Broadband in the Applications Age: Digital Platforms Drivers and Policy Implications
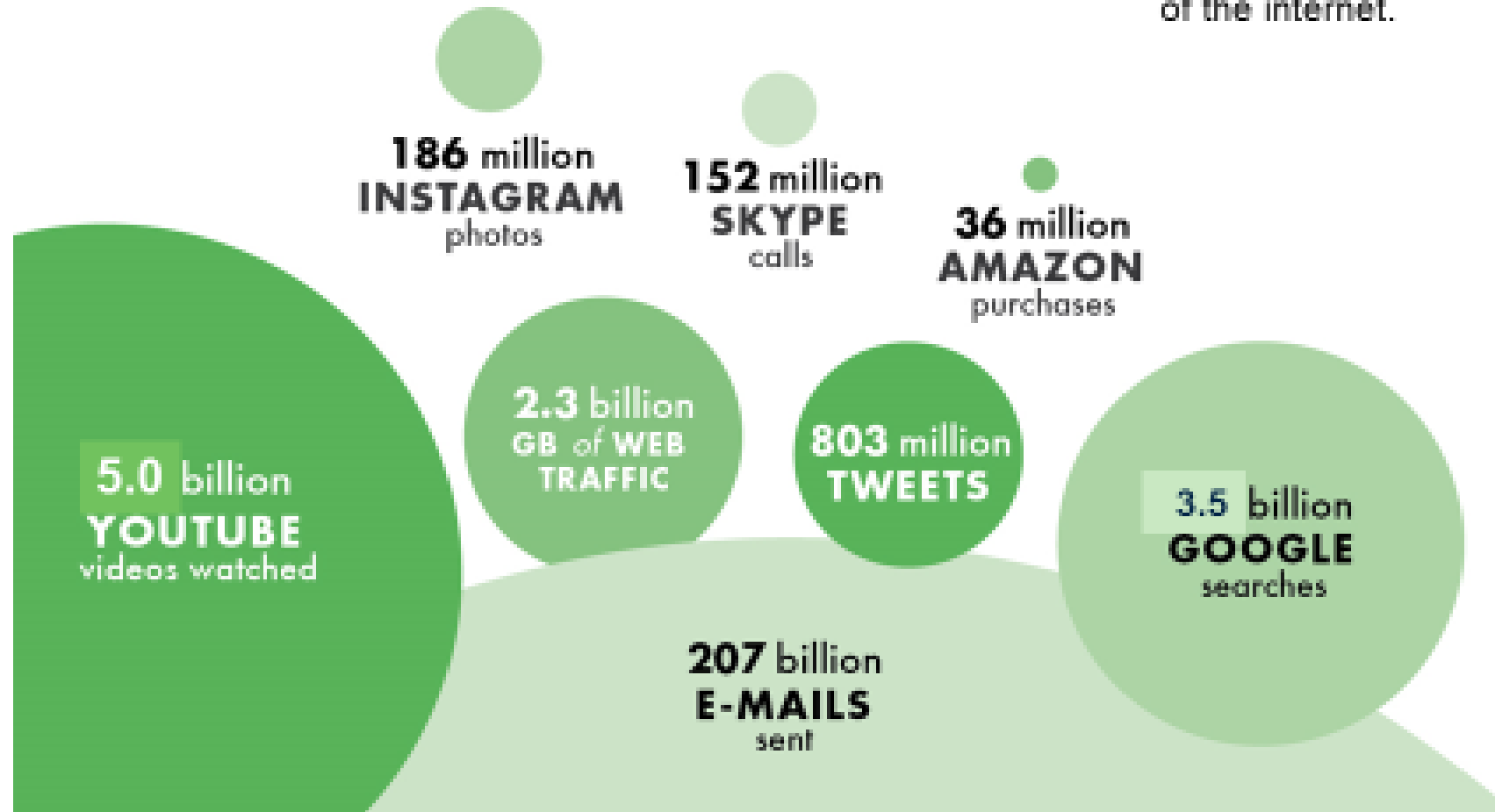
ITU Arab Forum on Future Networks: "Broadband Networks in the Era of App Economy",

