



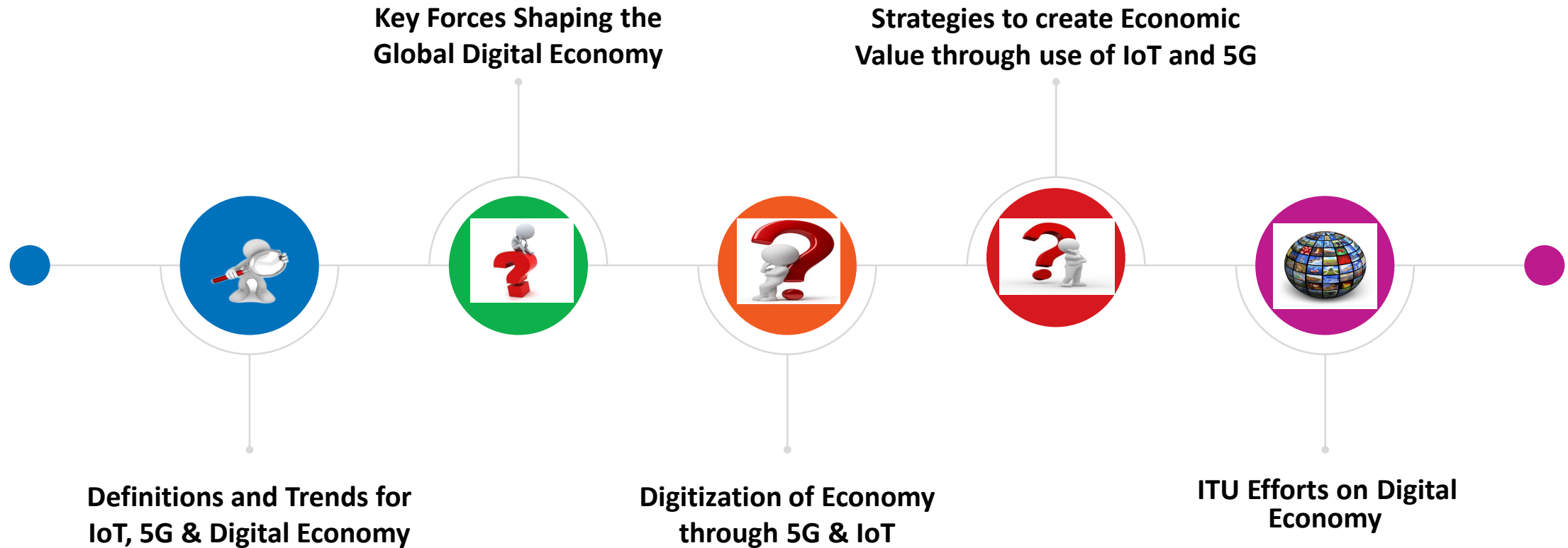
Role of 5G and Internet of Things (IoT) in the Digital Economy

Eng Mustafa Al Mahdi
ITU Arab Regional Office

4th ITU Annual Forum on “IoT, Big Data, Smart Cities and Societies” for Arab region
Dubai, UAE, 28-29 August 2019



Agenda



Definitions and Trends for IoT, 5G & Digital Economy



Definition: Internet of Things (IoT)

ITU define **Internet of things (IoT)** as a **global infrastructure** for the **information society**, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving **interoperable information and communication technologies** [[ITU-T Y.2060](#)]

Definition: 5G

5G is the term used to describe the next-generation of mobile networks beyond LTE mobile networks.

According to ITU guidelines, 5G network speeds should have a peak data rate of **20 Gb/s** for the downlink and **10 Gb/s** for the uplink.



5G

3G

2G

Definition: Digital Economy

There is no universally accepted definition of the term **digital economy**. However, a most common, although somewhat narrow understanding is the **internet-based economy or the share of Gross domestic Product (GDP) accounted by the Information and Communications Technology (ICT) sector**. There are multiple definitions of a Digital Economy. The European Commission defines the digital economy as “**an economy based on digital technologies**.” The World Economic Forum and the Group of Twenty (G20) define the digital economy as “**a broad range of economic activities comprising all jobs in the digital sector as well as digital occupations in non-digital sectors**”. These include activities that use digitized information and knowledge as the key factor of production; modern information networks as an important activity space; and ICT to drive productivity growth and optimize economic structures.



