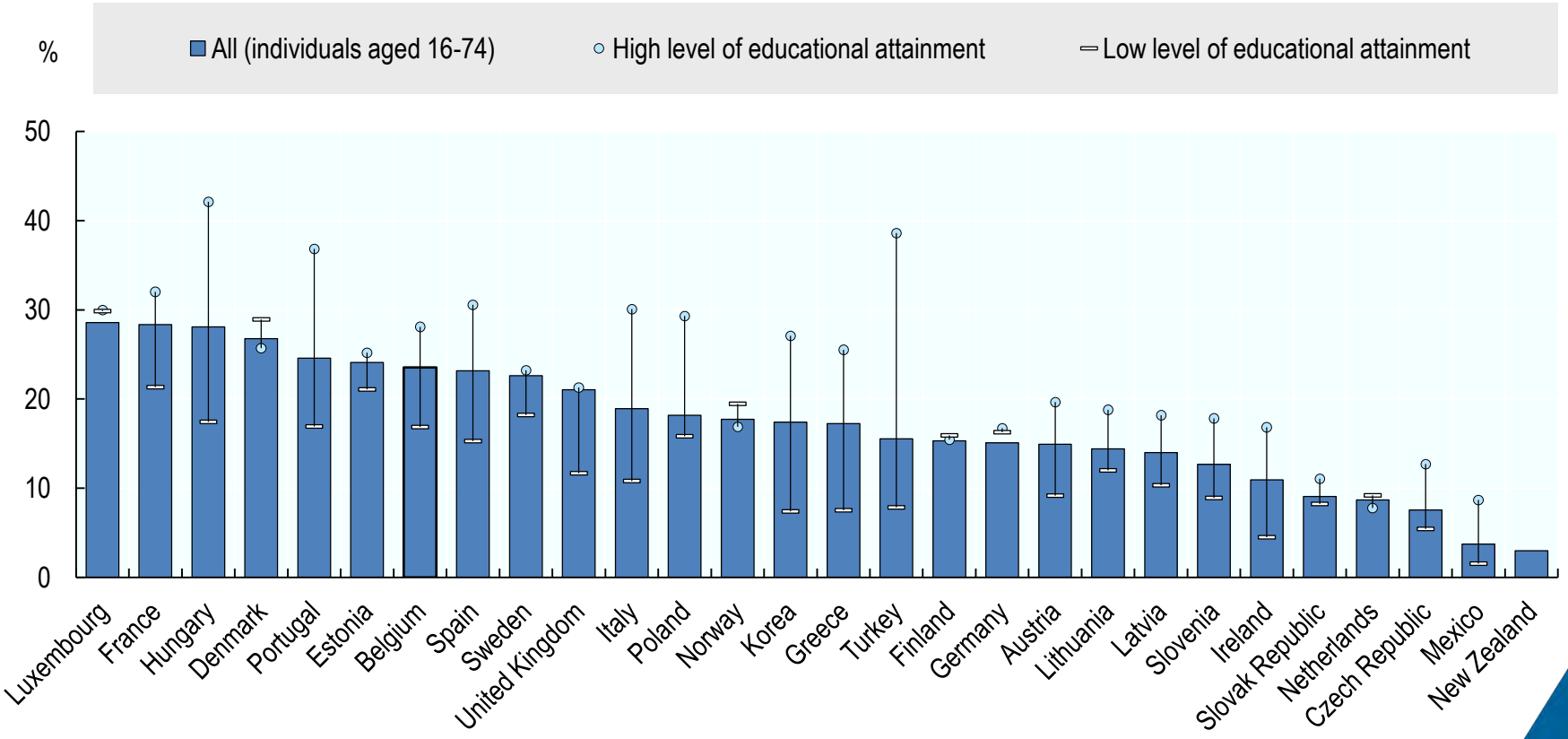
I don't need an employer, I can use a platform.

upwork

5. Security (and privacy) are a growing challenge

Digital security incidents experienced by individuals, 2015 or later

As a percentage of all individuals and by level of educational attainment



6. Effective models for strategic co-ordination will be needed

National digital strategy governance

Number of countries that have allocated respective responsibilities

	Lead the development	Contribute input	Co-ordinate
Government, e.g. Prime Minister, Presidency, Chancellery, etc.	4	0	5
Digital affairs ministry or body or ministerial position	8	1	10
Ministry or body not dedicated to digital affairs	15	2	13
Several ministries, bodies or institutions	6	14	5
Multiple public and private stakeholders	1	17	0

Main policy messages

- **Ensure that digital opportunities can be harnessed by all firms and individuals, and by governments themselves.**
- **Ensure connectivity for all, including to fibre networks.**
- **Foster more effective use of advanced digital technologies by individuals, firms and government.**
- **Strengthen skills for all workers and citizens.**
- **Review legacy frameworks.**
- **Embrace the potential of digital innovation, but mitigate social cost.**
- **Address digital risks strategically.**
- **Develop whole-of-government digital strategies and foster effective cooperation across countries.**

WHAT'S NEXT?

GOING DIGITAL

Making the Transformation Work for Growth and Well-being

Understand the digital transformation and its impacts on the economy and society

Provide policymakers with the tools needed to develop a forward-looking, whole-of-government policy response

Help overcome the gap between technology and policy development

OECD
BETTER POLICIES FOR BETTER LIVES

Digital Economy Outlook 2017

OECD i-library
www.oecd-ilibrary.org

Twitter
@OECDinnovation

OECD Science, Technology and Innovation
www.oecd.org/sti/ieconomy/

OECD Broadband Portal
www.oecd.org/sti/broadband/oecdbroadbandportal.htm

OECD Going Digital project:
http://oe.cd/goingdigital

ITU WTIS TUNISIA2017

Committed to Connecting the World

International Telecommunication Union

PARTNERSHIP ON MEASURING ICT FOR DEVELOPMENT

Developing a thematic list of ICT indicators for the SDGs

Martin Schaaper
Senior ICT Analyst
ICT Data and Statistics Division
Telecommunication Development Bureau
International Telecommunication Union

Partnership on Measuring ICT for Development



Background - SDG indicators

169 targets
(6 ICT-related targets)

231 indicators
(7 ICT indicators)

Global SDG ICT indicators

Target	Indicator(s)	Collected by
Target 4.4	Proportion of youth/adults with ICT skills, by type of skills	ITU
Target 4.a	Proportion of schools with access to: • the Internet • computers	UIS
Target 5.b	Proportion of individuals who own a mobile telephone, by sex	ITU
Target 9.c	Percentage of the population covered by a mobile network, broken down by technology	ITU
Target 17.6	Fixed-Internet broadband subscriptions, broken down by speed	ITU
Target 17.8	Proportion of individuals using the Internet	ITU

ICT for the SDGs

- ICTs recognized as key development enabler
- Important role that ICTs will play in achieving the SDGs stressed by the ICT community (e.g. WSIS, CSTD and UNGIS)
- All areas where ICTs will play a role need to be measured and monitored

Partnership Task Group on ICT for the SDGs

Objectives

- Propose a list of thematic ICT indicators - should help monitor the availability and use of ICT in different sectors relevant to the SDGs
- Review indicators in the core list while focusing on indicators related to the targets
- Improve availability of data (including disaggregated data) for the indicators that will be included in the thematic list

Members

- ITU and UN-DESA (co-leads)
- Bangladesh
- Brazil
- David Souter (expert)
- UIS
- UNCTAD
- UNEP-SBC
- UNU-EGOV
- UNU-ViE
- Uruguay

Tasks, activities and outputs

1. Develop a framework for monitoring the SDG targets with ICT indicators complementary to the existing global indicators framework
2. Prepare a methodology document
3. Awareness raising - disseminate the list of indicators to stakeholders, present and discuss the monitoring framework at relevant global and regional events
4. Compile and disseminate the data - by the relevant members of the TG/responsible agency on a continuous basis
5. Prepare regular quantitative assessments of the ICT indicators - final report to be prepared for 2020

Roadmap

Item	Timeline
Develop criteria and framework for the new indicators	Nov 2017
Reach out to other organizations	Ongoing
Call for inputs (indicators) to the Framework	Jan - Feb 2018
Analyze inputs including data availability, reliability, frequency etc.	Mar - Apr 2018
Prepare a document including the set of indicators proposed for selected SDG targets along with their definitions, benchmarks and the methodologies	Apr - May 2018
Disseminate the document to TG Members and other stakeholders for feedback and clearance	Jun 2018
Submit the final document to the 2nd meeting of the "Inter-Agency and Expert Group on SDG Indicators" in 2018	Aug - Sep 2018

Thank you!

indicators(at)itu.int

Measuring Emerging ICT Trends

Johannes M. Bauer

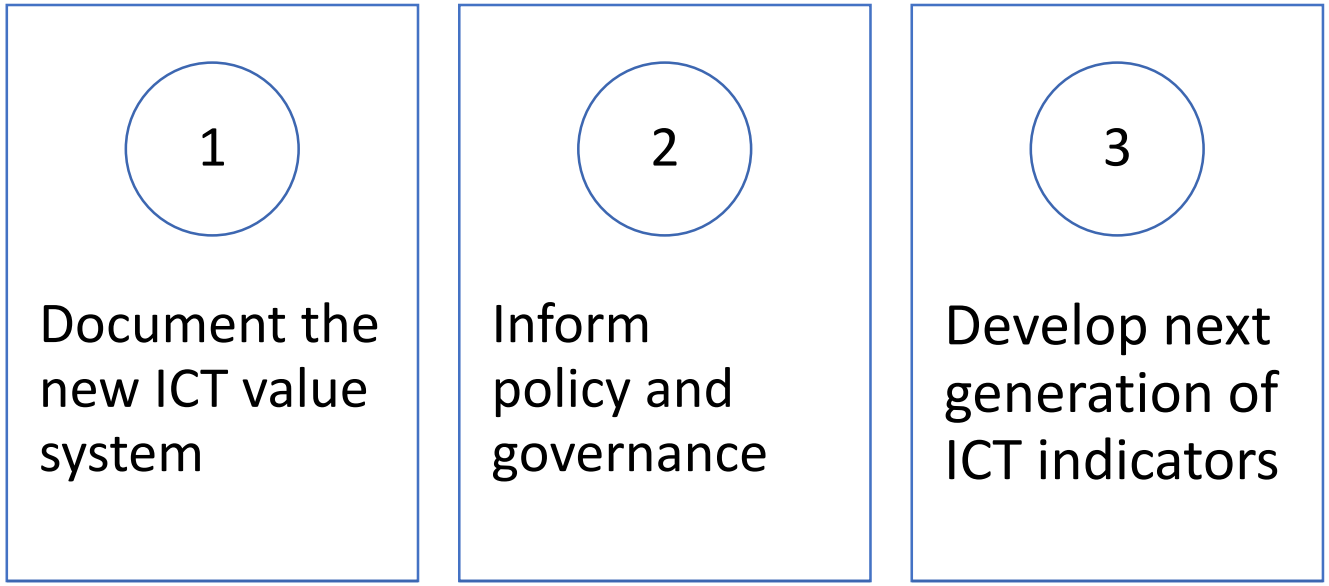
Michigan State University

Plenary Session 6

15th World Telecommunication/ICT Indicators Symposium (WTIS-17)

Hammamet, Tunisia, 14-16 November 2017

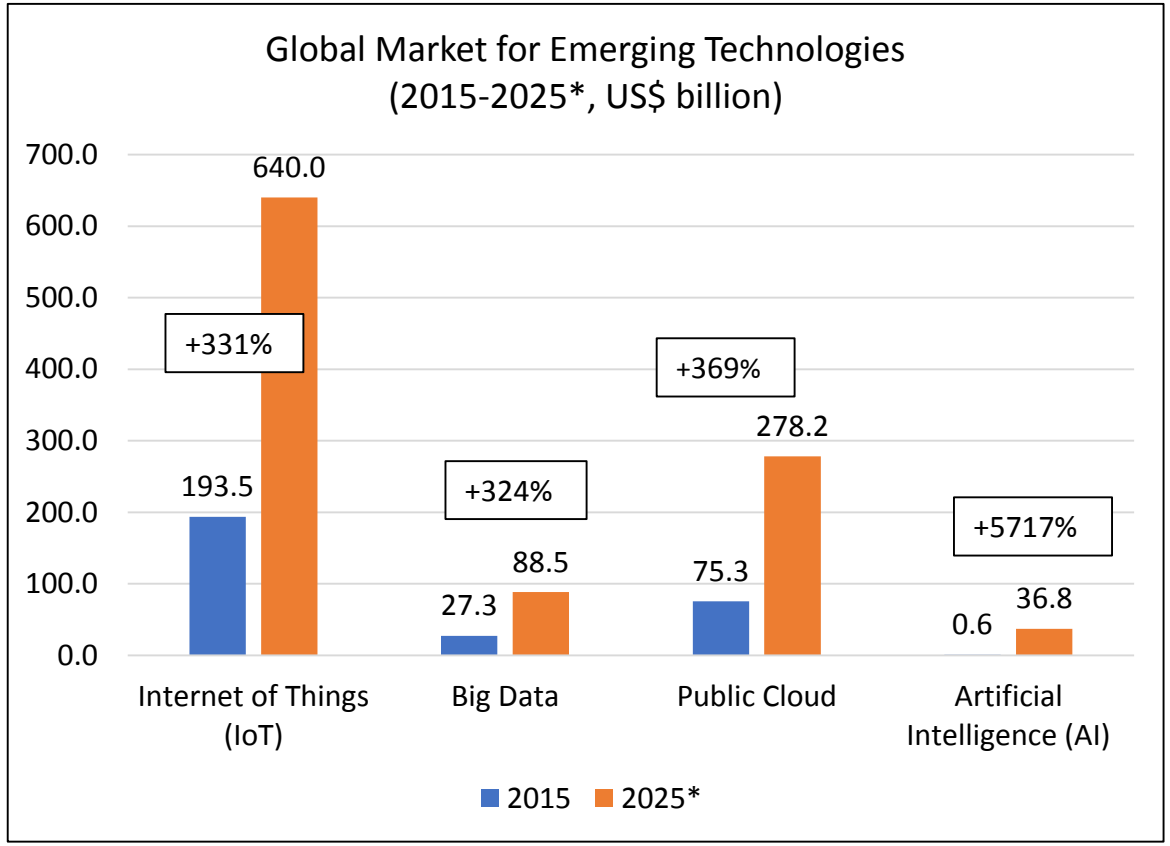
Transforming emerging technologies into economic and societal opportunities



Documenting the new ICT value system

Digital transformations

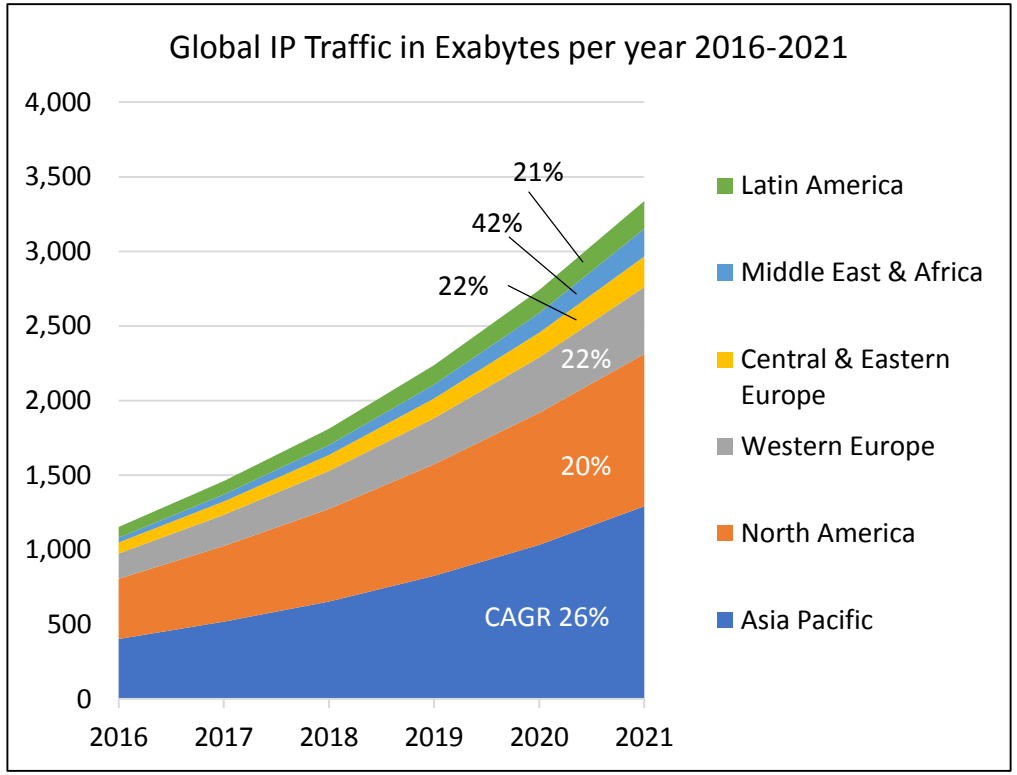
- Four key technologies
  - Internet of Things (IoT)
  - Big data (analytics)
  - New computing architectures
  - Artificial Intelligence (AI)
- Tremendous opportunities to contribute to the 17 Sustainable Development Goals
- New challenges to establish supportive policy and governance frameworks



Source: MISR 2017; * … estimated

Technological and economic forces

- Exponential performance increases of ICTs (e.g. Moore's Law, Cooper's Law)
- Rapidly improving fixed and wireless connectivity (speeds, QoS)
- Ubiquitous, distributed computing power in smart devices and objects
- Massive growth of user- and machine-generated data ("Zettabyte Era")
- Transition from "pipeline" to "platform" economy accelerates value generation