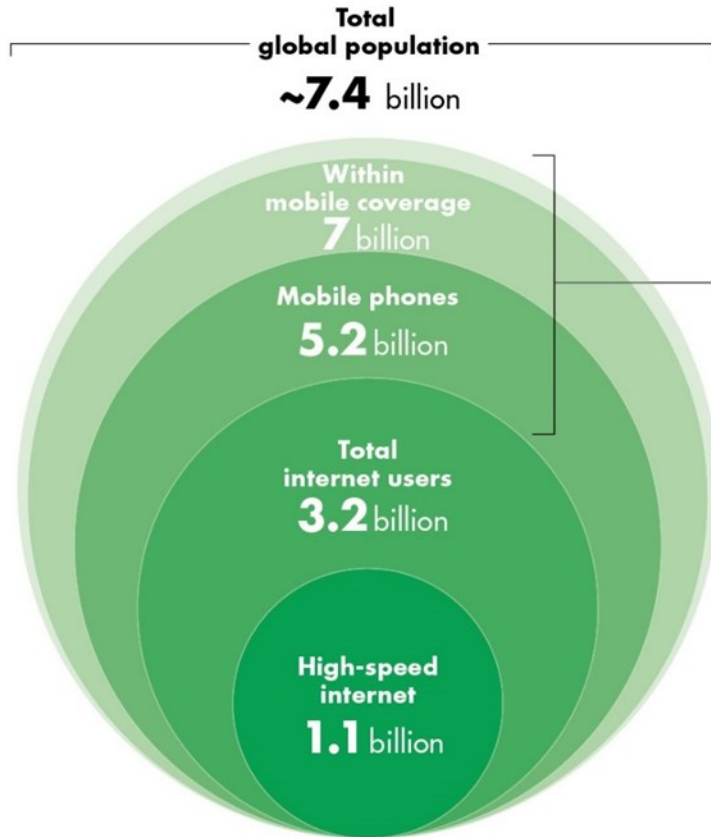Tunis - Tunisia, 21-22 Feb. 2017

crossotto@worldbank.org

A typical day in the life of the internet.

186 million **INSTAGRAM** photos

152 million **SKYPE** calls

36 million **AMAZON** purchases

5.0 billion **YOUTUBE** videos watched

2.3 billion GB of **WEB TRAFFIC**

803 million **TWEETS**

3.5 billion **GOOGLE** searches

207 billion **E-MAILS** sent

Broadband in the Applications Age: Digital Platforms Drivers and Policy Implications (2)
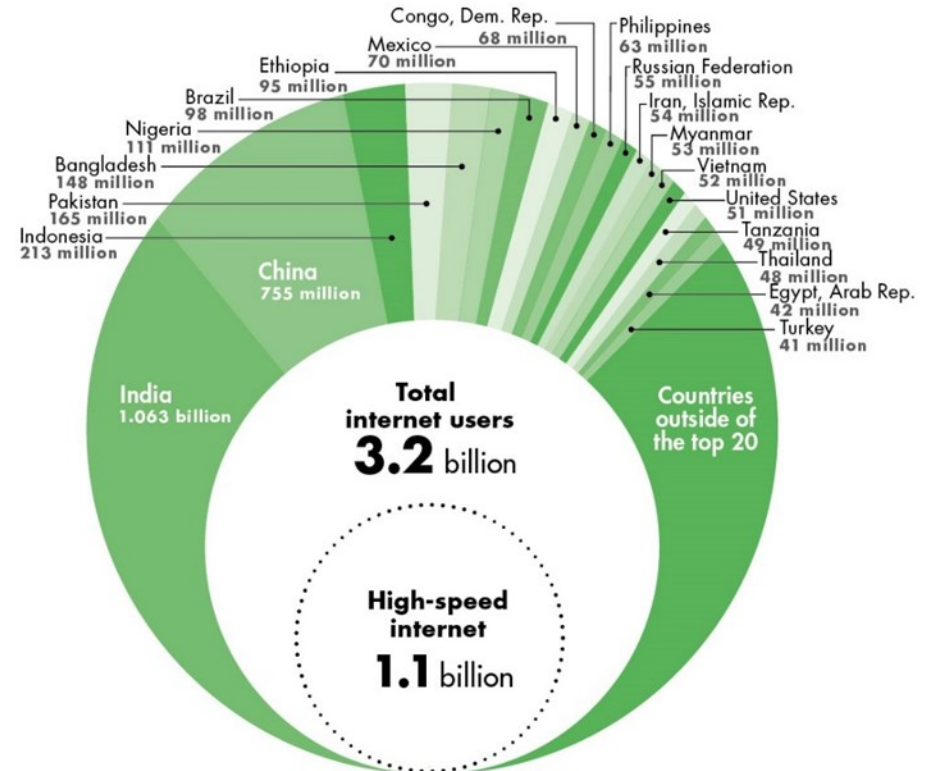
WORLD BANK GROUP
Transport & ICT

