التكنولوجيا الرقمية وريادة الاعمال والخدمات

Nouvelles opportunités technologiques et entrepreneuriale

(New) Digital Technologies and Business Opportunities

– 5G, IoT, Big Data, Cloud

ICOREC, Tunisia, 13-14 March 2018

Agenda

1. Introduction to Digital Economy
2. Network: 5G, IoT
3. Digital Technologies and Future of Energy

Introduction to Digital Economy

Production Factors:

- Agriculture Economy : Land and Labor
- Industrial Economy: Land, Labor and Capital
- Digital Economy: Land, Labor and Capital and Data

Digital Economy:

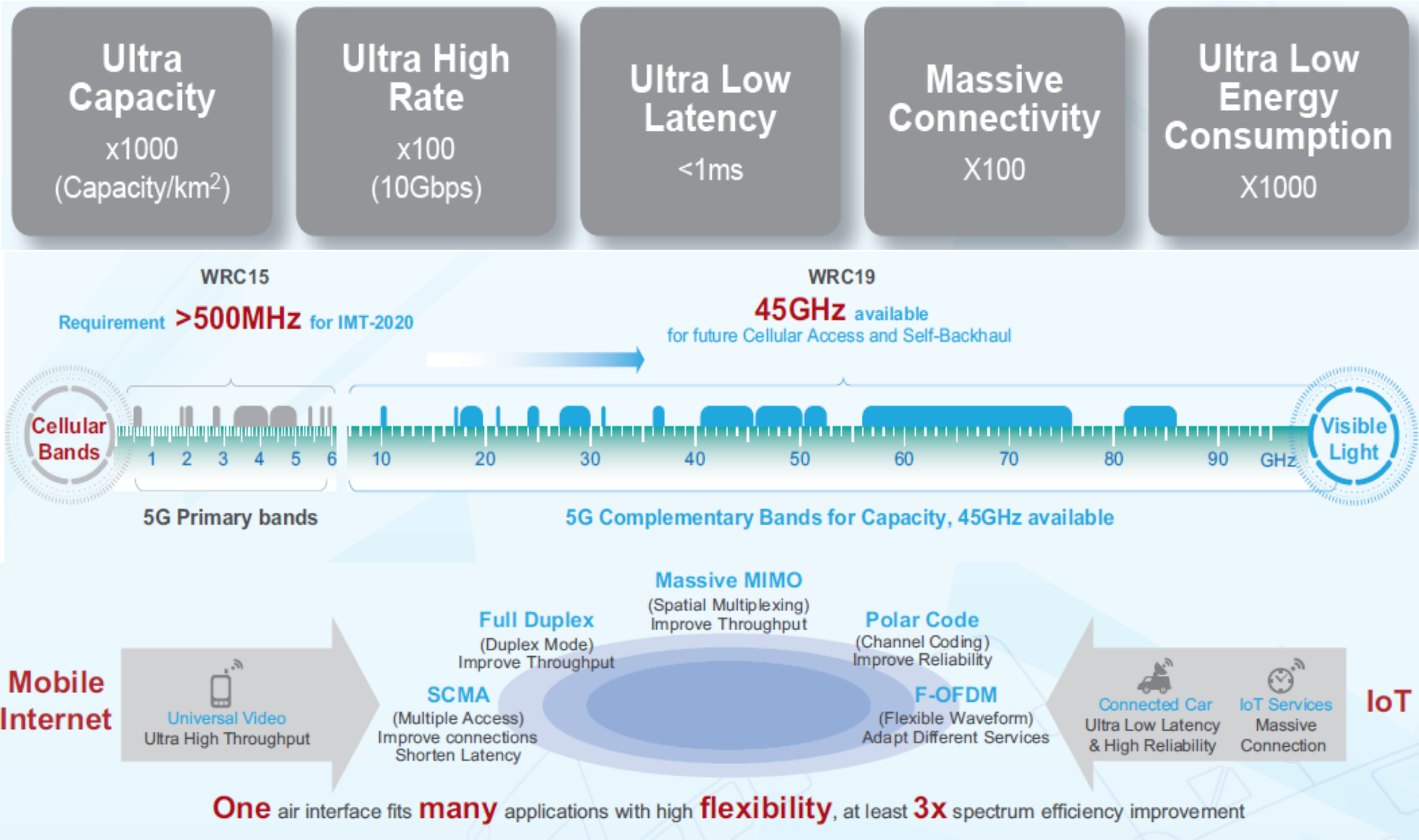
- Data Economy
- Non-location
- Platform Role
- Network Effect