Source: WEF

IoT Trends

While the **IoT** market in Arab Region is still in its infancy compared to the US and certain Asian countries, the arrival of 5G is likely to accelerate developments. GSMA Intelligence predicts that there will be **1.1 billion IoT** connections (cellular and non-cellular) in the region by **2025**. Due to the diversity of IoT applications and services, different access technologies will address different requirements.

5G will play a key role in supporting the next phase of enterprise digitization and will drive greater adoption of IoT in different sectors, IoT applications, which will account for almost **60%** of the **1.1 billion** IoT connections in the region by **2025**.

5G Trends

5G is rapidly moving from trials to early commercialisation. Between 2018 and 2020, more than 50 countries will launch 5G mobile services across North America, Europe, the Arab region and Asia Pacific. In some markets, the launch of 5G commercial services is occurring earlier than initially announced – notable examples include the US, China, South Korea, Australia and some of the Gulf Cooperation Council (GCC) Arab States.

The GCC Arab States will be slightly ahead of the global average by 2025, with 16% adoption (5G as a percentage of total mobile connections), compared to 15% globally.

Source: GSMA

5G Trends

While the more advanced countries are focused on 4G connections growth and early **5G** developments, the less developed nations continue to face the challenge of how to grow subscriber penetration. By end of 2018, in the GCC Arab States **77%** of the population are mobile subscribers and **67%** are mobile internet users. North Africa will have an average subscriber penetration of **70%**, while across the other Arab States penetration will stand at **48%**, including three markets where less than a third of the population subscribe to mobile services.

Source: GSMA

Qualcomm

Digital Economy Trends

The **Digital Economy** is growing faster than overall economies especially in the developing countries. Evidence shows that ICTs account for **17%** of GDP growth in developing countries (World Bank 2016). The Internet economy in developing economies is growing at **15-25%** annually”.

What key trends will we be seeing in the digital economy? Which issues are most crucial to address?

- **The ways in which people connect with others**, with information, and with the world is being transformed through a combination of technologies. These technologies will help us solve increasingly sophisticated problems, while big data will assist us in complex decision-making.
- This is the **Fourth Industrial Revolution (Industry 4.0)**, and it's going to have a massive impact on the economy as well. Already we're seeing the rise of the sharing economy, blockchain technology, and changes in manufacturing driven by **3D and 4D printing**.
- **The sharing economy** is a model in which people and organizations connect online to share goods and services. It is also known as collaborative consumption or peer-to-peer exchange. Two of the best-known examples of the sharing economy are Uber (**transportation**) and Airbnb (**housing**).

Source: <https://www.weforum.org/agenda/2016/11/the-digital-economy-what-is-it-and-how-will-it-transform-our-lives/>

Key Forces Shaping the Global Digital Economy



Key Forces Shaping the Global Digital Economy

In the digital economy, new business models are taking advantage of these three laws in combination

1965



Moore's Law [Computing]

The processing power of a microchip doubles every 18 months; computers become faster and the price of a given level of computing power halves every 18 months.

1993



Metcalfe's Law [Connectivity]

The value of a network is proportional to the square of the number of nodes; so, as a network grows, the value of being connected to it grows exponentially, while the cost per user remains the same or even reduces.

1997



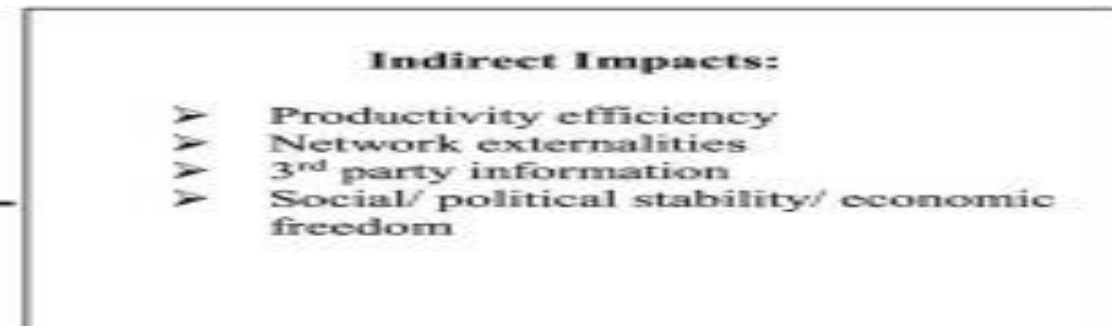
Gilder's Law [Bandwidth]