The internet remains unavailable, inaccessible, and unaffordable to a majority of the world's population.

a. ICT access by population

Total global population
~7.4 billion

Within mobile coverage
7 billion

Mobile phones
5.2 billion

Total internet users
3.2 billion

High-speed internet
1.1 billion

b. A closer look at the world's _offline_ population
(57% without internet; 30% without phone or internet)

Congo, Dem. Rep. 68 million
Mexico 70 million
Ethiopia 95 million
Brazil 98 million
Nigeria 111 million
Bangladesh 148 million
Pakistan 165 million
Indonesia 213 million
China 755 million
India 1.063 billion
Philippines 63 million
Russian Federation 55 million
Iran, Islamic Rep. 54 million
Myanmar 53 million
Vietnam 52 million
United States 51 million
Tanzania 49 million
Thailand 48 million
Egypt, Arab Rep. 42 million
Turkey 41 million

Total internet users
3.2 billion

High-speed internet
1.1 billion

Countries outside of the top 20

Sources: World Bank 2015; Meeker 2015; ITU 2015; GSMA, https://gsmaintelligence.com/; UN Population Division 2014. Data at http://bit.do/WDR2016-FigO_5.

Note: High-speed internet (broadband) includes the total number of fixed-line broadband subscriptions (such as DSL, cable modems, fiber optics), and the total number of 4G/LTE mobile subscriptions, minus a correcting factor to allow for those who have both types of access. 4G = fourth generation; DSL = digital subscriber line; ICT = information and communication technology; LTE = Long Term Evolution.

Source: WDR 2016

Broadband in the Applications Age: Digital Platforms Drivers and Policy Implications (3)

Digital infrastructure challenge: new models and competition to sustain broadband investment
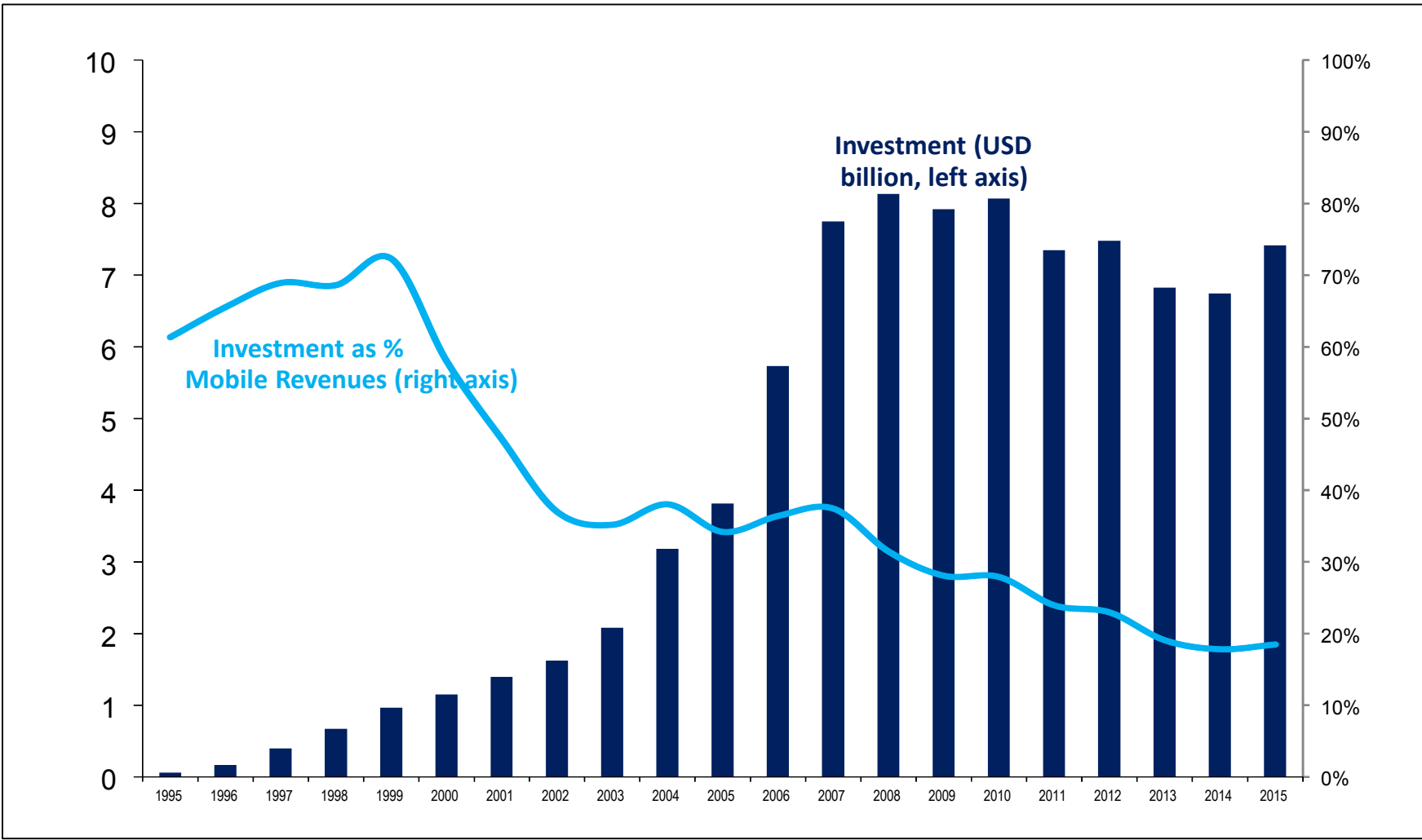
Source: World Bank background paper, Nov 2016