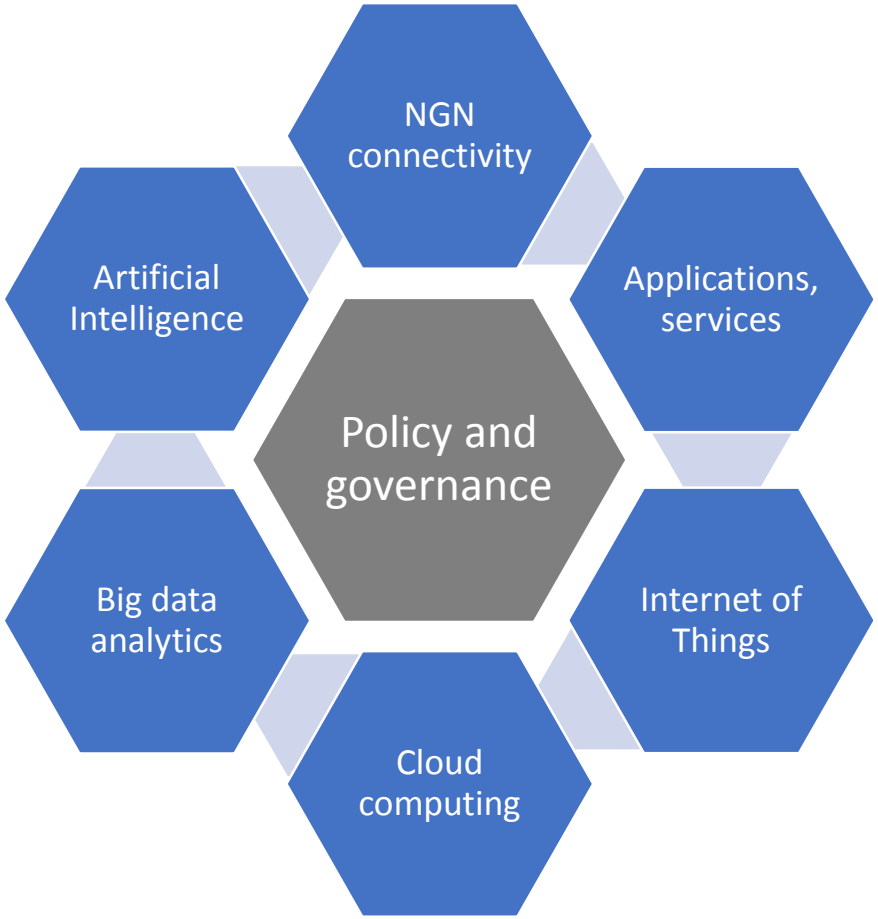
Source: Cisco, VPI, 2017

Enabling technologies

- The Internet of Things (IoT) extends connectivity to physical objects, sensors, and actuators to create cyber-physical systems (e.g. precision agriculture, health monitoring)
- Big data analytics mines, analyzes and visualizes the continuous stream of structured and unstructured data generated by digital communications (e.g. transportation, energy, services)
- Cloud computing flexibly deploys data processing, storage, and analysis capability to enable access anytime, anywhere, from any capable device
- Artificial intelligence (AI) uses machine learning (neural networks, deep learning) to make routine decisions or to augment the human capability to make difficult decisions (e.g. diagnostics, predictice maintenance)

Non-linear, dynamic value generation

A fast-paced digital innovation system



- Innovation unfolds among many interdependent players
- Rapid experimentation, real-time feedback, market selection, replication of successful solutions
- Disruption of existing industries and new “Blue Ocean” opportunities
- Requires adaptive policy making and regulation (both too little and too much regulation is bad)

Informing
policy and governance

ICTs are neither good nor bad …

- Effects of unfolding digital transformations are not yet fully known
- Advanced ICTs promise enormous benefits for Sustainable Development Goals (SDGs) and human rights, including
  - Smart agriculture, smart cities, environmental stewardship
  - Individual empowerment, better government, improved education
- They also bring new challenges and potential risks
  - Replacement of human labor by robots and artificial intelligence
  - Next-generation digital divides, ambiguous effects on income inequality
  - Surveillance and control by supposed “technologies of freedom”
- Policy appropriate to national conditions is critical (there is no single “best model”) and dependent on reliable indicators

… they need the right policy conditions

- Network infrastructure
  - Availability of fixed and mobile broadband, smart devices
  - National and international bandwidth, data centers
  - Differentiated infrastructure quality of service (speed, latency, jitter)
- All-IP seamless connectivity
  - Fixed and mobile broadband, LPWANs, NB-IoT, LTE-M
- Complementary user skills
  - Digitally literate workforce, data scientists, computer scientists
  - Increasingly powerful software empowers users with appropriate skills and mindset
- Policy responses that enable digital entrepreneurship and innovation
  - Differentiated based on assessment of national strengths and deficits
  - Based on good statistical evidence and models (stimulation, foresight)

Next generation of ICT indicators

Knowledge for sustainable development

- The power of emerging technologies is best harnessed using a human-centered design approach
- Requires reliable and continuously updated information
  - Agreed conventions on data definitions and measurement
  - Improved accessibility of data to users and entrepreneurs
- Machine-generated data collection and processing
  - Harvesting of data directly form the digital infrastructure and services
  - Networks or sensors and devices could generate trusted database
- Roles for the public sector and intergovernmental organizations
  - Collector of critical, standardized information that is of broad importance
  - Facilitator of data collection (open algorithms) and availability (open data)
  - Curator and archiver of data and analytical models (open repositories)

Indicators and models

- Focus on objectives (SDGs, other economic and social goals)
- Development of an enhanced system of indicators
  - Direct indicators of emerging technologies
    - Hardware (e.g. # of devices, % of installed base with certain capabilities, revenues)
    - Basic services and software (e.g. M2M, big data analysis software)
    - Applications and services (e.g. % of businesses using cloud solutions, AI)
  - Indicators for enabling conditions
    - Network infrastructure (e.g. % coverage, quality)
    - Skills (e.g. % digital literacy, # of data scientists)
    - Policy arrangements (e.g. % unlicensed spectrum, open data policies)
  - Effects on outcomes (e.g. income, employment, equality)
- Descriptive, explanatory, predictive, and prescriptive uses/models

Indicator matrix (see MISR 2017)

	Internet of Things (IoT)	Big Data/Analytics	Cloud computing	Artificial Intelligence (AI)
Direct measures				
Hardware	# of connected devices; Revenues in IoT device markets	% data center capacity dedicated to big data analytics; Investment in data analysis centers	# of data centers; Information processing capacity of data centers; Investment in cloud facilities	# of cognitive computing/deep learning installations; # of robots; Revenue of AI sectors
Basic services and software	# of M2M subscriptions	Revenues for big data analysis software	Revenues for IaaS, SaaS, PaaS	share of small, medium and large businesses using cognitive computing
Applications, services	# of smart homes; # of smart city applications; Revenues generated by IoT applications and services	% of businesses and government organizations using big data analytics; Revenues generated by data analytics services	% of businesses and government organizations using cloud computing; Revenues in cloud computing	% of businesses and organizations using AI applications Revenues of the AI sector
Enabling conditions				
Connectivity	% of population covered by mobile broadband, % of population covered by fixed broadband, available bandwidth, quality of connectivity, access to cloud resources, adoption of broadband, share of small, medium and large businesses using cloud resources, % of population using cloud resources			
Human capital	# of data scientists, # of computer scientists, % of schools with broadband connectivity			
Policy arrangements	Flexible spectrum policy, policies toward bottlenecks and market power, interoperability requirements, standardization, promotion of experimentation and innovation, open data policies			
Effects on SDGs and wellbeing				
Welfare effects	Efficiency gains, improvements in service quality, better service/price relationship, improvements in health, education, safety, care of elderly, empowerment, environmental stewardship, etc.			

Recommendations

1. Short-term: use existing processes and data collection (e.g. EGTI, Partnership on ICT for Development) to develop an enhanced system of ICT indicators for IoT, big data analytics, cloud computing, and AI

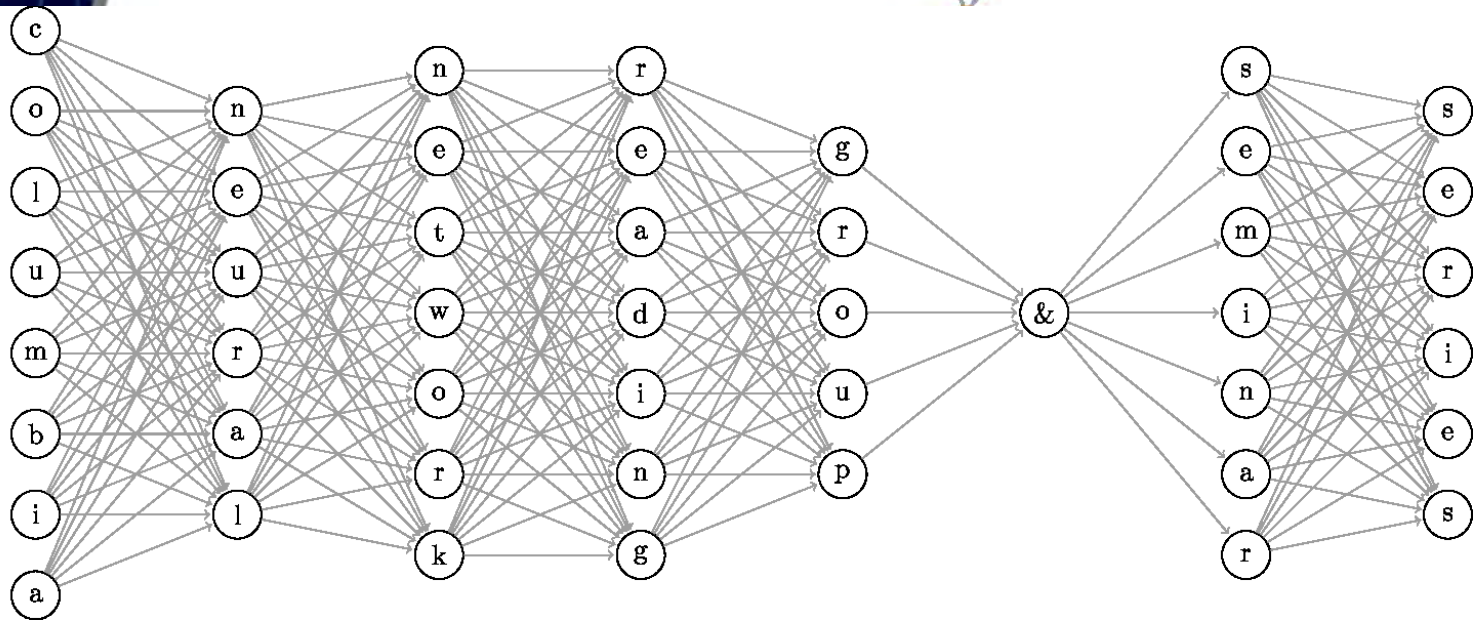
2. Medium-term: develop a “System of Digital National Accounts” in which publicly collected and curated, machine-generated, crowdsourced, and case-specific big data complement each other in a coherent framework

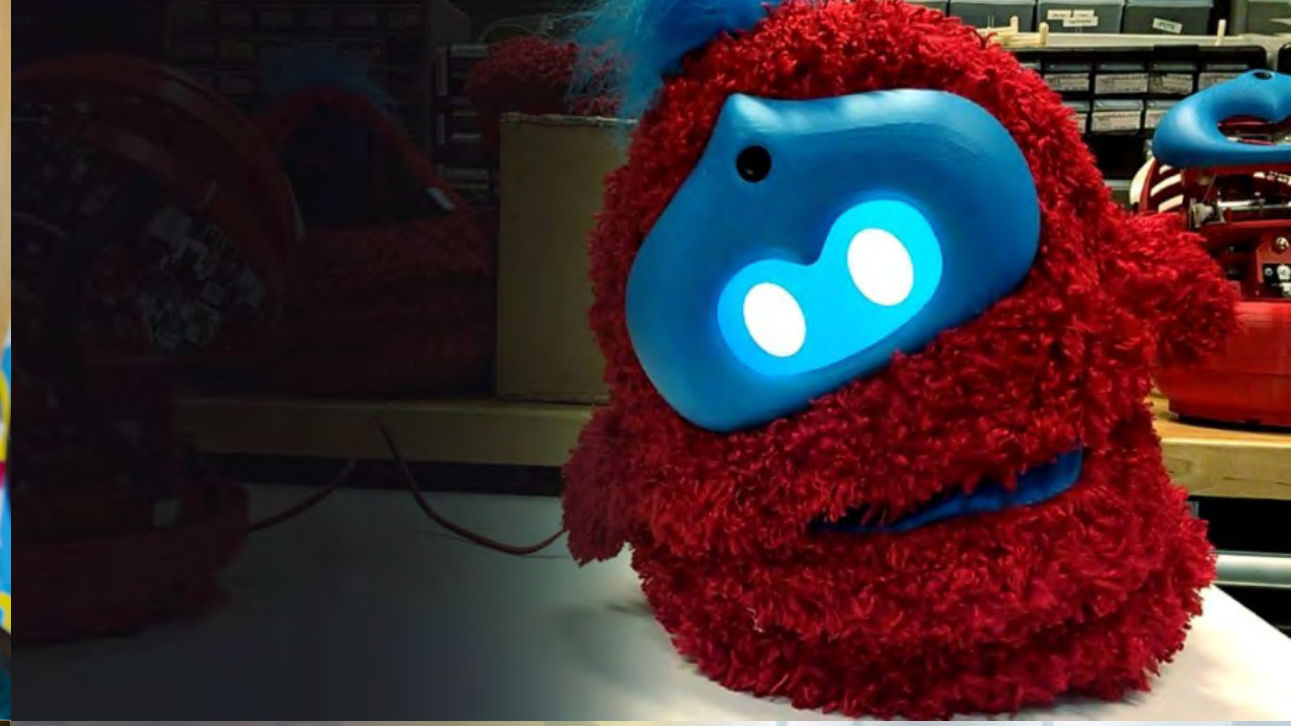
Thank you!