The total bandwidth of communication systems triples every twelve months. New developments seem to confirm that bandwidth availability will continue to expand

Key ICT Infrastructure Components for Digital Economy

According to WEF, seven main technologies are expected to have the most impact on the way we think about business and digital Economy:

1. Internet of Things (IoT)
2. Artificial Intelligence (AI)
3. Big data analytics
4. Cloud computing
5. Autonomous vehicles,
6. 3D printing
7. Advanced robotics, factory automation and drones, social media and platforms




Digitization of Economy through 5G & IoT

How



Digitization of Economy through 5G & IoT



The **5G** networks have as a central piece of powerful and flexible networks that will **connect everything to everything** and **everything to everyone** [the networks of networks]. This will allow more sophisticated applications and technological transformations that will change society.

The **Internet of Things (IoT)** shows that our smartphones, our homes, our cars, our cities, our schools and offices, our gyms, our stores and delivery systems, are increasingly linked and capturing and sharing data about us.



Digitization of Economy through 5G & IoT

5G will impact the solutions linked to **IoT** connectivity, **Big Data**, **Artificial Intelligence**, **Blockchain**, **robotics**, **virtual reality** or **ultra-high definition**. The objective is to create smart cities, smart metering, wearables and encourage the definitive step towards **Industry 4.0** of services such as autonomous vehicles, industrial automation, and emergency services.

Digitization of Economy through 5G & IoT

IoT technologies expected to connect **50 billion** devices to the network by 2020.

As result, Internet of Things (IoT) and 5G are digitizing the physical world and the economy, make it possible to acquire, analyze, and use data at a **scale, scope, and speed** never before achieved

Strategies to create Economic Value through use of IoT and 5G



Strategies to create Economic Value through use of IoT and 5G

- ❖ **Find ways to use IoT data:** Optimizing the use of Data and predicting future outcomes.
- ❖ **Consider interoperability:** By some estimates, between 40 and 60 percent of IoT applications need to interact with other IoT applications to create maximum value. **Remember Metcalfe's Law [Connectivity]?**
- ❖ **Connect to businesses:** Connecting businesses through IoT applications can create more value by streamlining processes, optimizing systems, and reducing costs.



Source: Digital Transformation Strategy
By Professor Venkatraman

Strategies to create Economic Value through use of IoT and 5G

- ❖ **Think globally:** With larger populations comes the need for more infrastructure and more business transactions, and the resulting value could be enormous.
- ❖ **Become a user.** Knowledge is power and those who capture the data and use it most intelligently will benefit the most.
- ❖ **Try a new/innovative business model:** IoT and 5G is driving companies to change their business model to capture value in non-traditional areas. For example, by using IoT links and data/product manufacturers can offer those goods as a service.