Broadband in the Applications Age: Digital Platforms Drivers and Policy Implications (4)
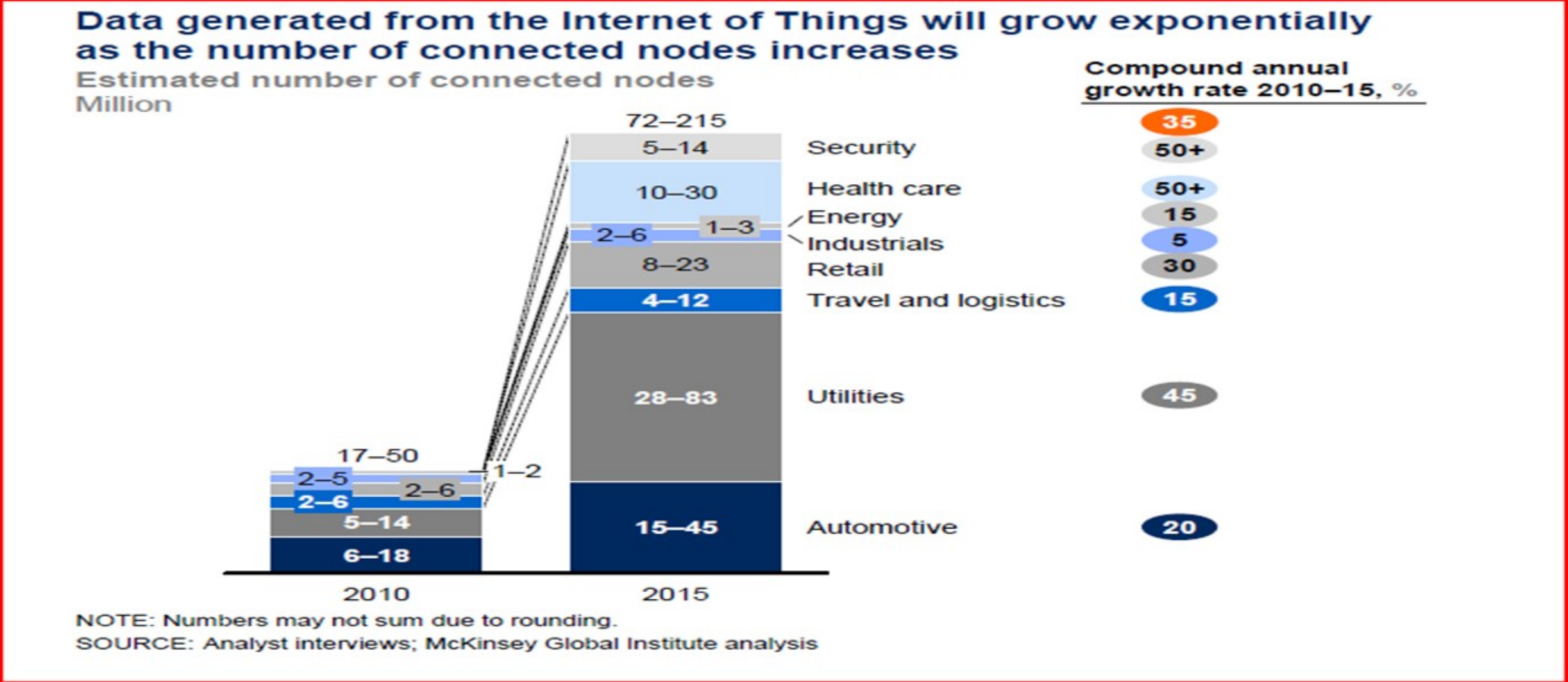
Digital Platforms: Industry Fundamentals