Beyond Artificial Intelligence …

May Amr
Director, Data acquisition and annotation
:) Affectiva

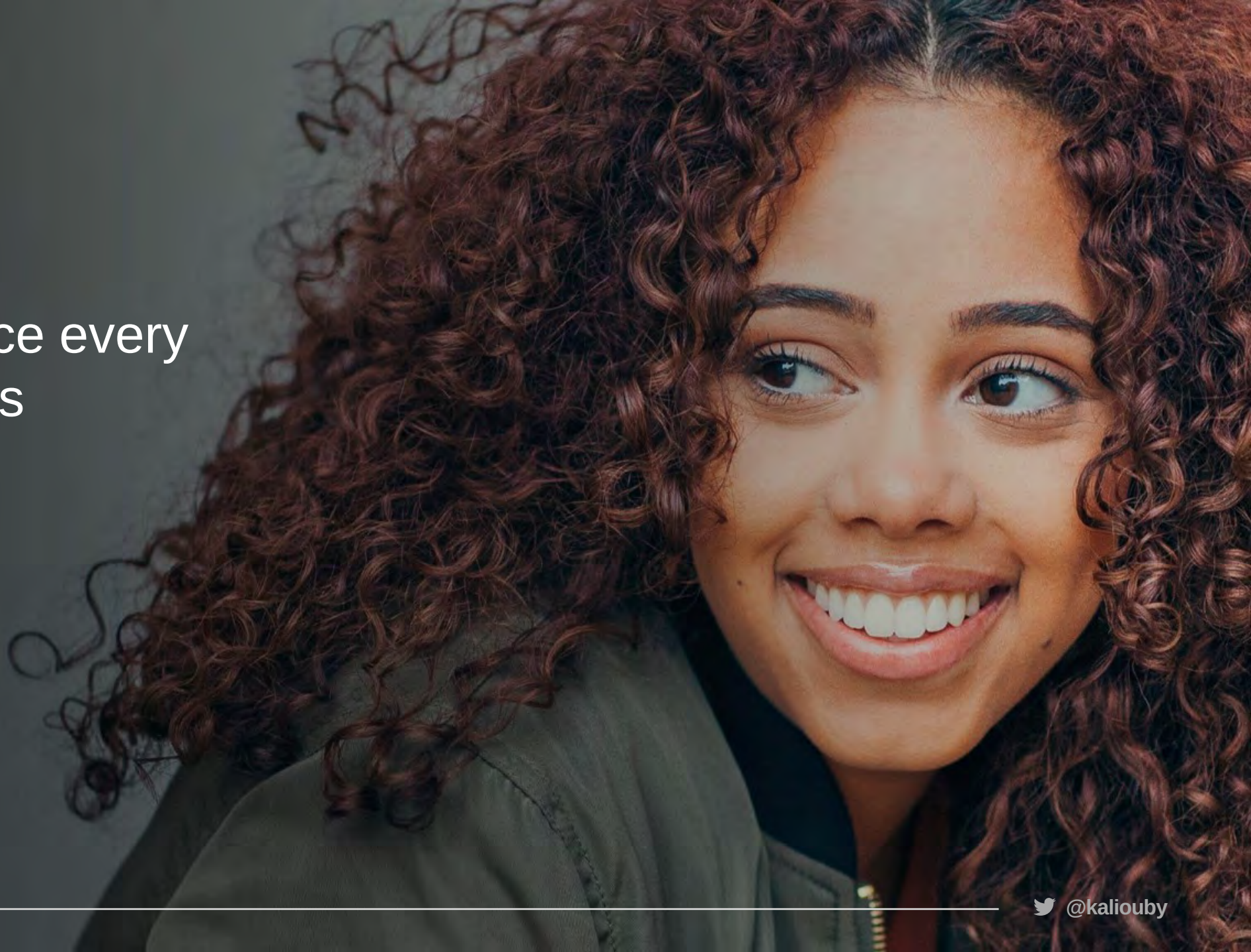
Human Brain Inspiring AI Scientists

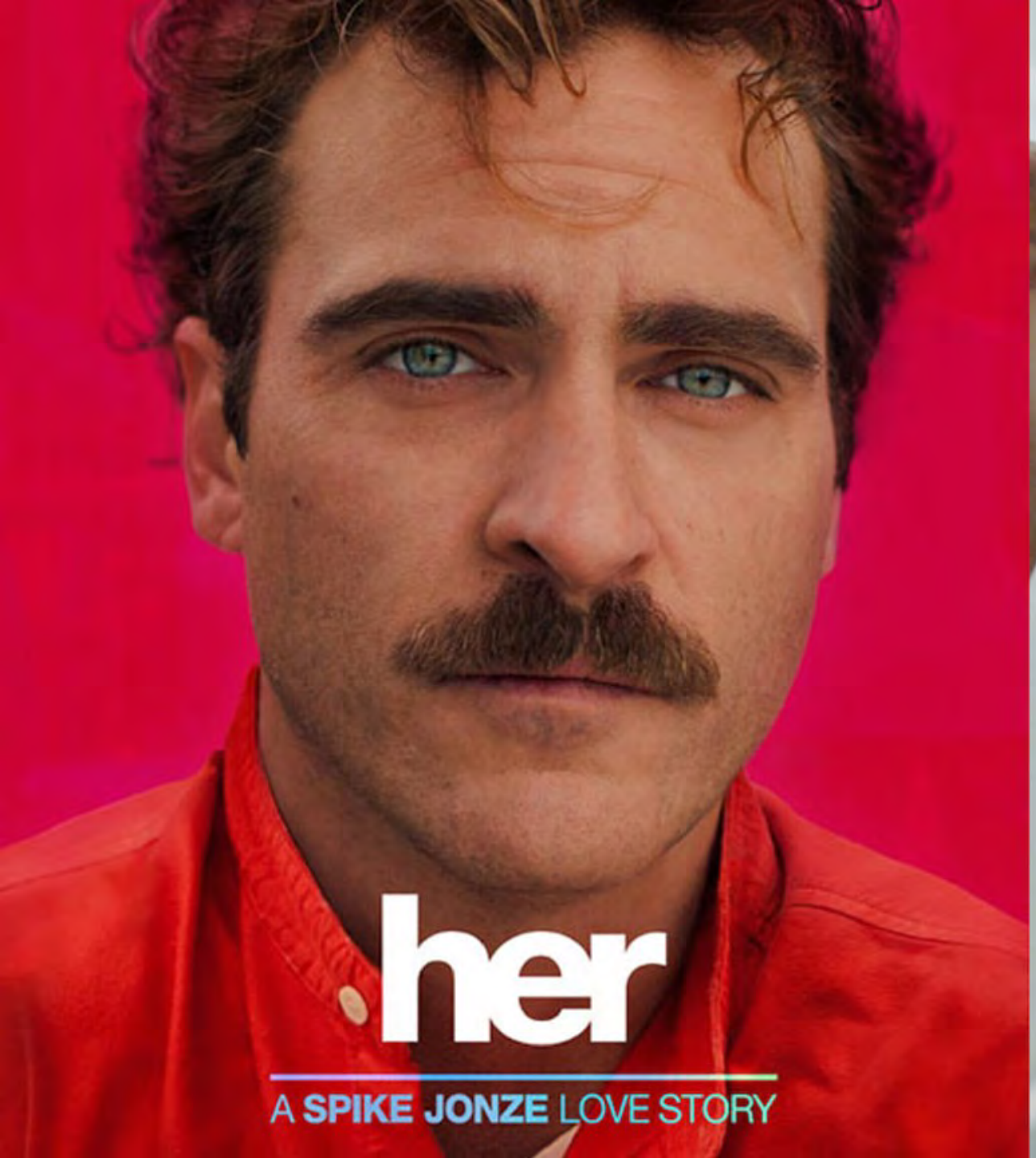


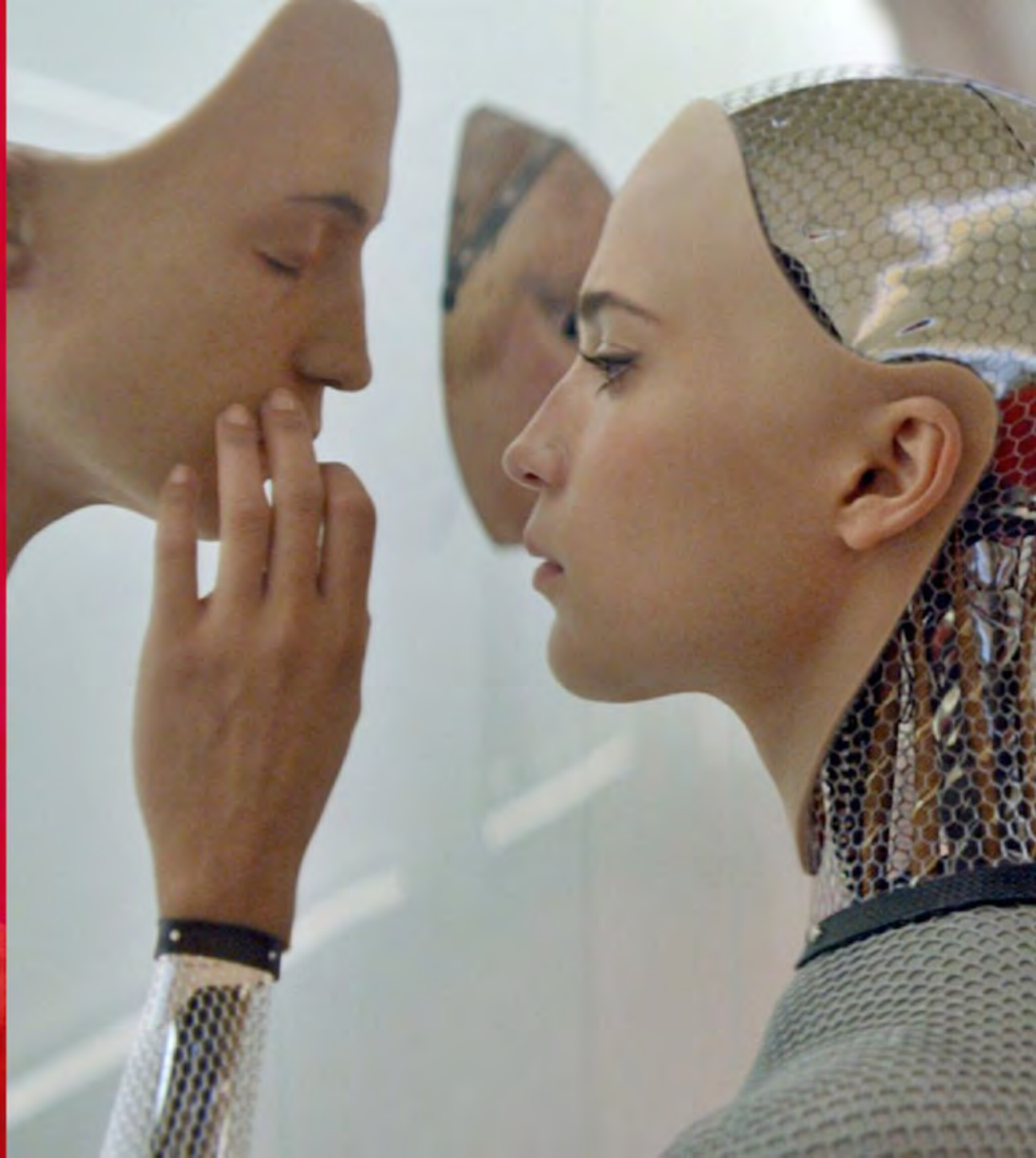



I'll be able to hear your tone of voice, understand how you're feeling, and detect any concerns that may be troubling you.
Hello, Norrie. Thank you for participating in this very important medical trial.
YES

Emotions influence every aspect of our lives




her
A SPIKE JONZE LOVE STORY



What if doctors could objectively measure how you are **feeling the way they measure our other vital signs**?


What if our cars knew we were getting angry and **could make our brakes more responsive**?

How do humans read emotions?

Emotion sensing is **highly complex. Humans interpret emotions by combining multiple channels:**

55%

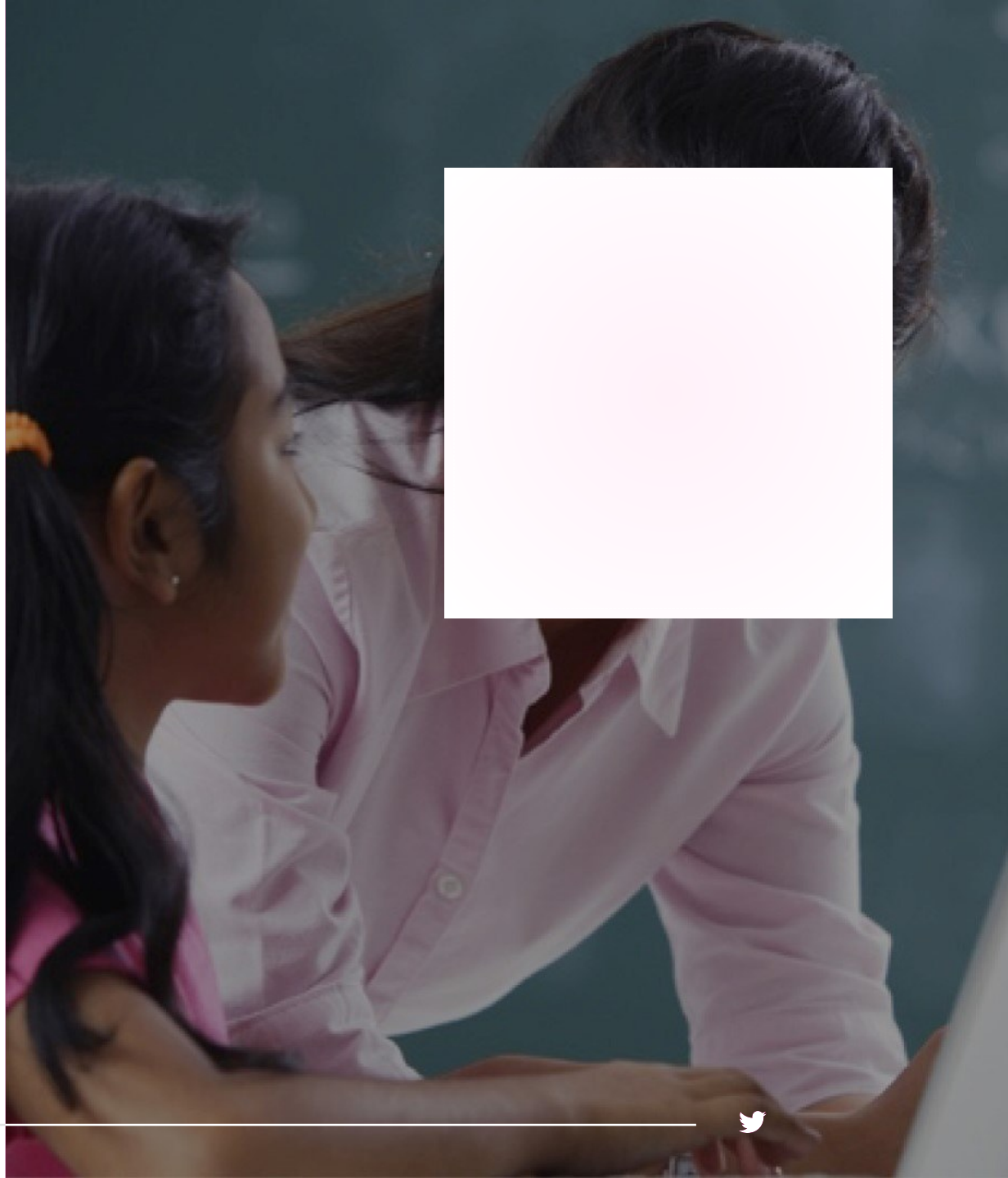
Facial expressions and gestures

38%

How the words are said

7%

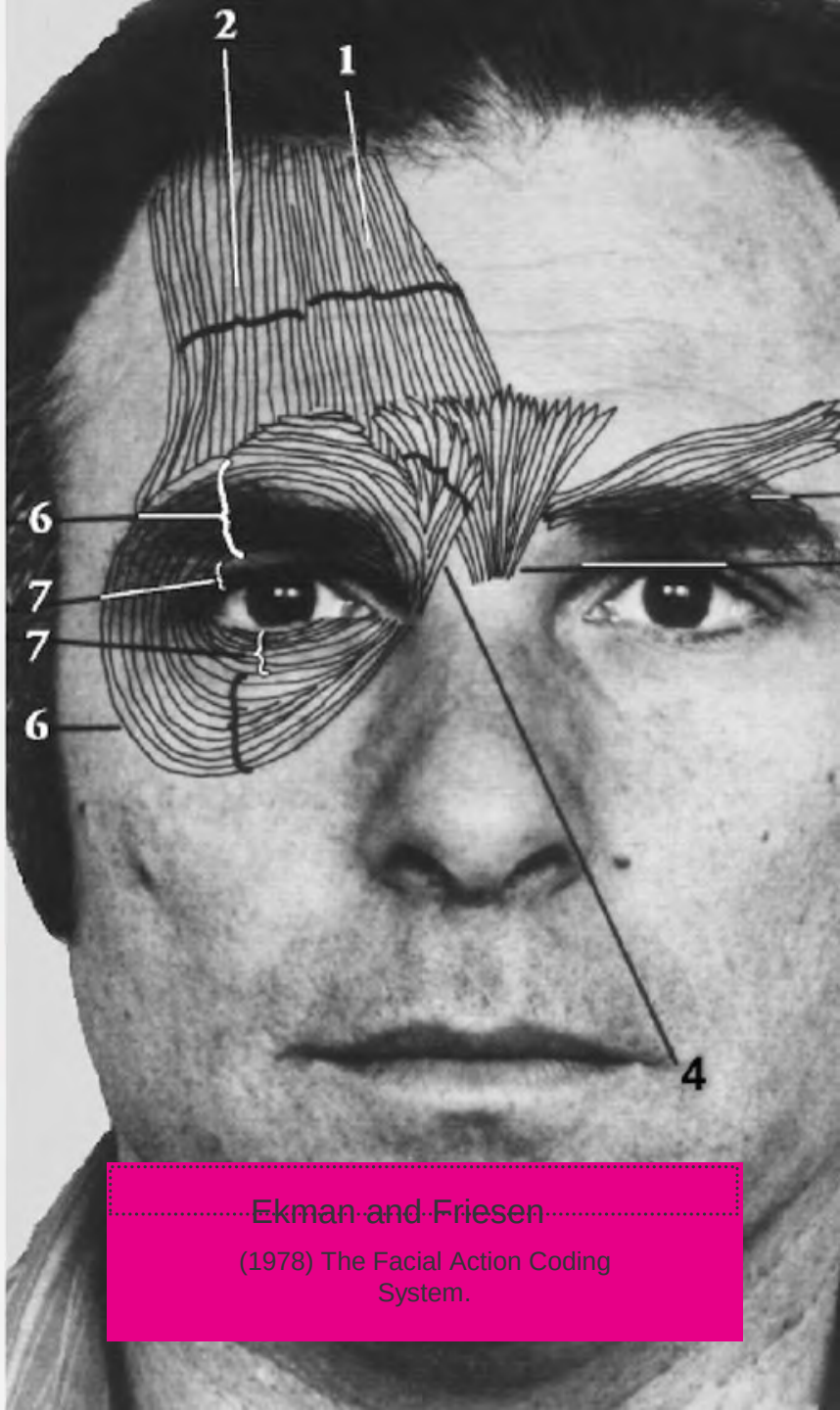
The actual words



:) Affectiva

Duchenne de Boulogne

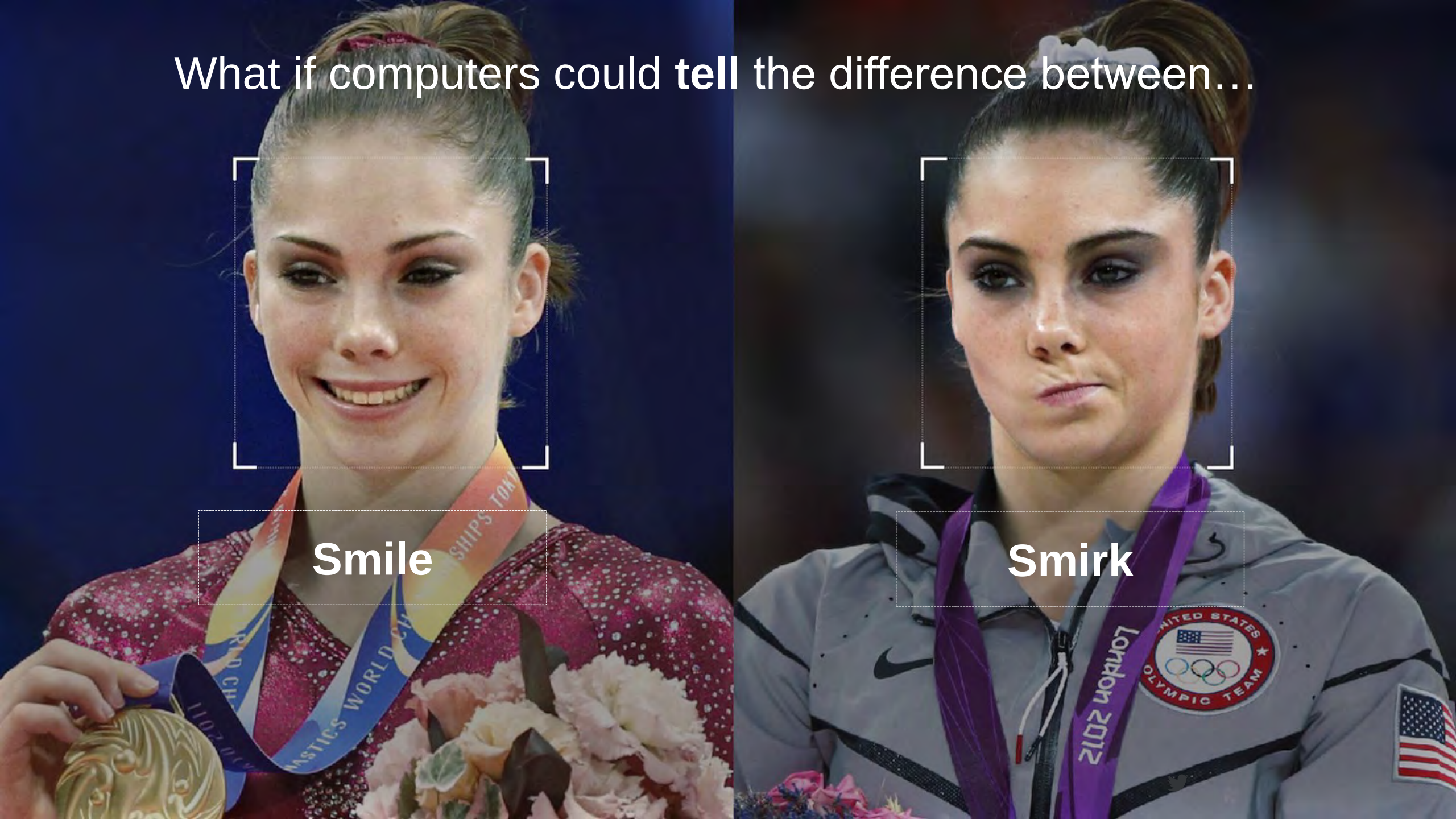
(1862) The Mechanism of Human Physiognomy.