Source: Digital Transformation Strategy By Professor Venkatraman

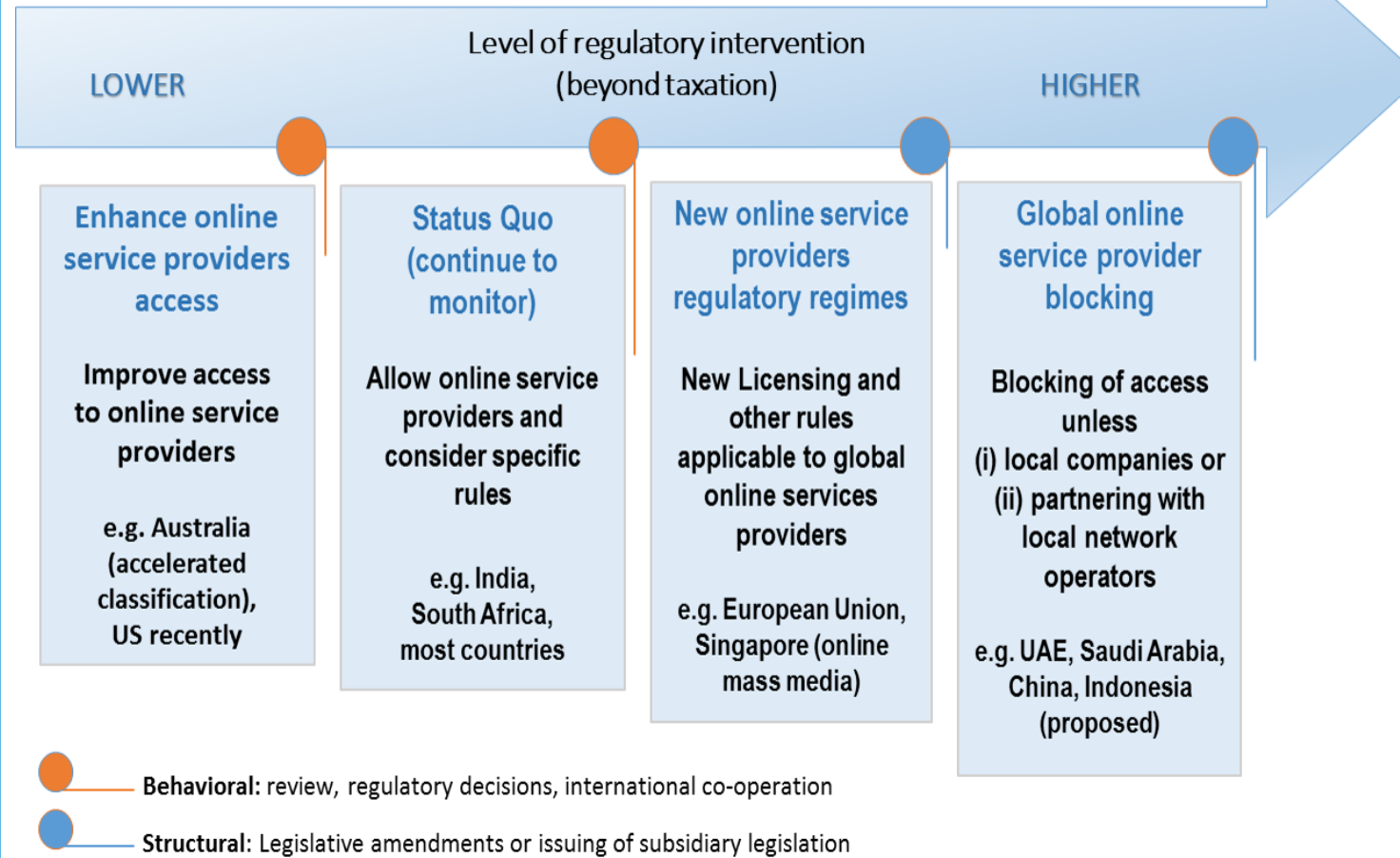
ITU Efforts on Digital Economy



ITU Efforts on Digital Economy

ITU is working on policy and regulatory research, collecting data on the evolution of the Digital Ecosystem and the impact of ICTs on the national and international economy