- Cost per gigabyte HDDs declined from USD56 in 1998 to USD0.05 in 2012 (OECD)

- Solid state drives accelerated the decline in cost from USD40 in 2007 to USD0.1 in 2012 (OECD)

- China grew from 2% of global ICT exports (2000) to 30% in 2012

- 400 million victims of cyber attacks, and USD110 bn. lost by consumers: 12 victims per second, ~ USD300/victim (Symantec)

- 35.8 million M2M SIM cards in OECD countries in 2014 (8 million each in both Italy and France)

Digital Platforms: Industry Fundamentals

- **MEMS** 80–90% Price decline in MEMS (microelectromechanical systems) sensors in past 5 years (Mc Kinsey)

- **Augmented reality**. Video will dominate IP consumer traffic in 2018 (Cisco VNI)

- **Internet of Things (IoT). $36 trillion** Operating costs of key affected industries (manufacturing, health care, and mining) (Mc Kinsey)

- **Cloud. 2 billion** Global users of cloud-based email services like Gmail, Yahoo and **80%** North American firms hosting or planning to host critical applications on the cloud (Mc Kinsey)

- **Automation of knowledge work. $9+ trillion** Knowledge worker employment costs, 27% of global employment costs (McKinsey); 20% of all work transacted online in 2020 (oDesk)
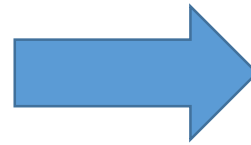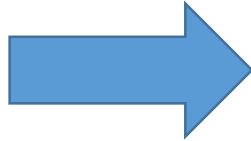
Digital Platforms: Industry Fundamentals

Broadband in the Applications Age: Digital Platforms Drivers and Policy Implications (7)

Digital Platforms: Industry Fundamentals

Virtualisation of work:
jobs on digital platforms

Source: Upwork

Digital Platforms: Policy Implications (I)

Massive shift in value towards services and applications
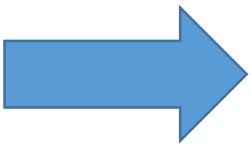
Higher pressures to provide Ultra-Fast Broadband. Telcos have declining margins; CAPEX constraints; traditional telco business model is over

Digital platform business model requires : (a) Attention to digital divide and digital inclusion and (b) a redefinition of competition policy in the sector

Traditional reform: Privatize telco SOEs, increase competition over the whole value chain

Infrastructure Sharing

- Active Infrastructure (elements managed by operators)
  - Transmission systems, antennas, spectrum, Internet Exchange Points (IXPs) at national/local level
- Passive Infrastructure (elements not necessarily managed by operators after installation)
  - Ducts, Fiber optic cables, Towers, Cabinets containing power supply, air conditioning, Physical space on the ground
- "Dig Once" policy: collaboration with other sectors, especially transport
  - Largest cost element (90%*) for deploying broadband is burying fiber optic cables and conduits underground.