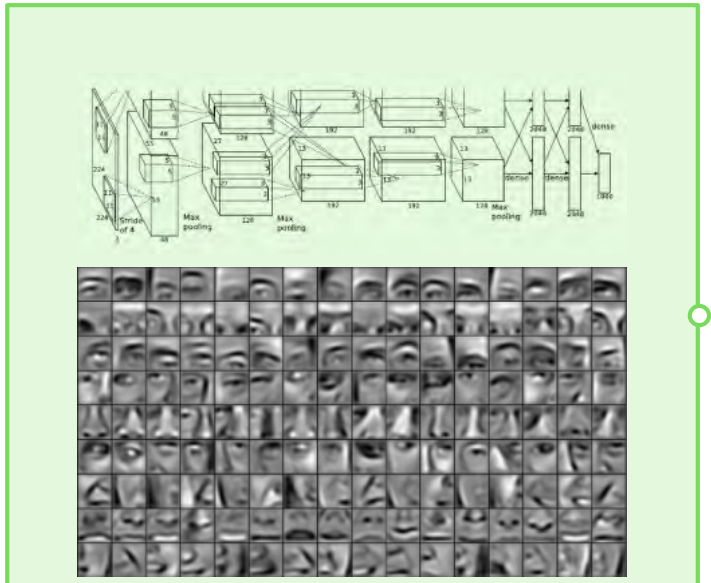
Ekman and Friesen

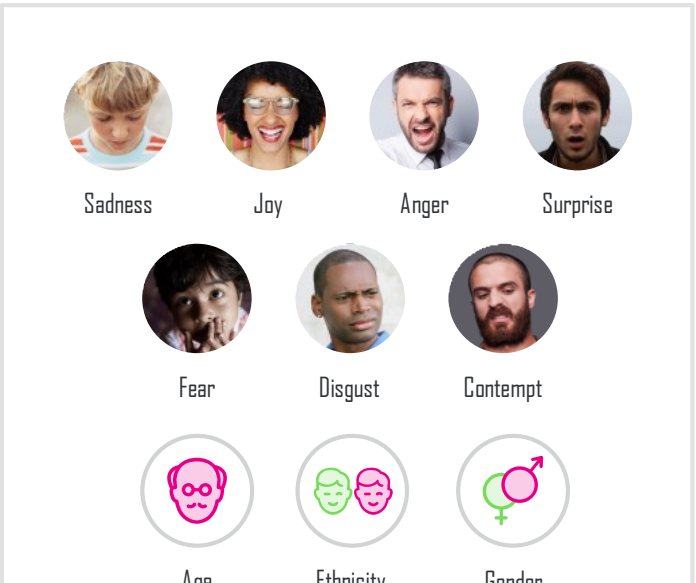
(1978) The Facial Action Coding System.

What if computers could **tell** the difference between…



Emotion AI platform built on **deep learning**



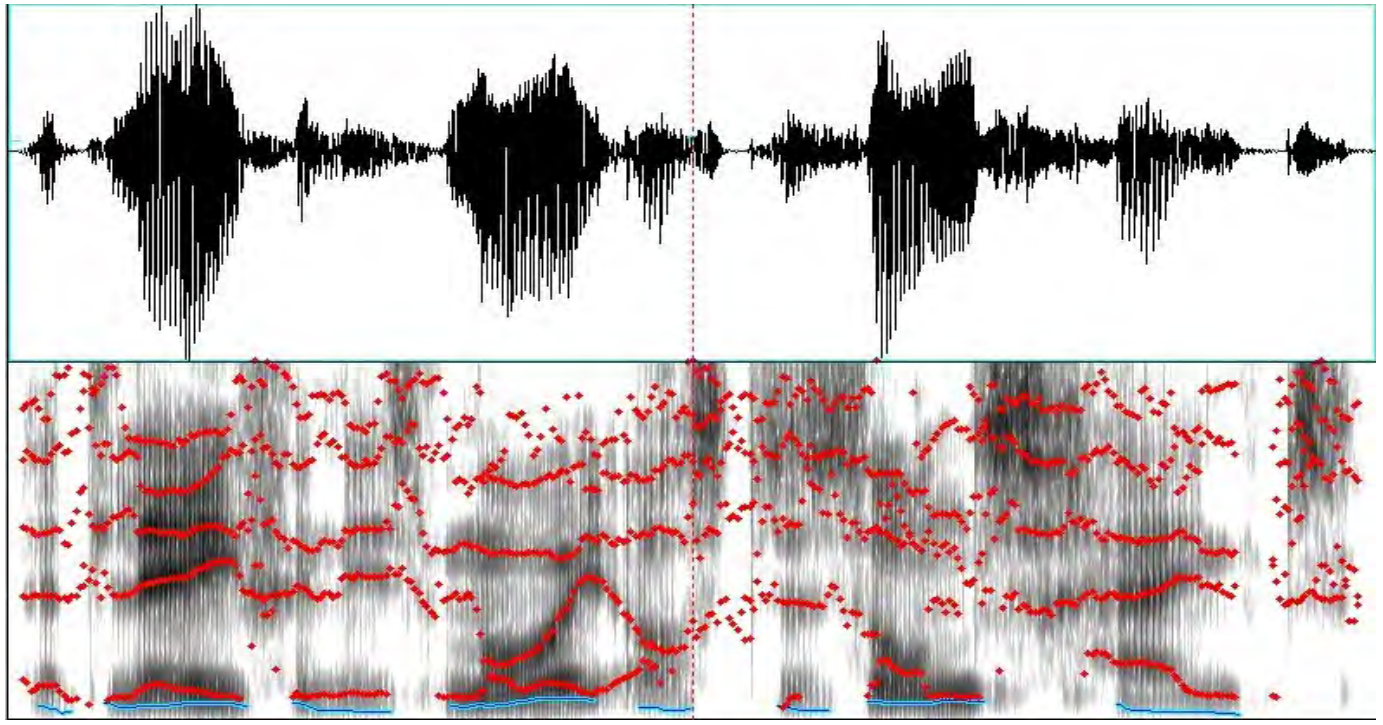


Input:
Labeled and unlabeled videos (+voice) data. Meta data. Latest training used 1M+ images.

Deep Neural Networks

Output:
23 Facial expressions
7 Emotions
Valence, Engagement, Attention, Age, Ethnicity, Gender

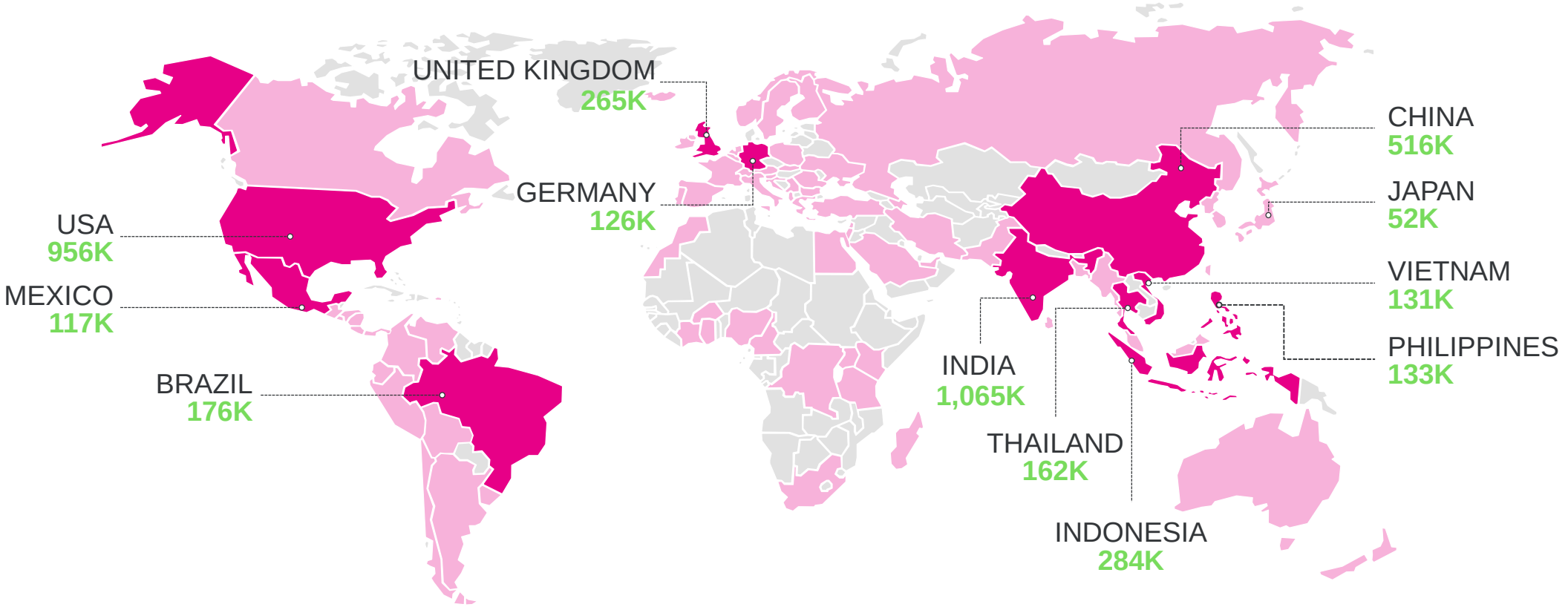
Emotion from **Speech**



World's largest **emotion data repository**

87 countries, 6M faces analyzed, 2B facial frames
Includes people emoting on device, mobile phone and while driving

Top Countries for Emotion Data

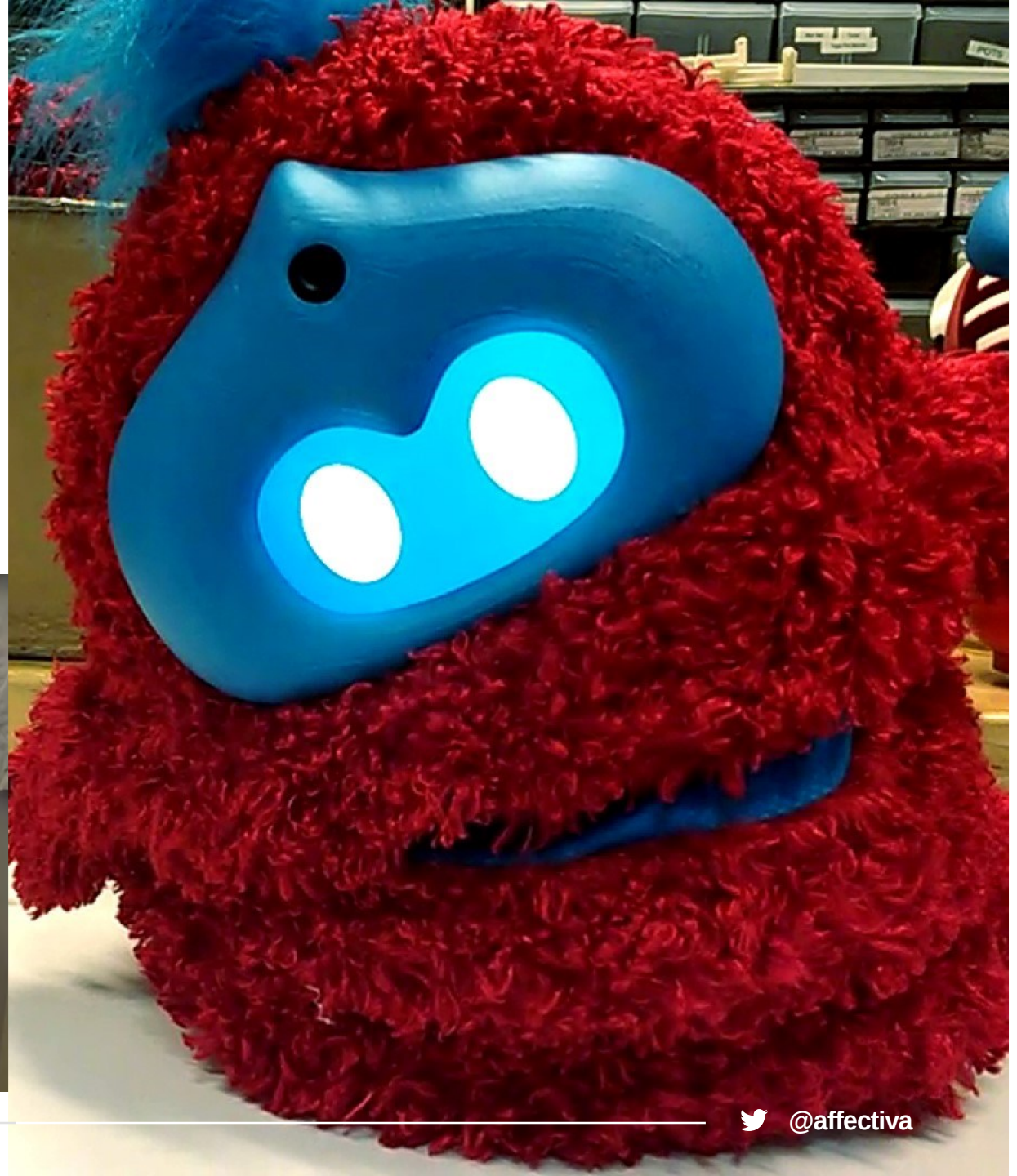


Emotion AI – Possible Markets

Tega learning companion for kids

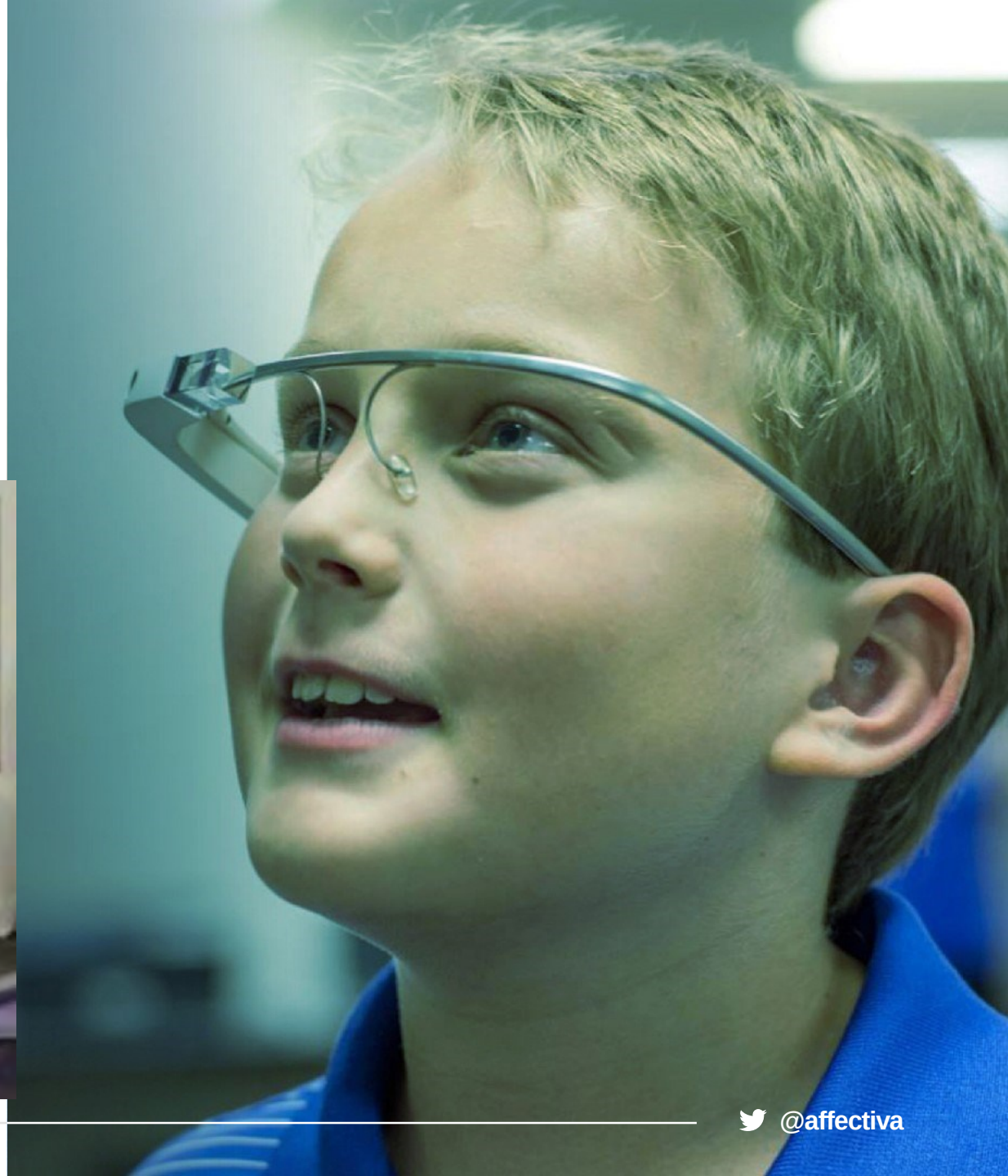
mit media lab

Tega helped Children to learn more words in shorter duration



Health and Wellbeing

Brain Power: helping individuals on **the autism spectrum** BRAIN POWER GLASS



The merger of IQ & EQ in tech is inevitable


Learn more
www.affectiva.com

Trends in the Global Digital Economy

Increasing Divides and the Promise of Local Entrepreneurship

15th ITU WTIS, Hammamet, Tunisia
16 Nov 2017

Dr. Nicolas Friederici
Postdoctoral Researcher, Oxford Internet Institute

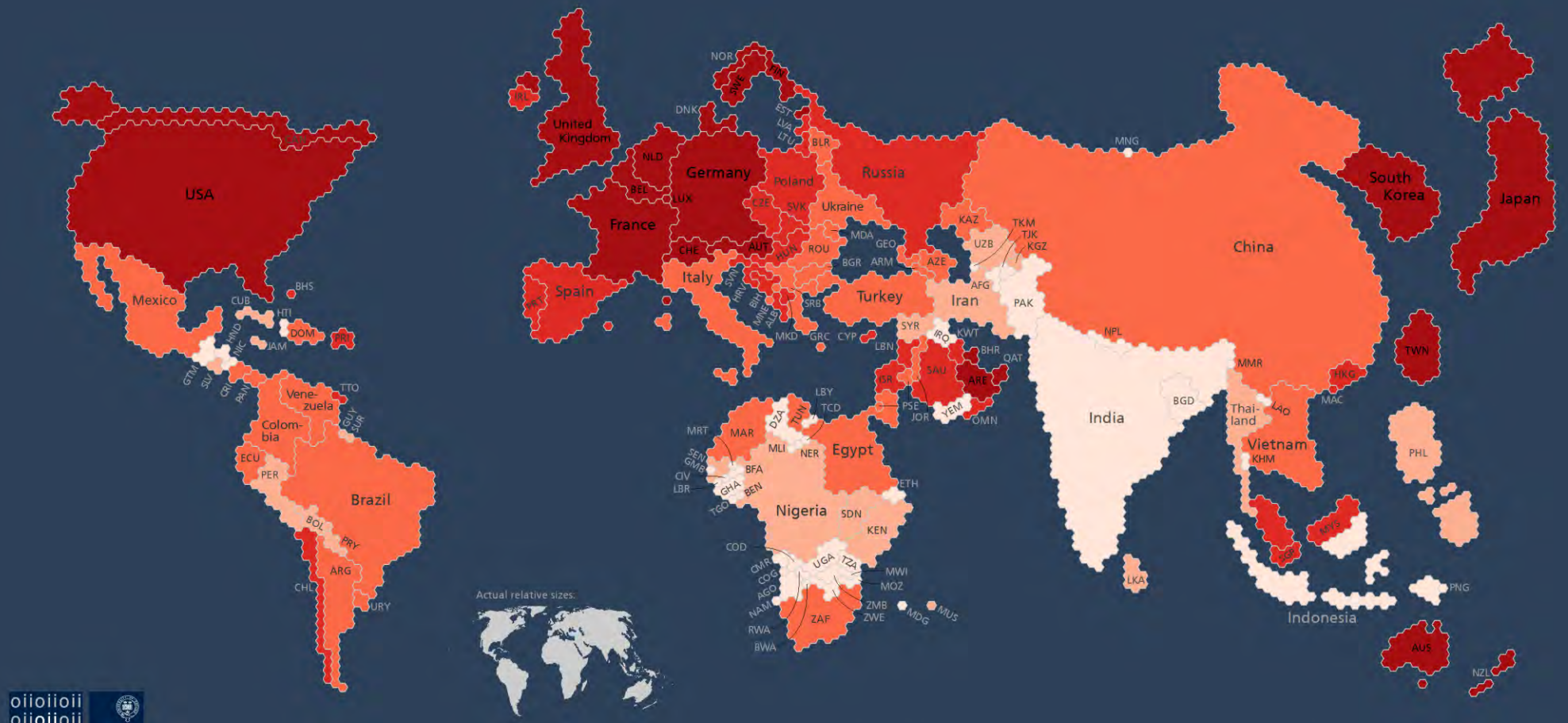
nicolas.friederici@oii.ox.ac.uk, @friedema
https://www.oii.ox.ac.uk/people/nicolas-friederici/
http://geonet.oii.ox.ac.uk, @GeonetProject

Geonet

Investigating the Changing Connectivities and Potentials of Sub-Saharan Africa's Knowledge Economy

oiioiioii
oiioiioii
oiioiioii

University of Oxford



The World Online

Percentage of people online

80–100% 60–80% 40–60% 20–40% 0–20%

Number of people online

One ● represents roughly 470,000 people online.