Continuum of possible regulatory responses for the Digital Ecosystem

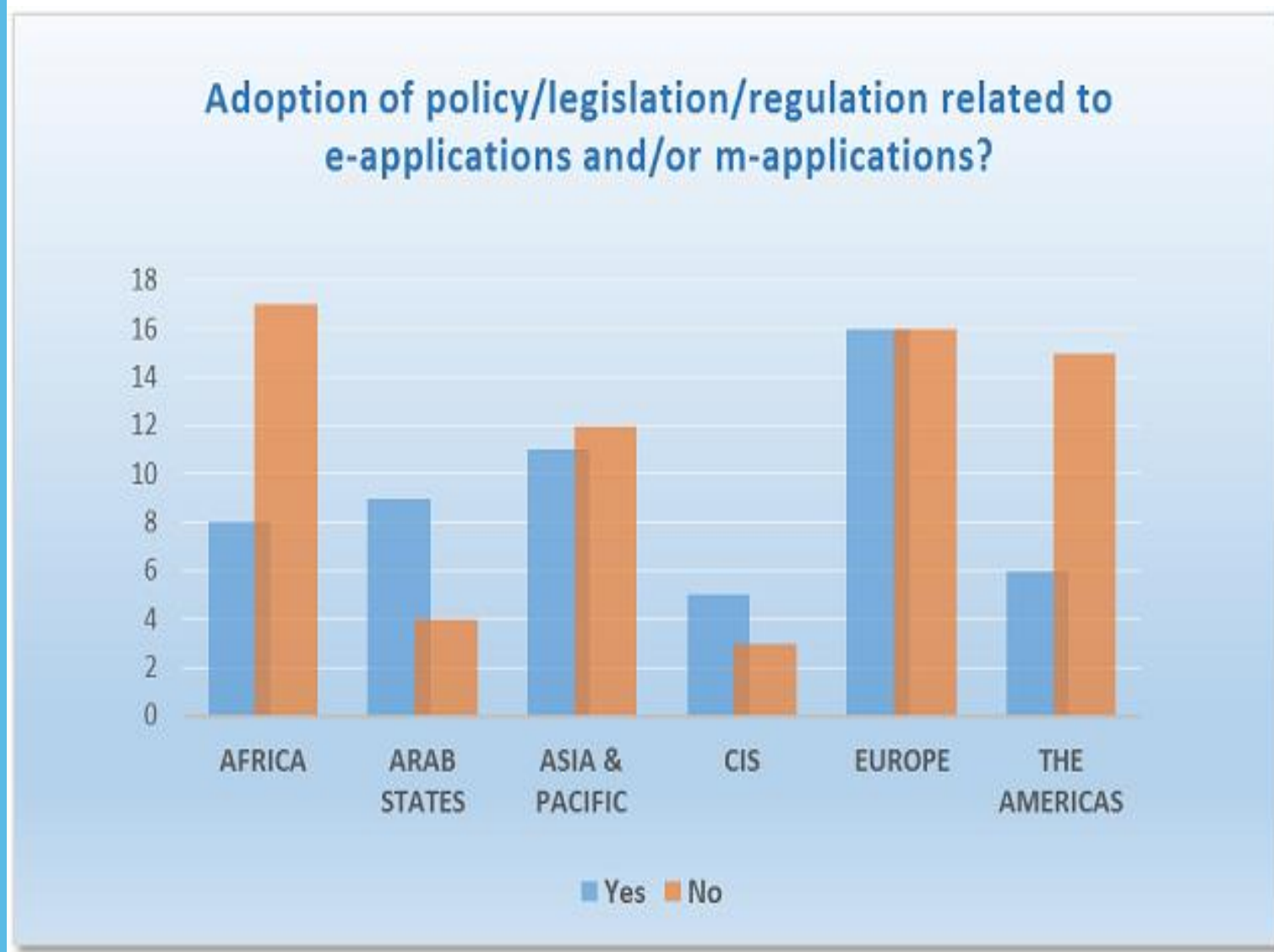


https://www.itu.int/en/ITU-D/Regulatory-Market/Pages/Collaborative_Regulation/App_Economy.aspx

ITU Efforts on Digital Economy

ADOPTION OF SPECIFIC REGULATION

55 over **122** countries reported in **2016** the adoption of policies, regulation/legislation related to e-applications and m-applications and their relationship with and across other sectors of the economy.



ITU portal for Digital Economy

Digital Economy



To meet the expectations of a rapidly evolving digital ecosystem, policy makers and regulators need to adapt and develop more flexible, innovative and light-handed regulatory frameworks expanding beyond the traditional core telecom sector to take into account the multi-facet and multi-stakeholder dimensions of the digital world.

Series Digital Ecosystem | Useful links

POWERING THE DIGITAL ECONOMY: Regulatory approaches to securing consumer privacy, trust and security



Exploring the issues of online privacy, trust and security, including digital

https://www.itu.int/en/ITU-D/Regulatory-Market/Pages/Collaborative_Regulation/App_Economy.aspx



Powering the digital economy: Regulatory approaches to securing consumer privacy, trust and security



GSR-17 Discussion paper

SOCIAL AND ECONOMIC IMPACT OF DIGITAL TRANSFORMATION ON THE ECONOMY

Work in progress, for discussion purposes
Comments are welcome!
Please send your comments on this paper at: grr@itu.int by 30 July 2017



The views expressed in this paper are those of the author and do not necessarily reflect the opinions of ITU or its Membership.