Universal Access Reform: Access to platforms and not only connectivity

Broadband in the Applications Age: Digital Platforms Drivers and Policy Implications (9)
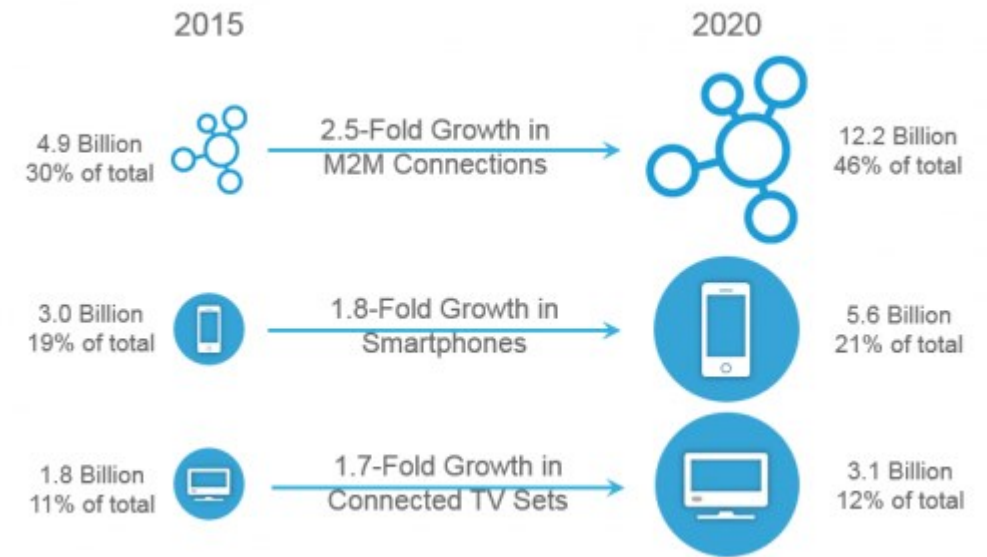
Digital Platforms: Policy Implications (II) – A New Agenda (OTT)

- Provision of different services over different platforms (*e.g.*, technological neutrality)?

- Service providers allowed to offer multiple services over multiple platforms

- What are the regulatory policies for new technologies and services with regard to numbering, spectrum, universal service, and interconnection?

- Legal framework to support a digital environment (*e.g.*, intellectual property laws, computer crime, electronic transactions, data privacy and security)

- Regulation encourages digital payments allowed

- Tax credit for IT investment; R&D

- OTTs allowed in the connectivity space, to extend network to isolated regions (Loon-X (Google), internet.org (Facebook)) – New LEOs

Regulatory obligation	Traditional operators	OTT player
Licensing	Must purchase license to operate	Often not subject to specific licensing
Accessible Market	Only serve customers within the regulated jurisdiction	Serve any user, anywhere
Taxes	Subject to local and national taxes	Locating operators in low cost locations and tax heavens
Infrastructure /Network	Unbundling, open access to Infrastructure obligations.	no obligations
Privacy	Strict data protection and privacy requirements by Law	Practiced on a limited and generally voluntary basis

Broadband in the Applications Age: Digital Platforms Drivers and Policy Implications (10)

Digital Platforms: Policy Implications (III) – A New Agenda (IOT)

IOT regulatory issues	Good practice regulatory trends
Licensing and Spectrum management: Ensure spectrum is available for a wide range of IoT applications, at short and long range, in licensed and unlicensed bands	Ensure availability of spectrum for short range IoT communications, foster capacity of backhaul networks that connect IoT gateways to the Internet, roll-out of small cell technology such as 4G.
Switching and Roaming: Standard mobile telephony network SIMs and accounts unsuitable for large M2M users, mobile devices, and fixed devices in areas of poor reception	Mobile network operators develop M2Mspecific business units with appropriate billing and management. Further development and deployment of embedded, remotely provisioned SIMs in M2M systems.
Addressing and Numbering: Very large address space needed for globally addressable things	Deployment of IPv6 by ISPs, public and private sector organizations. Use of IMSI for M2M applications.

2015   2020

4.9 Billion 30% of total — 2.5-Fold Growth in M2M Connections → 12.2 Billion 46% of total

3.0 Billion 19% of total — 1.8-Fold Growth in Smartphones → 5.6 Billion 21% of total

1.8 Billion 11% of total — 1.7-Fold Growth in Connected TV Sets → 3.1 Billion 12% of total

Source: Cisco.

Conclusions

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crossotto@worldbank.org

linkedin.com/in/carlomariarossotto

openknowledge.worldbank.org/author-page?author=Rossotto%2C+Carlo+Maria