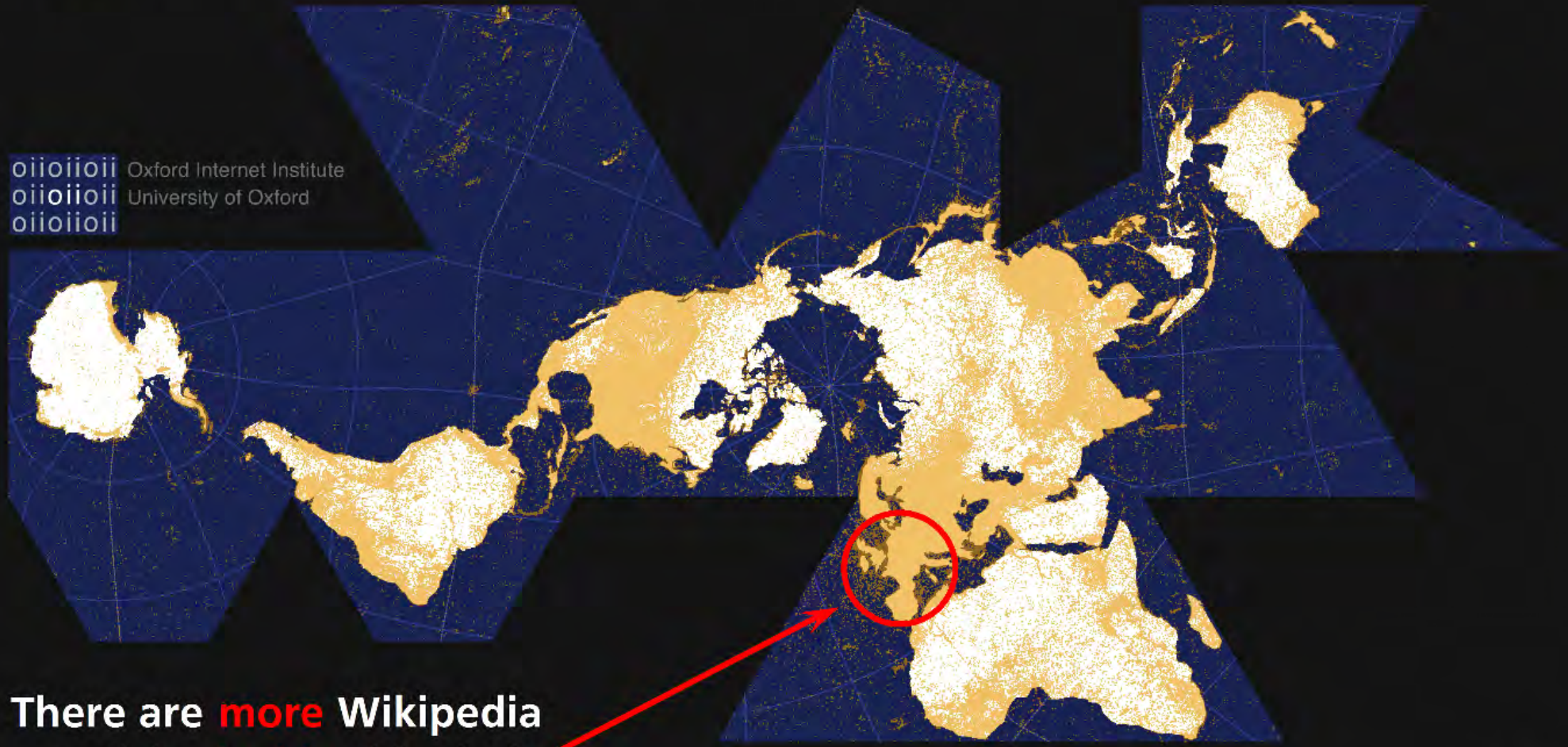
The countries are scaled proportionally to the number of Internet users in that country. Countries with fewer than 470,000 people online have been removed from the map. The shading indicates the percentage of the population that is online.

The visualization uses 2013 data from the World Bank's Worldwide Development Indicators project and from Natural Earth.

The Geographically Uneven Coverage of Wikipedia

While it is an invaluable resource of knowledge for numerous users, Wikipedia's articles have a strong bias in their geographic distribution. Below map is based on 3,336,473 geotagged articles in November 2012 data dumps of 44 language versions. Each article is represented by an orange dot.

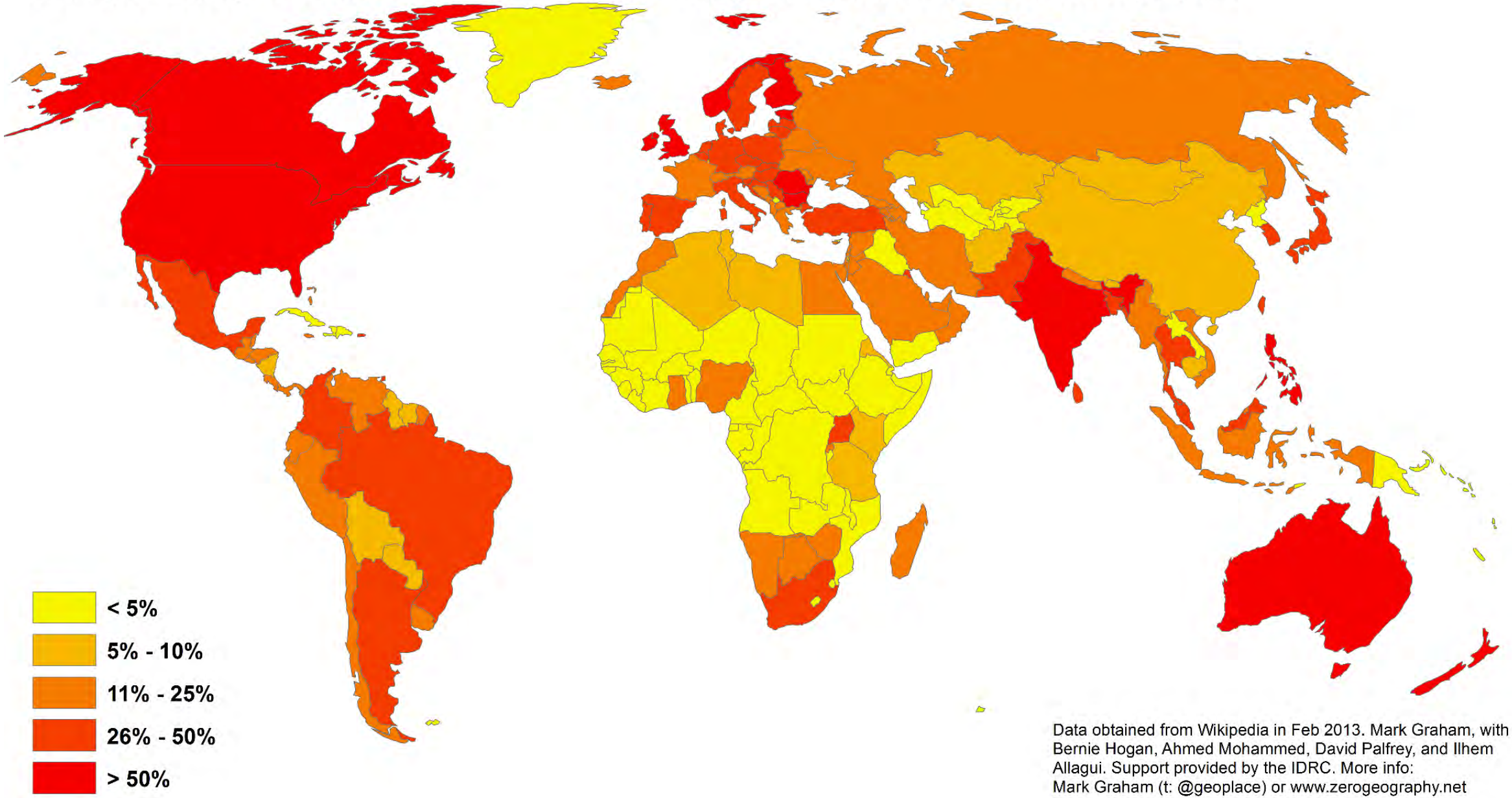
oiioiioi Oxford Internet Institute
oiioiioi University of Oxford
oiioiioi



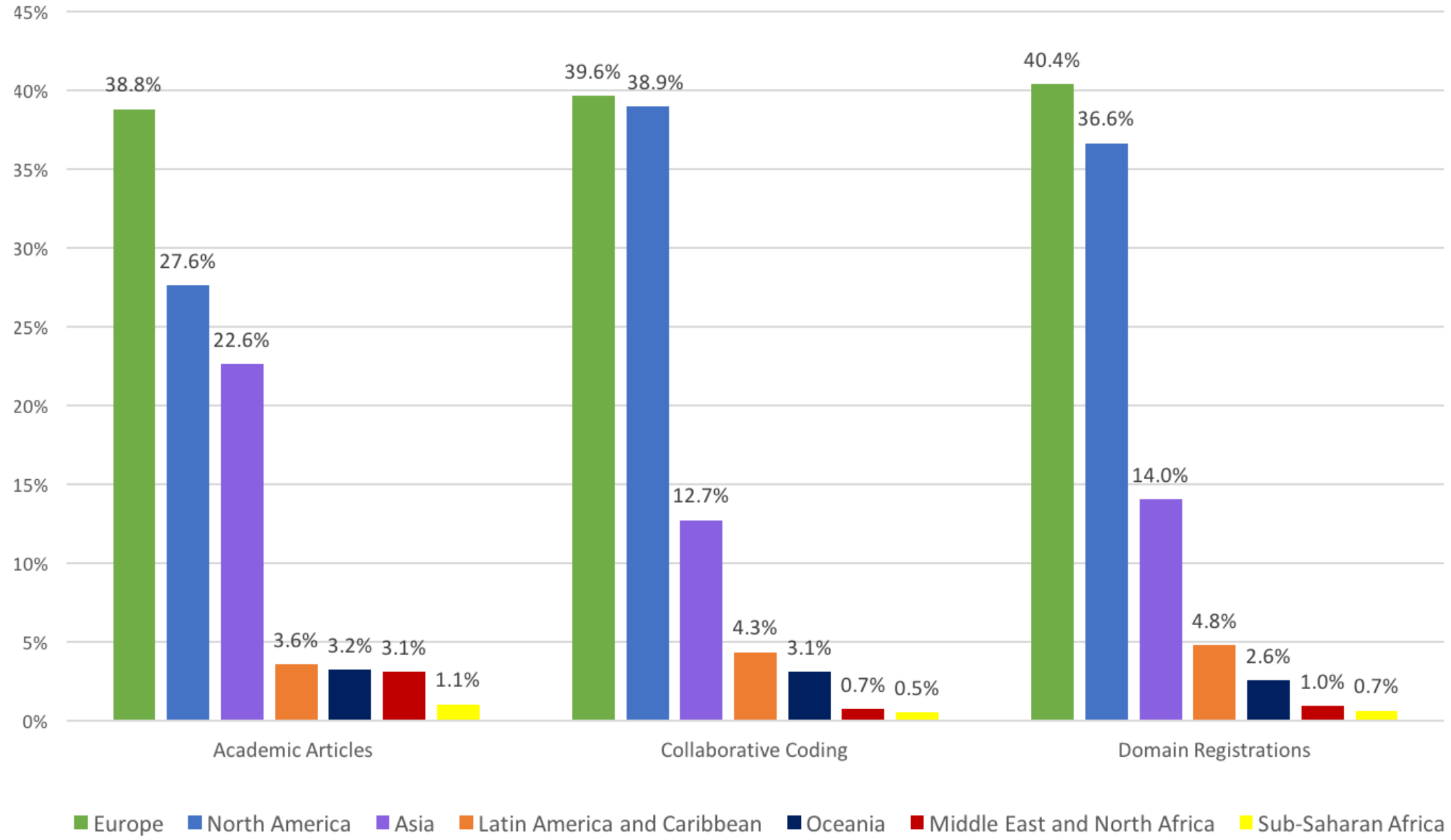
There are more Wikipedia articles inside this circle than outside of it

This map is part of the Information Geographies project at http://geography.oii.ox.ac.uk.

Ralph Straumann, Mark Graham
Data sources: Wikipedia, Natural Earth



Detail at: http://geonet.oii.ox.ac.uk/blog/explaining-locally-contributed-content-in-wikipedia-about-sub-saharan-africa

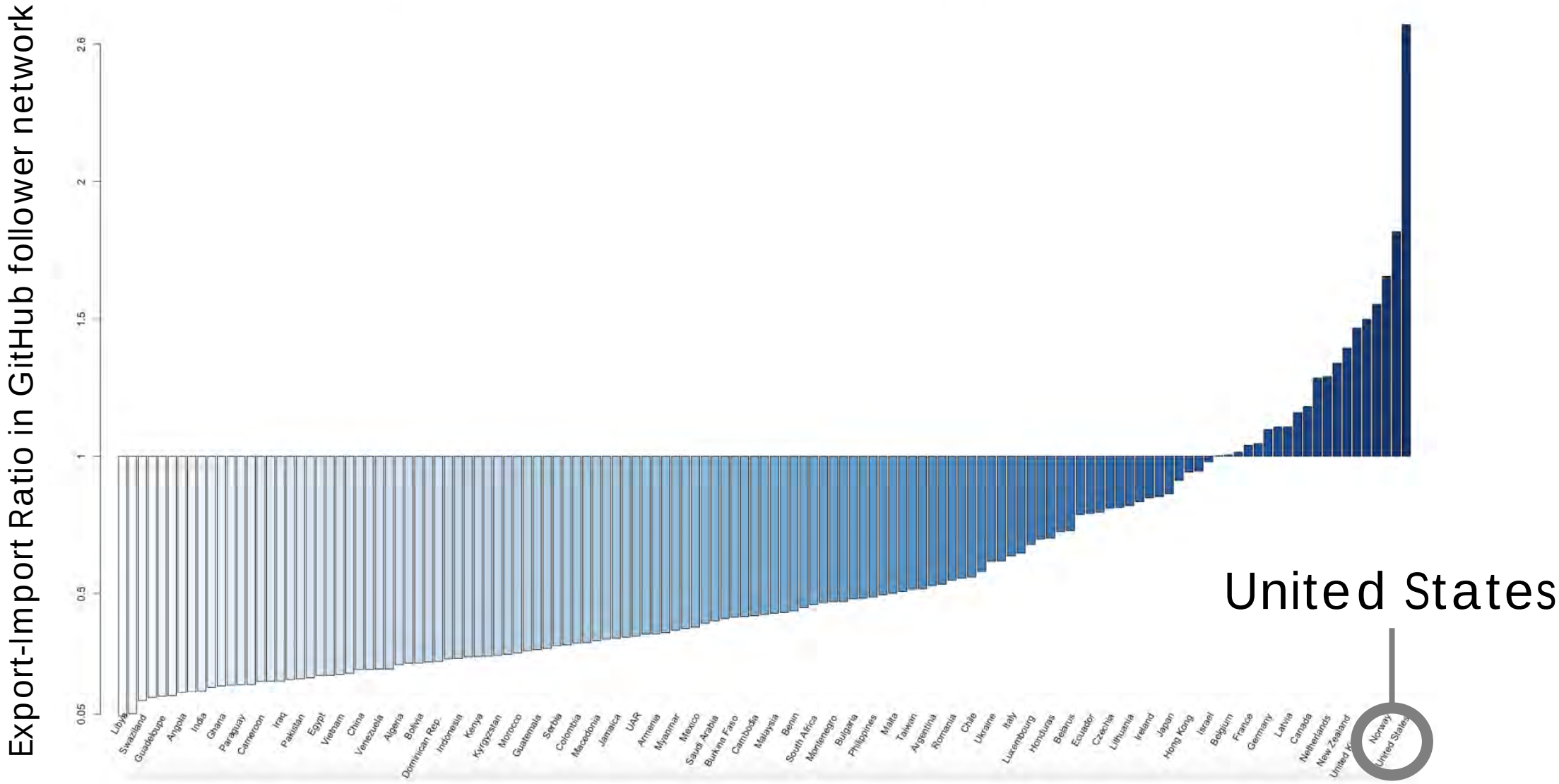


Source: Ojanpera et al., 2017, Oxford Internet Institute

http://geonet.oii.ox.ac.uk, @GeonetProject

Network centrality of countries on *GitHub*

(GitHub is the largest collaborative programming community worldwide with more than 24 million users)