5G, and IoT

Network: 5G

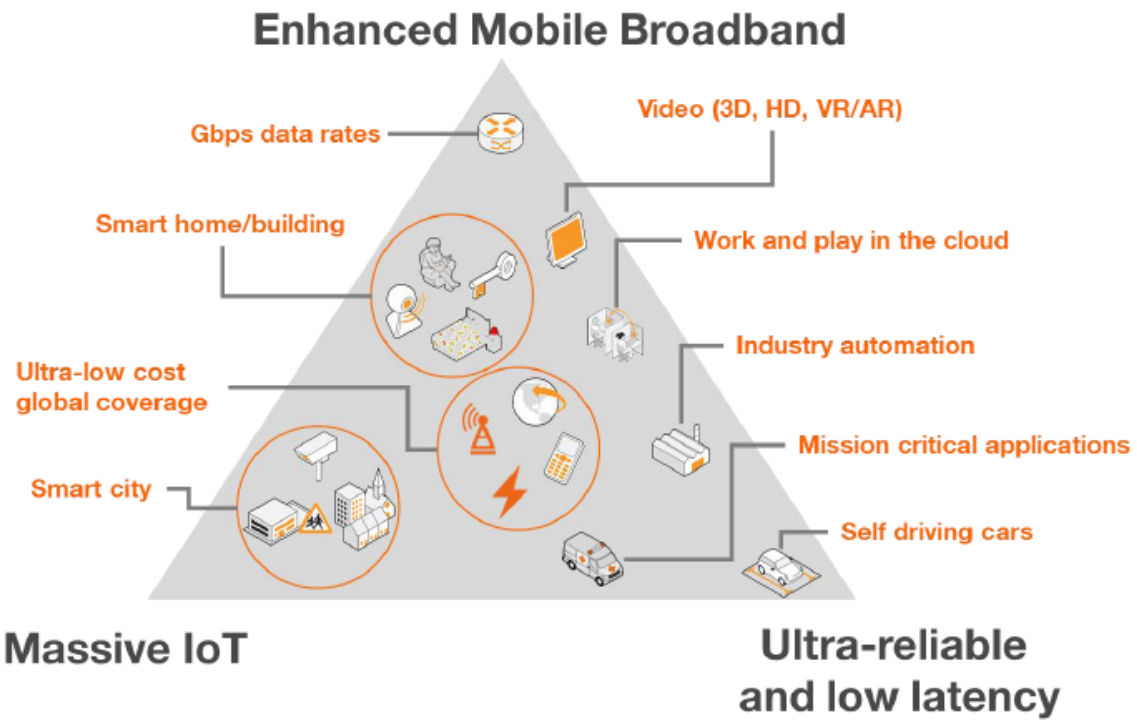
Throughput, Latency, Capacity, Connectivity, Energy (IoT, Throughput), Traffic Management: Multi-services, Multi-QS, Slicing

5G Performances Targets (Huawei, 2015)



5G Connectivity Services
(Orange, October 2017)

5G connectivity services
all delivered by the same network



key expectations

- ambient connectivity and higher minimum throughput:
  50 Mbps "everywhere"
- higher capacity and experienced data rates
  Up to Gbps experienced rates
  x10 spectral efficiency vs. 4G+
  new cm/mmWave spectrum
- expand the IoT for support of vertical industries
  99.999% reliability
  1 to 10 ms latency
- higher energy efficiency:
  energy consumption divided by 2 for a traffic x1000
- enable ultra low-cost networks
  for low ARPU/low density areas

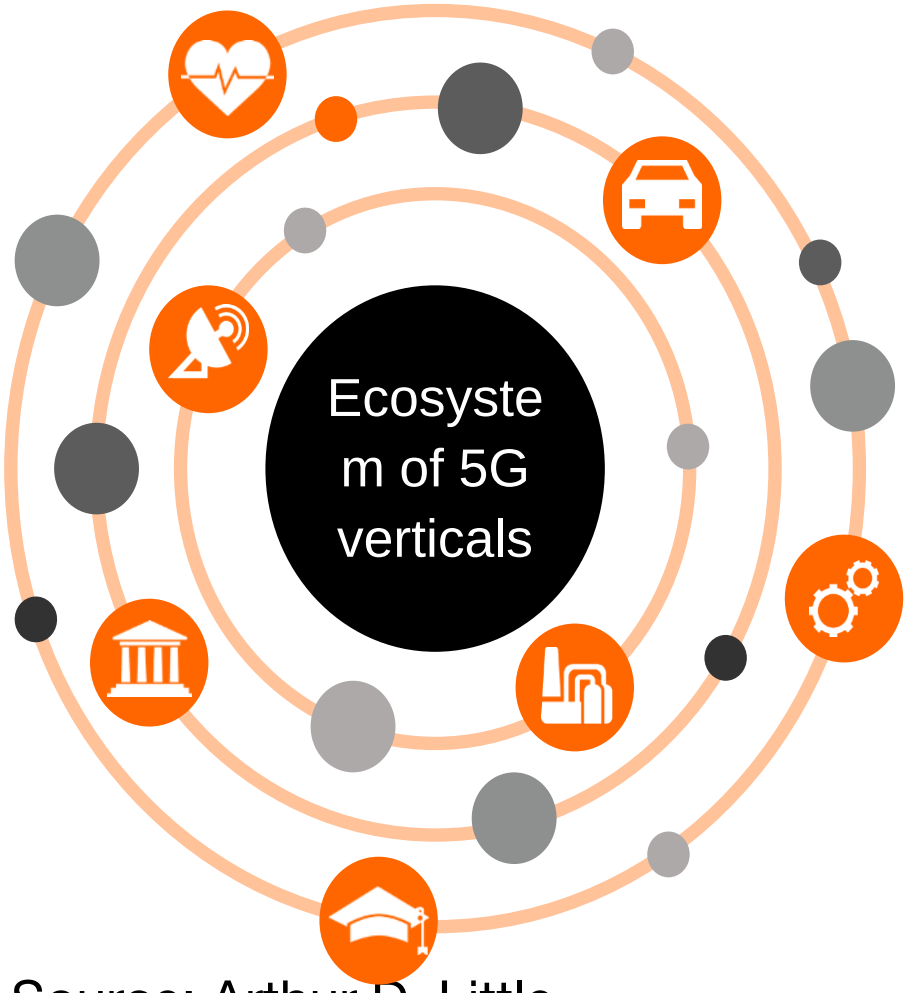
5G Offer to Consumers ?
(Orange, October 2017)