Expert reports
Thematics

ITUPublications

The economic contribution of broadband, digitization and ICT regulation



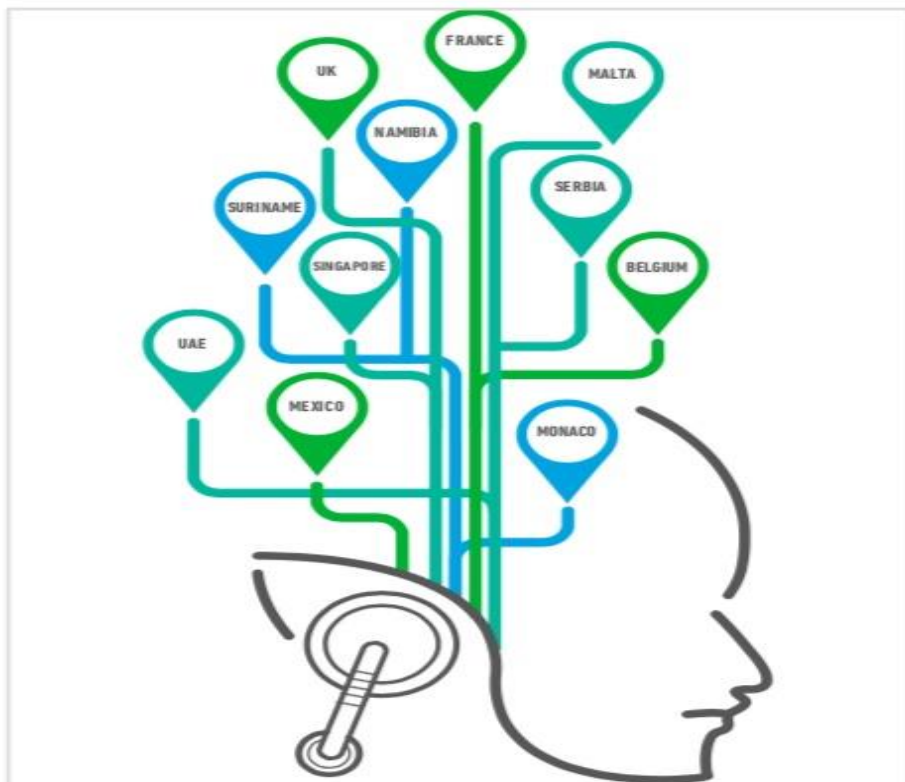
Regional initiative

4

Internet of Things,
smart cities and big data

To raise and spread awareness of the importance of future challenges in the era of the IoT and big data, and how to address such challenges; establish regulatory frameworks and take measures to help cope with the rapid changes in the field of ICTs; and work to ensure the transition to SCCs

Digital policy on the agenda of the UN General Assembly's 73rd session [2018 session]



A total of eleven countries referring to AI in their speeches

Leveraging the opportunities of the Digital Economy

The digital economy is a driver for innovation and competitiveness. To leverage the opportunities of today's digital economy, international cooperation is needed to foster inclusive economic growth.

The International Telecommunication Union (ITU), as the UN lead agency for Information and Communication Technologies, spearheads consensus-building initiatives that are helping to extend the benefits and opportunities of the digital economy to all.



By Malcolm Johnson, Deputy Secretary-General, ITU

ITU Efforts on Digital Economy [Recommendations from Publications]

- To meet the expectations of a rapidly evolving **digital ecosystem**, **policy makers and regulators** need to adapt and develop more **flexible, innovative and light-handed regulatory frameworks** expanding beyond the **traditional core telecom sector** to take into account the **multi-facet and multi-stakeholder dimensions** of the **digital world**.
 - Policymakers should set out **defined spectrum assignment schedules**
 - Updates to **infrastructure rules** fundamental to **cost-effective 5G deployment**
 - Regulation should evolve to deliver **socioeconomic benefits of 5G**
- **5G technologies** is the backbone for efficiency improvements in transportation and industries in the Arab Region as well as across the globe – driving economic value in areas from enhanced broadband technologies to digital industry to helping combat climate change. That in turn will require an **ecosystem of technology, regulatory, security and industry partners** to deliver on the potential.

An aerial photograph of the ITU campus in Oslo, Norway, featuring several large, modern buildings and a central green area. The image is overlaid with a semi-transparent blue filter. The text "THANK YOU!" is written in large, white, bold, sans-serif capital letters across the upper left portion of the image.

THANK YOU!

Arab High Level Forum on WSIS and SDGs (AHLF) in Beirut from 19-21 March 2019