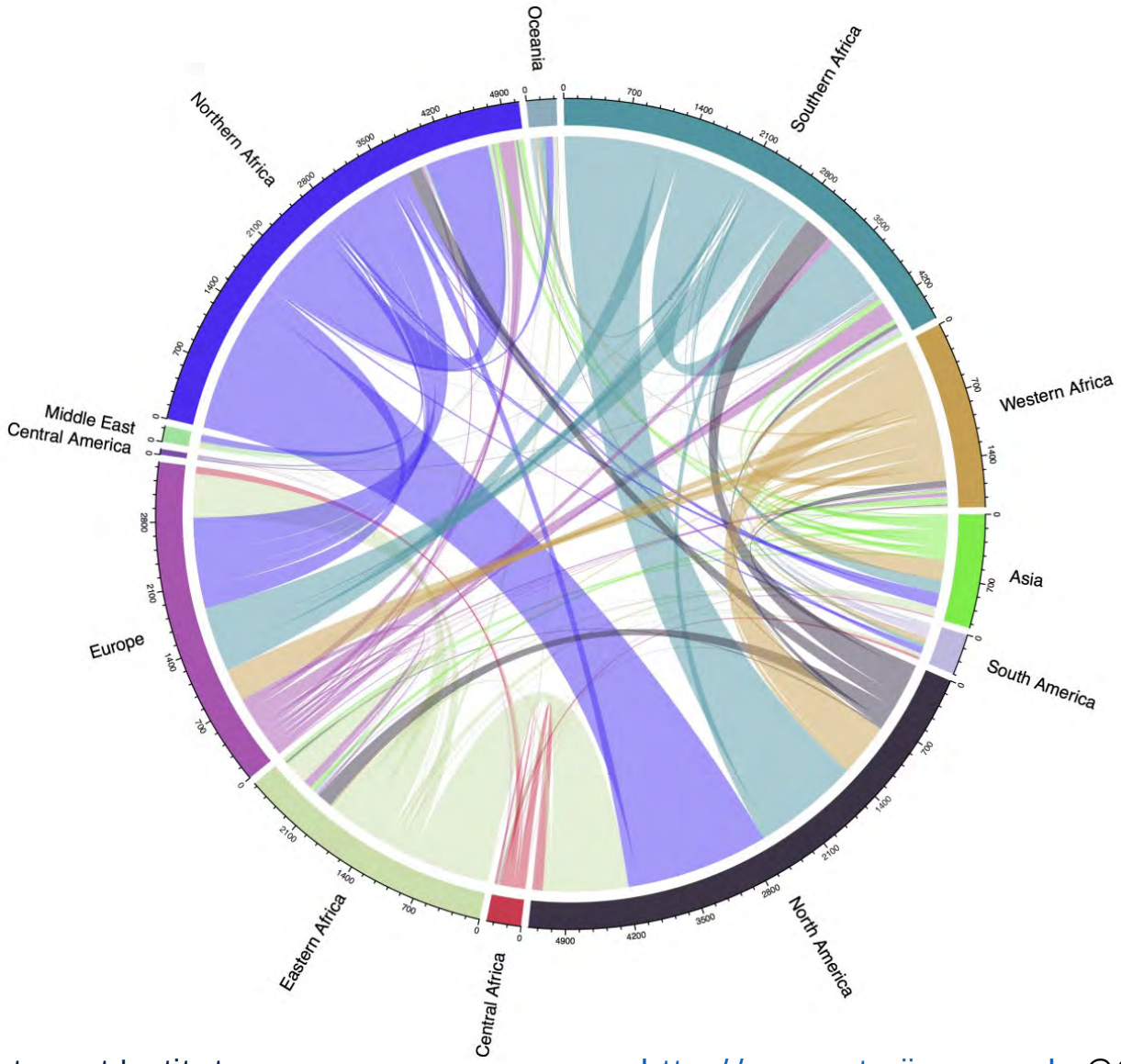


Source: Braesemann et al., Oxford Internet Institute

http://geonet.oii.ox.ac.uk, @GeonetProject

Africa's participation on *GitHub*

(GitHub is the largest collaborative programming community worldwide with more than 24 million users)



Source: Braesemann et al., Oxford Internet Institute

http://geonet.oii.ox.ac.uk, @GeonetProject

Publicly traded companies [edit]

All market capitalization figures are in USD millions.

2016 [edit]

Third quarter	
Apple Inc	▲612,662.8
Alphabet	▲541,700.3
Microsoft	▲448,223.3
Amazon Inc.	▲401,629.1
Facebook	▲368,704.1
Exxon Mobil	▼363,175.4
Berkshire Hathaway	

2017 [edit]

Third quarter[13][note 1]	
Apple Inc.	▲791,726
Alphabet Inc.	▲664,550[14]
Microsoft	▲568,965
Amazon.com	▼459,435
Berkshire Hathaway	▲451,840[15]
Alibaba Group	▲436,850[16]
Tencent	▲405,007

List of African countries by GDP (nominal)

From Wikipedia, the free encyclopedia

List [edit]

The 2016 estimates are as follows:[7][8]

2016 Rank	Country	Nominal GDP ($ billions)
1	Nigeria	537.966
2	Egypt	330.765
3	South Africa	266.213
4	Algeria	165.974

Economy of Africa

Statistics	
Population	1.1 billion (15%; 2013[1])
GDP	Nominal: US$2.39 trillion, €1.80 trillion (2013) PPP: US$ 3.757 trillion (2013)

3rd quarter 2016 valuation of

- Google ~ Nigeria's GDP
- Big five ~ 280 x Rwanda's GDP
- **Big five ~ Africa's GDP**

There is *hope*!

Digital entrepreneurship holds potential for local development

Progress needs to be assessed

Conditions for scaling need to be enabled

Thank you!

Dr. Nicolas Friederici
Postdoctoral Researcher, Oxford Internet Institute

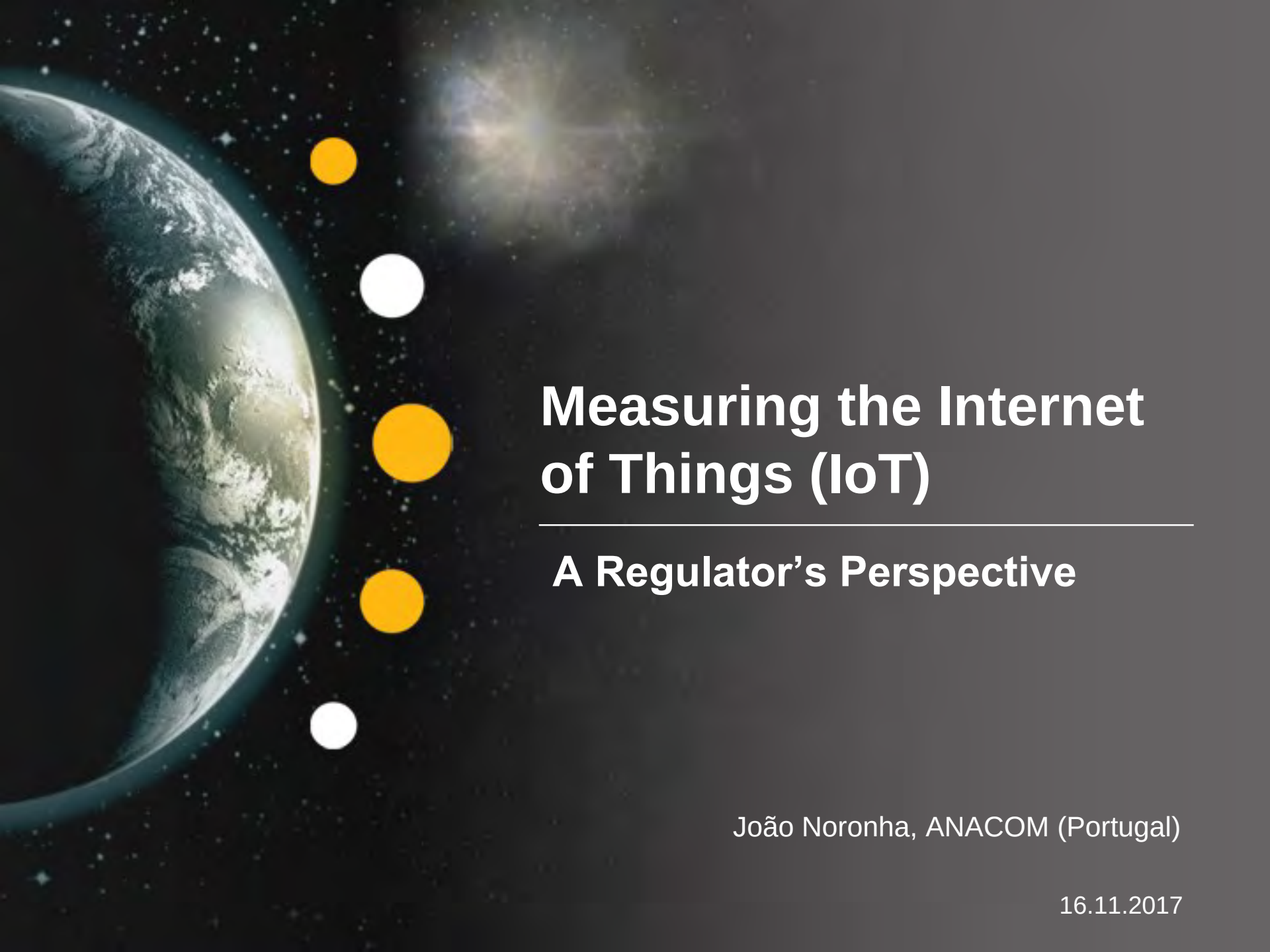
nicolas.friederici@oii.ox.ac.uk, @friedema
https://www.oii.ox.ac.uk/people/nicolas-friederici/
http://geonet.oii.ox.ac.uk, @GeonetProject

Geonet

Investigating the Changing Connectivities and Potentials of Sub-Saharan Africa's Knowledge Economy

oiioiioii
oiioiioii
oiioiioii

UNIVERSITY OF OXFORD



Measuring the Internet of Things (IoT)

A Regulator's Perspective

João Noronha, ANACOM (Portugal)

16.11.2017

Index

1. The Internet of Things (IoT)
2. IoT, public policy and regulation
3. Measuring the IoT
   - Coverage
   - Usage
   - Examples
4. Conclusions

Index

1. The Internet of Things (IoT)
2. IoT, public policy and regulation
3. Measuring the IoT
   - Coverage
   - Usage
   - Examples
4. Conclusions

A definition of IoT

"*An IoT is a network of **interconnected**, uniquely identifiable **'Things'** which are connected to the Internet and use standard communication protocols.*

*The 'Things' have physical or virtual representation in the digital world, **sensing/actuation capability and/or programmability capabilities**.*

*'Things' **generate information**, including the 'Things' identity, status, location or any business, social or privately relevant information.*

*The 'Things' **offer anywhere/anytime services** that exploit the generated information through an intelligent interface with or without human intervention*"

Source: IEEE (adapted)

The Internet of things (IoT)

28 billion devices

According to the "Ericsson Mobility Report" in 2022 there will be 28 billion connected devices.

Interconnected and communicating

A Massive number of devices will be connecting and communicating through the Internet and other (private) networks

Generating Big Data

Huge amounts of data will be collected, transmitted, analyzed and monetized

Covering all areas of activity

IoT will influence all areas of activity

Connected homes

Home automation, energy management, security, entertainment, assisted living, wearable technology…

Smart farming

Satellite monitoring, plant sensors, smart seeding, smart irrigation,…

Industry 4.0

Cyber physical productions systems

Transport, energy, health, education, consumer services, government,…

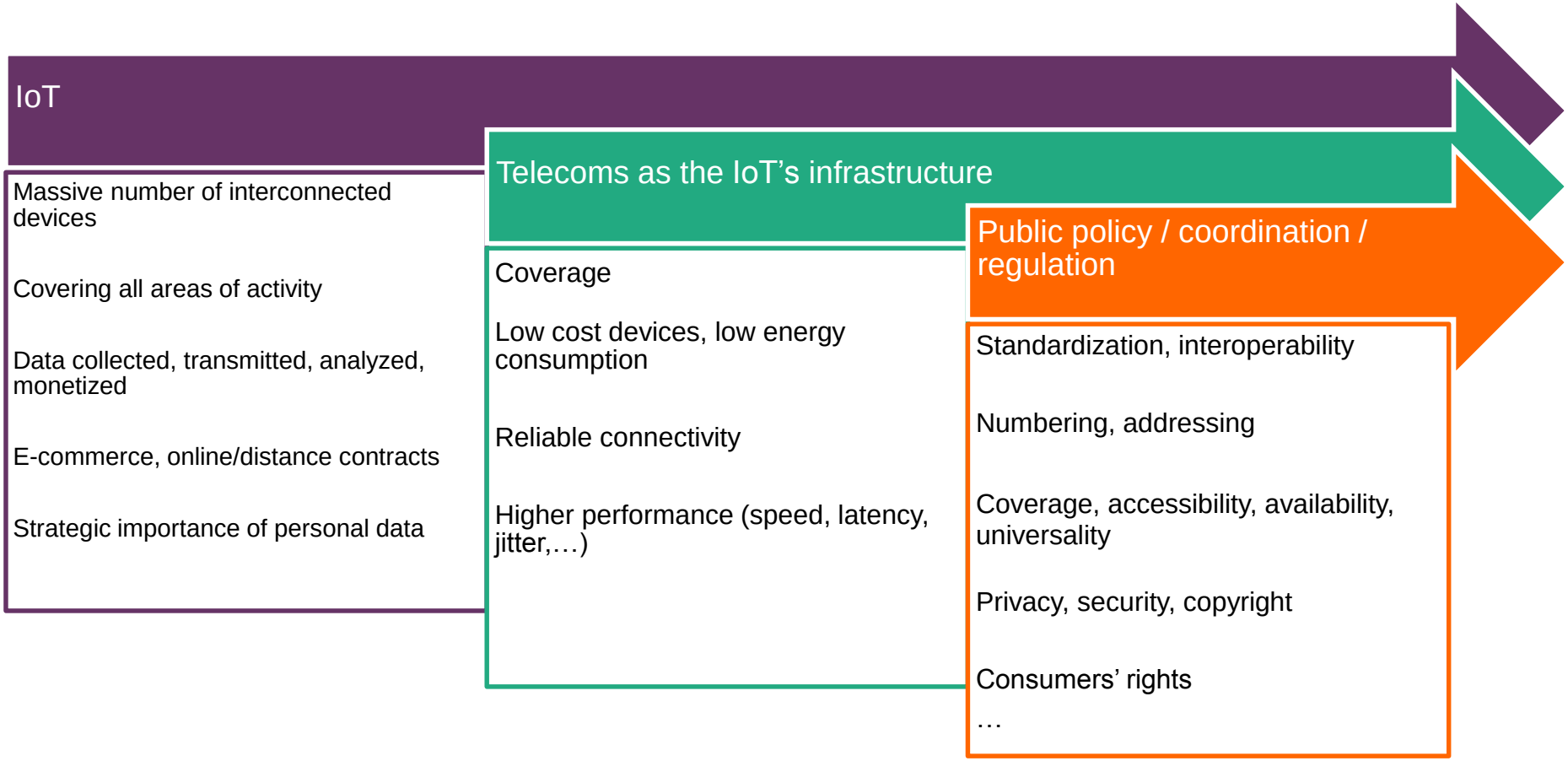
Smart cities, connected health, smart retail, smart supply chain, …

“The new electricity”

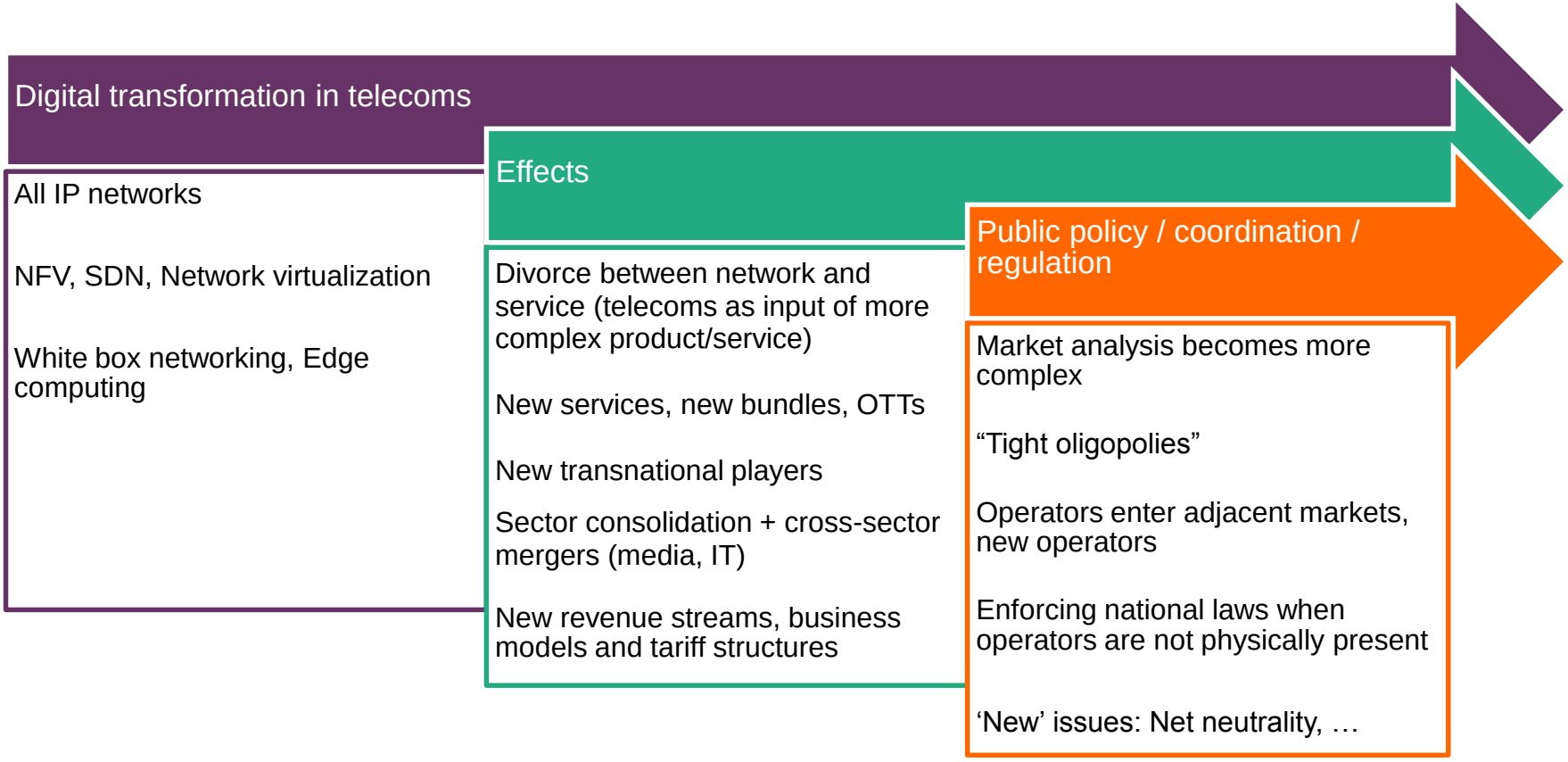
Index

1. The Internet of Things (IoT)
2. IoT, public policy and regulation
3. Measuring the IoT
   - Coverage
   - Usage
   - Examples
4. Conclusions

Regulation & public policy (1)
Telecoms – the IoT's "infrastructure"



Regulation & public policy (2)
Digital transformation in telecoms



The IoT will raise old & new issues for Public policy/regulation

Index

1. A definition of IOT
2. The relevance of the IoT
3. IoT, public policy and regulation
4. Measuring the IoT
   - Coverage
   - Usage
   - Examples
5. Conclusion

IoT indicators for public policy / regulation (1)

Coverage

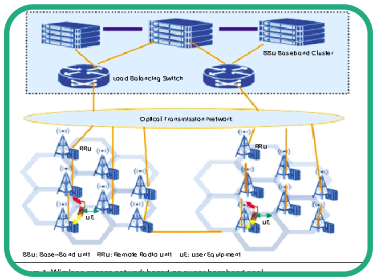
Usage

Devices, connections, subscribers, clients, traffic, revenues

IoT indicators for public policy / regulation (2)

Coverage

IoT indicators for public policy / regulation (3): Coverage



Mobile coverage

- 2G, 2,5G, 3G, 4G ✓
- 5G WORK IN PROGRESS
- LPWA (feasible/necessary ?) ?

Fixed coverage

- 90% of wireless traffic supported by fixed networks (Delloite) ✓
- 60% mobile traffic offloaded on to fixed networks (Cisco)
- Short-range IoT, which cover a plurality of devices (Ericsson).

IXPs, datacenters, cloud

- (feasible/necessary ?) ?

IoT indicators for public policy / regulation (4)

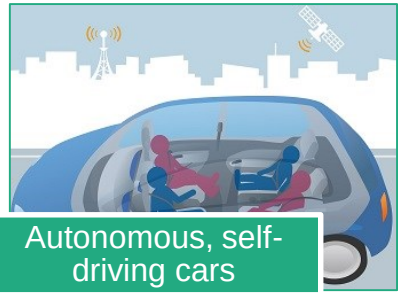
Usage

Devices, connections, subscribers, clients, traffic, revenues

IoT indicators for public policy / regulation (5): IoT applications

Wide area critical applications

- Ultra-reliability
- Availability
- Low latency, high data throughput



Autonomous, self-driving cars

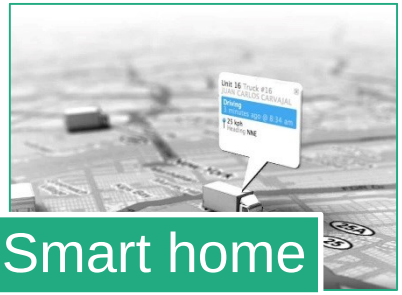
Wide area non-critical applications

- High-connection volumes
- Low traffic
- Low energy consumption
- Low-cost devices

Fleet management

Short range applications

- Typical range of less than 100 m.



Smart home

IoT indicators for public policy / regulation (6): networks & datasources

Wide area critical applications	4G,5G	Supply side (mobile operators)
Wide area non-critical applications	2G, 2,5G, 3G, Cellular LPWA (NB IoT)	
	LPWA (Sigfox, LoRa, RPMA, …)	Supply side (LPWA operators)
Short range applications	Wi-Fi, Bluethooth, ZigBee Fixed / powerline communications	• Device vendors • IaD-*Internet as datasource* • User surveys • …

IoT indicators for public policy / regulation (7): Indicators & challenges

2G, 2.5G, 3G, 4G,5G

Cellular LPWA (NB IoT)

LPWA (Sigfox, LoRa, RPMA, …)

Wi-Fi, Bluethooth, ZigBee

Fixed / powerline communications

M2M-type indicators

N.º devices, clients, traffic, revenues

- N.º of devices
- Type of devices
- Type of applications
- …

- Split by network (…4G, 5G)
- Collect data for specific apps/devices (e.g. connected cars ?)
- Effect of eSIMS, simultaneous/multi-homing connectivity
- Separate P2P & M2M mobile penetration

Transnational corporations offering services across borders

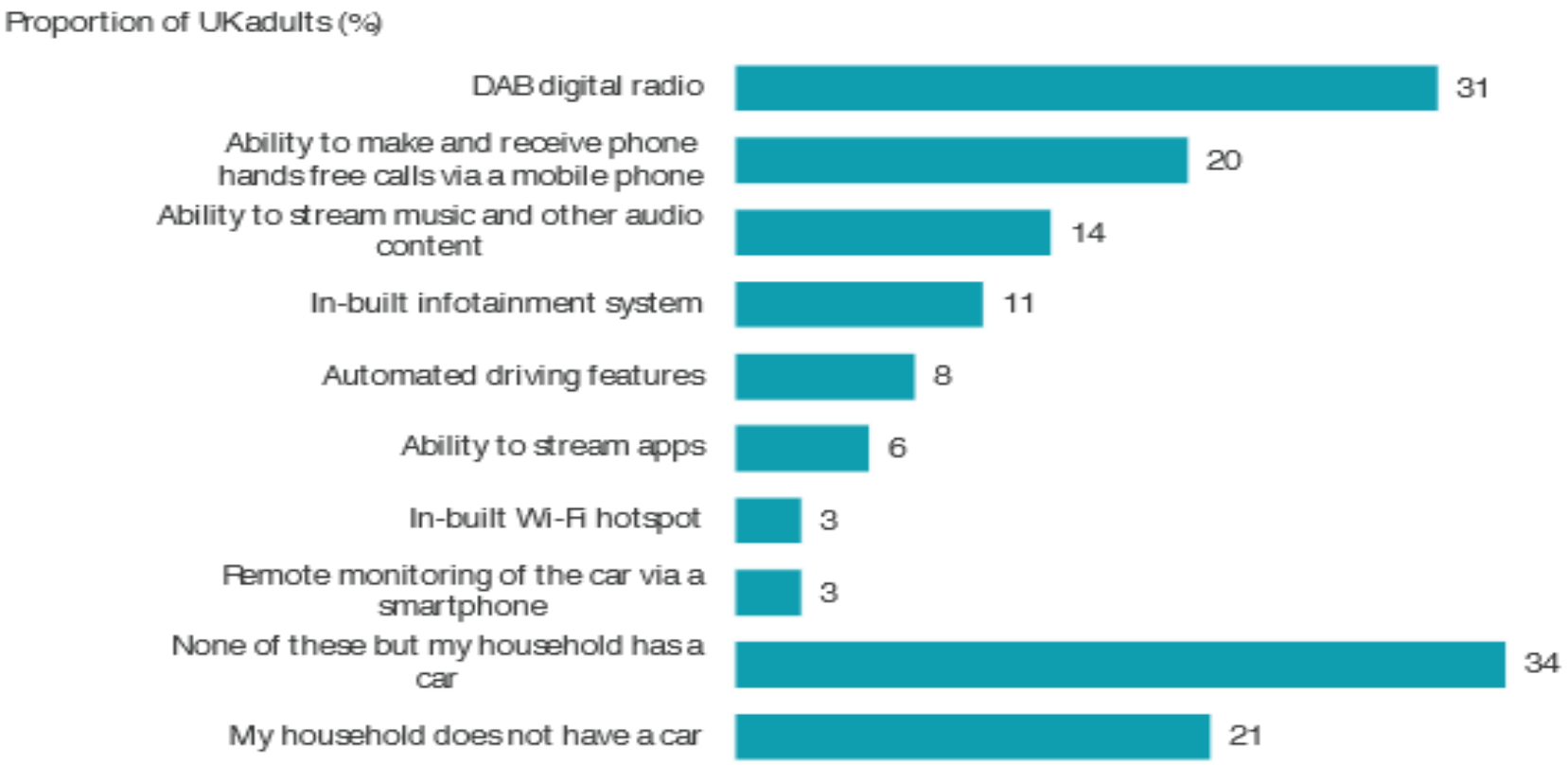
- Partial data
- Users may not know which devices/apps are used (in the case of surveys)
- …

Example: LPWA services (supply side data)

- In 2016, ANACOM collected data from LPWA providers in Portugal
- Indicators collected included: number of devices, clients, traffic and revenue
- Conclusions were, as expected:
  - Significant number of devices
  - Low volume of traffic per device
  - Low number of (corporate) clients

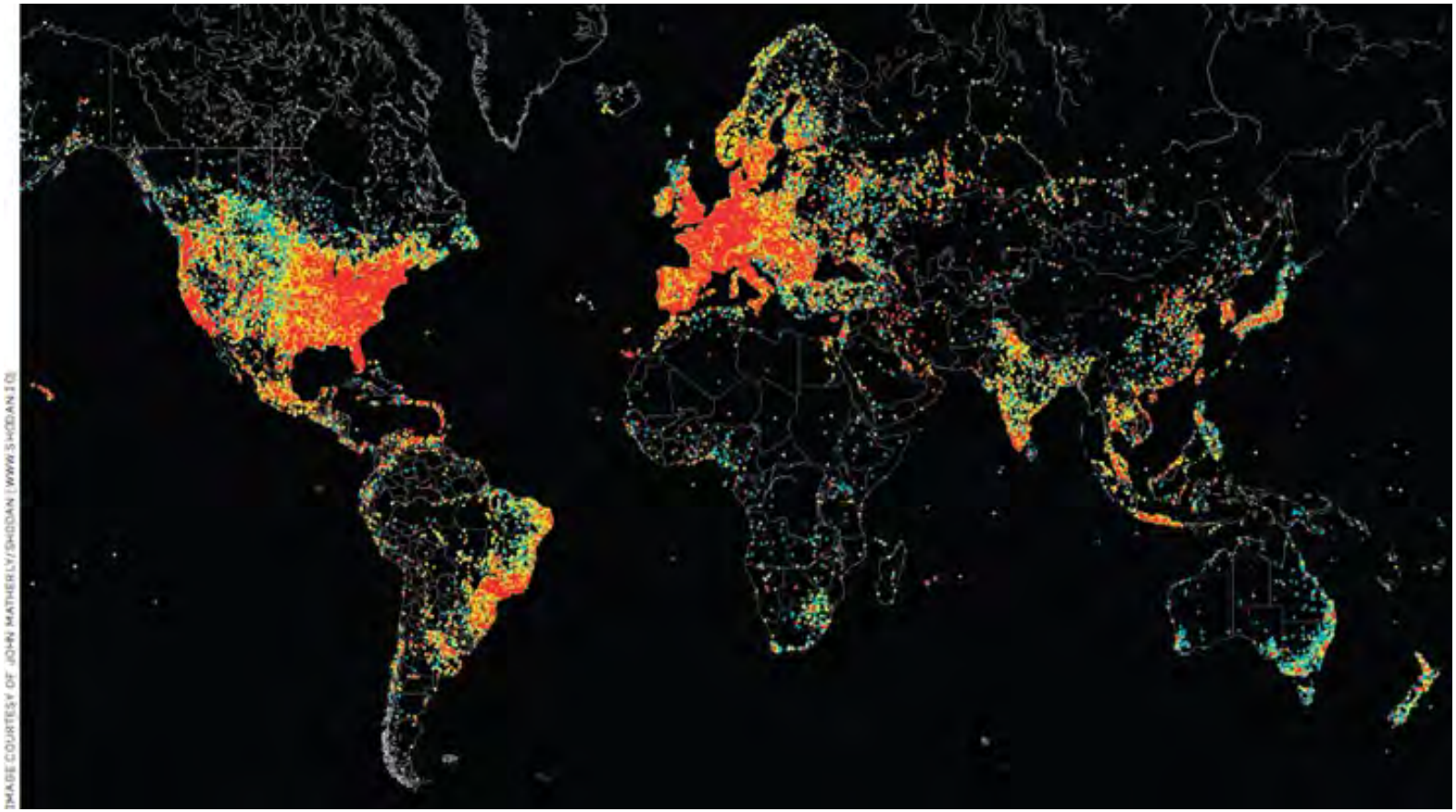
Example: connected cars (consumer survey)

Figure 5.13: Features in car(s) used by household



Source: Ofcom research, 2017
Base: All adults (n = 1062)
Q14: Which of the following features does the car (or cars) used by your household have? Select all that apply, even if you do not personally use the feature [MULTICODE]

Example: *Internet as Datasource*
Shodan, a search engine for the *things*



Source: www.shodan.io, OECD

Index

1. A definition of IOT
2. The relevance of the IoT
3. IoT, public policy and regulation
4. Measuring the IoT
   - Coverage
   - Usage
   - Examples
5. Conclusions

Conclusions

- Coverage:
  - Continue to collect data on fixed and mobile coverage.
  - Develop 5G coverage indicators.

- Compute mobile penetration for P2x and M2M separately.

- Refine M2M and mobile indicators:
  - 2G, 3G, 4G … 5G.
  - By application (?)
  - Investigate effects of e-Sims and simultaneous/multi-homing connectivity.

- Explore alternative data sources: LPWA providers, device vendors, retail outlets, Internet sources (search engines, …), …

- Adapt consumer/enterprise surveys to the IoT: devices, applications, new services,…

Obrigado

João Noronha, ANACOM (Portugal)

dee.stats@anacom.pt

SMART GOVERNANCE FOR SMART CITIES

FARUK TUNCER

WTIS-17, Nov 16th 2017

Hammamet, Tunisia

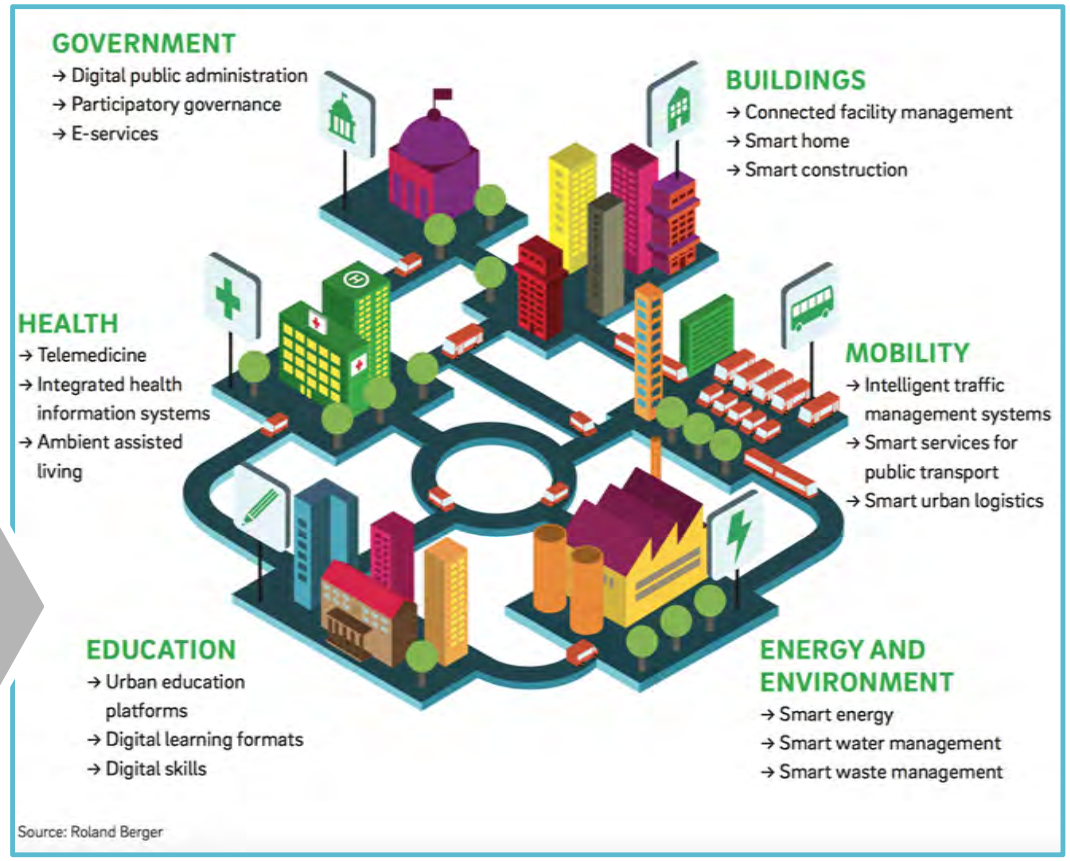
The world is urbanizing rapidly.

- More than **60% of global GDP** is generated in **600 urban centers** today (McKinsey Global Institute, 2011)
- In 2050, approximately **75% of the global population** will live in cities (UN, 2014)
- **2 billion people** will **migrate** from rural areas to cities until 2050 – **biggest transition** in human history
- This global shift will impose **challenges**, such as traffic congestion, rising inequality or environmental pollution

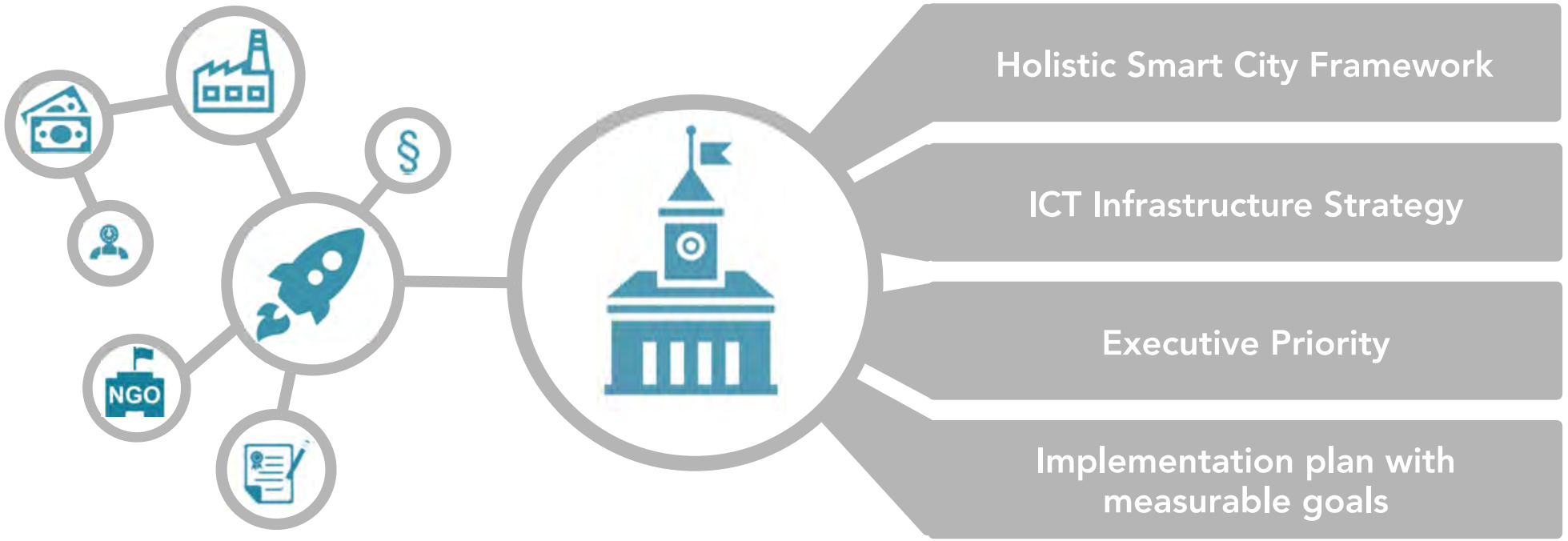
Equal to
88 new cities
with the size of
Shanghai

Digital technologies revolutionize the way of tackling the most pressing urban challenges: the Smart City.

- **Smart cities** use ICT to solve their most pressing challenges
- **Heavily data-driven:** Granular, real-time big data give new insights into **urban behavioral patterns** and infrastructural dynamics
- **Smart services:** Data and insights can be used for the development **smart urban services** and evidence-based policy making in various action fields



Smart cities require comprehensive strategy with measurable goals driven by the city leadership as central actor.



ECOSYSTEM MANAGEMENT

STRATEGIC PLANNING

The successful development of smart cities should be monitored by distinguishing between process and outcomes.

EXAMPLE: Smart Energy through decentral micro grids

Innovation

- Micro grids

Process

- Micro grid energy production/total energy production in %
- Number of households connected to micro grids/Number of total households

Outcomes

- CO2 emissions per capita
- Renewable energy consumption/total energy consumption in %

EXAMPLE: The City of Vienna has a holistic smart city strategy with focus on long-term sustainable outcomes.

Smart City Wien "Rahmenstrategie"

- The City of Vienna focuses on three dimensions: (1) resources, (2) quality of life, (3) innovation
- All masterplans of the different city departments have to align to the main strategy
- The different goals are set for the year 2050 on several quantitative and qualitative indicators

EXAMPLE: The City of Vienna has a holistic smart city strategy with focus on monitoring long-term sustainable outcomes.

KPIs for Energy:

- Decrease of net energy consumption per capita by 40 % until 2050 (compared to 2005).
- Decrease of primary energy use per capita from 3,000 to 2,000 Watt until 2050
- 20% of gross energy consumption by renewable energy sources until 2030, 50% until 2050

KPIs for Mobility (selection):

- Decrease of motorized private transport to 20 % until 2025, 15% until 2030 und below 15% until 2050

Main KPI for resource dimension:

- Decrease of Vienna's green house gas emissions per capita by 35% until 2030 and 80% until 2050 (compared to 1990)

EXAMPLE: The City of Chicago has a holistic smart city strategy with focus on monitoring technological development.

CHICAGO TECH PLAN

Services

City-produced data and tools

—Number of available internal and external data sets
—Number of available City-related apps
—Number of urban sensing platforms
—Number of urban sensing data sets

Increased quality of services

—Percentage increase in customer satisfaction levels related to projects, as measured by surveys
—Amount of response time decreases for city services

Skills

Digital skills

—Number of digital trainings available/performed
—Number of residents receiving digital skill trainings
—Number/availability of trainings performed in Spanish
—Number of public computer center locations with on-site support
—Number of Smart Communities neighborhoods

Use of digital technology

—Number of residents using computers at home
—Number of social media accounts in Chicago
—Number of tweets in Chicago


THANK YOU FOR YOUR ATTENTION!

THE ROLE OF DATA IN MAKING SINGAPORE "SMARTER"

PREPARED BY

KWAN KEE NG
SINGAPORE

FOR WTIS-17

INFOCOMM MEDIA DEVELOPMENT AUTHORITY

SINGAPORE RECOGNISED THE IMPORTANT ROLE OF DATA

- Reliable and timely statistics provides the basis for measuring national progress and information about effectiveness of policies and programmes.
- Reliable, standardised & comparable statistics are a key element towards objective measurement, and tracking of performance.
- Composite indicators such as the 'Global Smart Sustainable Cities Index' will provide a summary of the baseline reference point and future trends of smart and sustainability performance based on key dimensions (e.g., economy, environment, society and culture) and standardised sets of indicators, enabling benchmarking across cities or countries,
- Provides insights to drive behavioural change, and empower decisions

… AND HAVE A WELL-ESTABLISHED NATIONAL STATISTICAL SYSTEM

Decentralised Statistical System

- Singapore has adopted a decentralised statistical system since 1973. Official statistics are collected and compiled by the Singapore Department of Statistics (DOS) as well as Research and Statistics Units (RSUs) in government ministries and statutory boards.

Singapore Statistical System	
DOS	• National statistical authority responsible for official statistics on the Singapore economy and population
Gazetted RSUs	• Responsible for statistics on specific subject matters under the parent ministry's purview; • Empowered to issue requisition for data under Statistics Act
Non-Gazetted RSUs	• Responsible for statistics on specific subject matters under the parent ministry's purview; • Collect data under administrative regulations or other Acts

…HIGHLIGHTING OUR COMMITMENT TO COLLECT GOOD DATA

Benefits of the Decentralised Statistical System

- The decentralised statistical system fosters closer contact and greater interaction between statistical personnel and data users, leading to more relevant statistics being collected and analysed.
- Through leveraging administrative records, a larger range of statistics can be compiled on a more timely and cost-effective basis.
- With statistical personnel specialised in subject matters, can better focus on providing quality statistics
- Complemented by greater coordination of statistical activities and adoption of common standards, through the co-ordinating role played by DOS to minimise duplication of work and reduce respondent burden, frequent discussions with relevant agencies on statistical matters, and legislative and administrative changes which promote the adoption of national statistical standards.

BIG PICTURE – SINGAPORE AS A “SMART” NATION

- Harnessing data for informed policy making, and better quality of life
- A economy that is driven by knowledge and information
- Every piece of datum represents a decision point of a human being
- Smart nation is how you can aggregate all these decision points to understand human decision making at the national level
- Leveraging technologies and innovations to transform data into information:
  - Smart home
  - Smart building
  - Smart transportation
  - Smart wearables for health and lifestyle
  - Data analytics and Artificial Intelligence

HOW WE ARE EMBRACING DATA TO INFORM POLICIES AND STRATEGIES IN IMDA

Producing and disseminating ICT & Media statistics from national surveys & telecom operators

- Enterprise surveys (manpower, usage, industry performance)
- Household surveys (access, usage)
- Telecom and pay TV statistics from operators

Monitoring, benchmarking and development of digital economy indicators

- Willingness to invest, build technical capacity and capability, explore new data sources and apply innovative processes

SINGAPORE PARTICIPATED IN ITU'S SMART SUSTAINABLE CITIES PILOT EXERCISE, JUST COMPLETED AUDIT OF PHASE 2 WITH ITU AUDITOR

- The ITU Focus Group for Smart Sustainable Cities has formulated a list of KPIs to measure Smart Sustainable Cities and has invited Singapore to participate in a pilot exercise to assess their KPI framework using Singapore data. The pilot project will contribute to ITU's international standardization of the indicators and the subsequent development of a 'Global Smart Sustainable Cities Index' derived from this set of indicators.
- ITU Sec-Gen met with PM Lee on 2 June 2015 and mentioned this project to PM Lee, hoping to have Singapore's participation. Singapore accepted, signed an agreement on 13 Oct 2015 and became one of the pilot cities.
- Subsequently, an IMDA internal project team with representatives from various divisions was formed to undertake the effort. As IMDA is the national focal agency for ITU, we have reached out to the relevant agencies for assistance on the indicators, arranged for the auditor visit and verification of data with agencies.

ROLE OF DATA IN SINGAPORE ILLUSTRATED BY THE SSC KPI

- The KPIs are divided into 3 dimensions:

- **Economy**
- Examples include:
  - **No. of public transport stops with dynamic information available**
    - Traffic congestion is becoming a major problem in many global cities and cities are investing in public transport as one of the most efficient ways to move people around the city. Providing riders with information on the status of the system along with the arrival and travel times (i.e. dynamic information) will encourage transit use.
    - For this indicator, the use of data will help to gauge the efficiency of the public transport system in the city. An increasing trend and higher values are considered positive.

  - **Percentage of water distribution system monitored by ICT**
    - Water loss from distribution systems is a problem in almost all cities around the world, but can be a serious issue in areas where water is scarce. This problem deserves immediate attention and appropriate action to reduce avoidable stress on scarce and valuable water resources.
    - Water losses in urban networks not only lead to economic losses for the utilities, but also reduce the number of people that have access to water. Where urban water supplies are concerned, minimizing losses from the system to the lowest technically feasible level is an urgent requirement. Thus, making use of data to achieve this objective is important for water-scarce Singapore.

ROLE OF DATA IN SINGAPORE ILLUSTRATED BY THE SSC KPI

- **Environment**
- Examples include:
  - **Greenhouse gas (GHG) emissions per capita**
    - In order to prevent the most severe impacts of climate change, countries have signed on to the United Nations Framework Convention on Climate Change (UNFCCC), and agreed to cooperate with the aim of limiting the increase in global average temperature and the resulting climate change impacts. In this context, the industrialized countries need to annually prepare and submit precise and regularly updated inventories of greenhouse gas (GHG) emissions.
    - A declining trend and lower values are considered positive.
  - **Energy consumption of public buildings**
    - Buildings can account for a significant proportion of the energy use, GHG emissions and resource use within a city. Energy efficiency and energy reduction in buildings can reduce GHG emissions, conserve resource and mitigate against climate change.
    - Low values should be pursued.
    - A declining trend is positive.

ROLE OF DATA IN SINGAPORE ILLUSTRATED BY THE SSC KPI

- **Society and culture**
- Examples include:
  - **Average life expectancy**
    - "Life expectancy at birth reflects the overall mortality level of a population. It indicates the average number of years that a newborn is expected to live if current mortality rates continue to apply and summarizes the mortality pattern that prevails across all age groups - children and adolescents, adults and the elderly." (World Health Organisation, 2006)
    - An improving trend and higher values are considered positive, and is an outcome indicator of sustainable development.
  - **Percentage of city inhabitants covered by basic health insurance or a public health system**
    - Lack of health insurance coverage or a public health system is a significant barrier to accessing needed health care, including preventive services.
    - Basic health insurance would provide financial risk protection and cover essential health-care services at an affordable cost and should be counted.
    - An improving trend and higher values are considered positive, and is an input indicator for sustainable development.

THANK YOU

INFOCOMM MEDIA DEVELOPMENT AUTHORITY

PROVIDING THE PEOPLE WITH UBIQUITOUS, ACCESSIBLE INFORMATION SERVICES

--CHINA XIANYANG NEW SMART CITY CASE

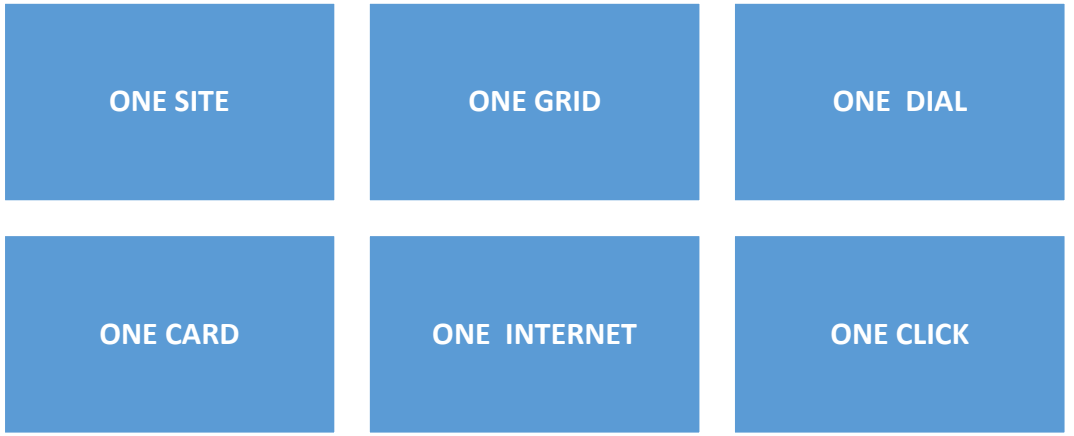
BRIEF INTRODUCTION OF XIANYANG CITY

- Xianyang City of Shaanxi province is located in the interior part of the GuanZhong Plain.
- Ancient Xianyang, is the capital of Zhou, Qin, Han, Tang and other 13 dynasties . Along with Xi'an, Xianyang is the starting point of the ancient Silk Road.
- The current Xianyang is the center of Chinese transportation system as well as one of eight internet Node Cities in the country.

SMART CITY ACHIEVEMENT

----The Smart City Construction project officially initiated in 2011 has always conducted the construction by taking citizens into consideration.

- The project has particularly implemented people doing
- Business in “ONE SITE”
- Governing in “ONE GRID”
- Serving citizens in “ONE DIAL”
- Benefiting citizens’ financial life in “ONE CARD”
- Connecting the city with “ONE INTERNET”
- “Xianyang in palm” in “ONE CLICK”

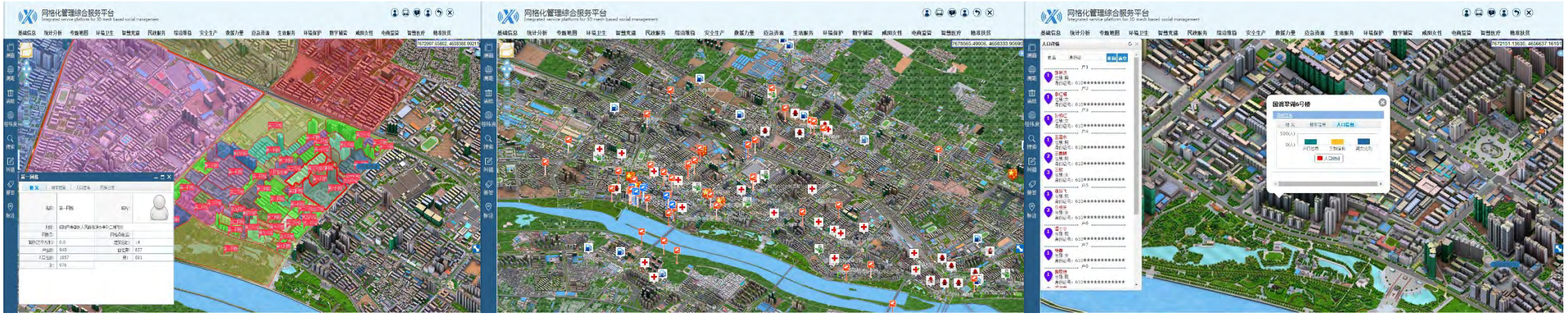


BUSINESS IN “ONE SITE”

- Building an efficient and transparent online government
- All the matters that encourage and guide people and enterprise services are pushed to the Internet and mobile terminals, and all departments can submit online transactions through the Internet.

GOVERNING IN “ONE GRID”

- Relying on urban management and geographic information technology platform, Xianyang city management area is divided into unit grid according to certain standards.
- Covering the construction of the community service, city management, comprehensive management of maintenance of stability, safety, civil affairs, comprehensive management, safety supervision, emergency, population, life, environment, business, medical and other content as one of the information platform.



SERVING CITIZENS IN “ONE DIAL”

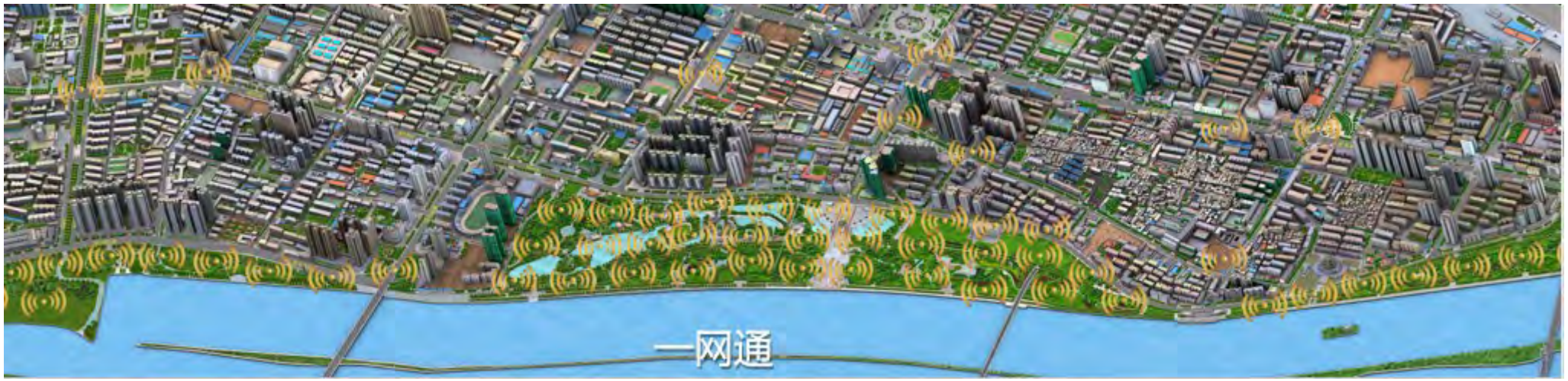
- Hundreds of public services and complaints hotline have been integrated into the government sector for "12345“
- The establishment of "integrated government", providing "one-stop service", the masses have difficulty, just dial 12345 a number, you can get a convenient one-stop one-stop integrated service.

Benefiting citizens’ financial life in “ONE CARD”

- Implementation of smart medical and benefit the people funds "one card", based on the public electronic health information, the construction of the city, county, town, village four levels of intelligent medical information sharing platform.
- The integration of the grain subsidy, subsistence allowances, Medicare and other 51 kinds of benefit the people subsidy funds into the system, set up card sharing and clearing platform for publicity, the public through the use of a personal identification card, residents' health service, benefit the people fund management, public service, electronic payment, information collection, information query and personal RMB bank the payment and settlement account function, truly a multi-purpose card

CONNECTING THE CITY WITH “ONE INTERNET”

- In order to meet the needs of the Internet to the masses whenever and wherever possible, to the urban and town's main square, tourist attractions and other crowded supermarket, the station area as the focus, the implementation of the "wireless city network“
- People open the phone will automatically search "smart Xianyang" wireless WiFi signal, to achieve free access to the Internet anytime, anywhere.



“XIANYANG IN PALM” IN “ONE CLICK”

- Developed "Xianyang" mobile phone APP application, the news information, bus travel, weather, tourism, catering, warm water and electricity fee, medical care, education, fund, vehicles, public toilets, address inquiries and other kinds of life service information, public service information package deployed in mobile phone APP, convenient query and management.
- People only need to use mobile phones to download smart Xianyang client, they can freely access anytime, anywhere, enjoy online community life, life information, video sharing, medical registration, travel assistance, travel and other life services

ACHIEVEMENTS OF SMART CITY IN XIANYANG

- Supporting data sharing and integration.
- Strengthen the ability of government service
- Improving the service level of the convenience of the people
- Innovative ways of social governance services

Thank you!