What can 5G offer to consumers?

Enhanced and New MBB experience	• better comfort • new devices (e.g. AR/VR) and services (cloud)	
FTTH-like Fixed Wireless Access	• might be used for certain type of households without FTTH in 202X	
More diverse IoT experiences	• new connected machines • diverse usages leveraging the complementarity of LoRa, LTE-M and 5G IoT	
Connectivity for everyone	• in emerging countries • in low density areas	

5G Empowering Vertical Industries
(5G PPP White Paper)

5G becomes the basis for an evolution of the whole economy and prevents promising future industries from leaving (ADL, 2017)



Source: Arthur D. Little

Automotive, Transport and Logistics
Autonomous driving, digitalization of transport and logistics, mobile information society

Energy
Smart / intelligent metering and networks, decentralized generation

Health
Cloud robotics for assisted living, remote surgery, remote patient monitoring, smart medication

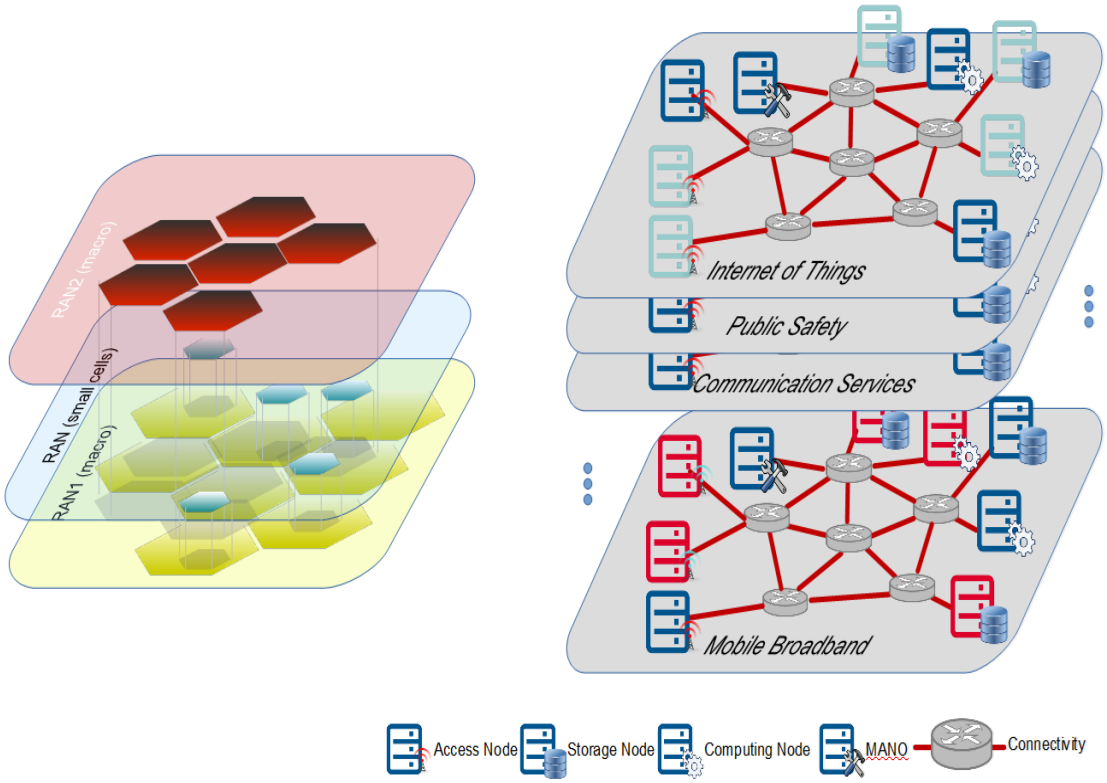
Media and Entertainment
Virtual / augmented reality, massive multi-person video calls, real-time games

Industry 4.0 / Internet of Things
Time-sensitive process control, automation, communication between and within businesses

Public Services / Smart City
Smart / intelligent society, public safety, catastrophe alarm

Education
Remote tutoring and learning, e-learning, video conferences with several participants

Virtualisation allows 5G operators to offer “Network Slices” to meet various application and segment needs



Source: “Unlocking Commercial Opportunities from 4G evolution to 5G”, GSMA Network 2020, March 2016

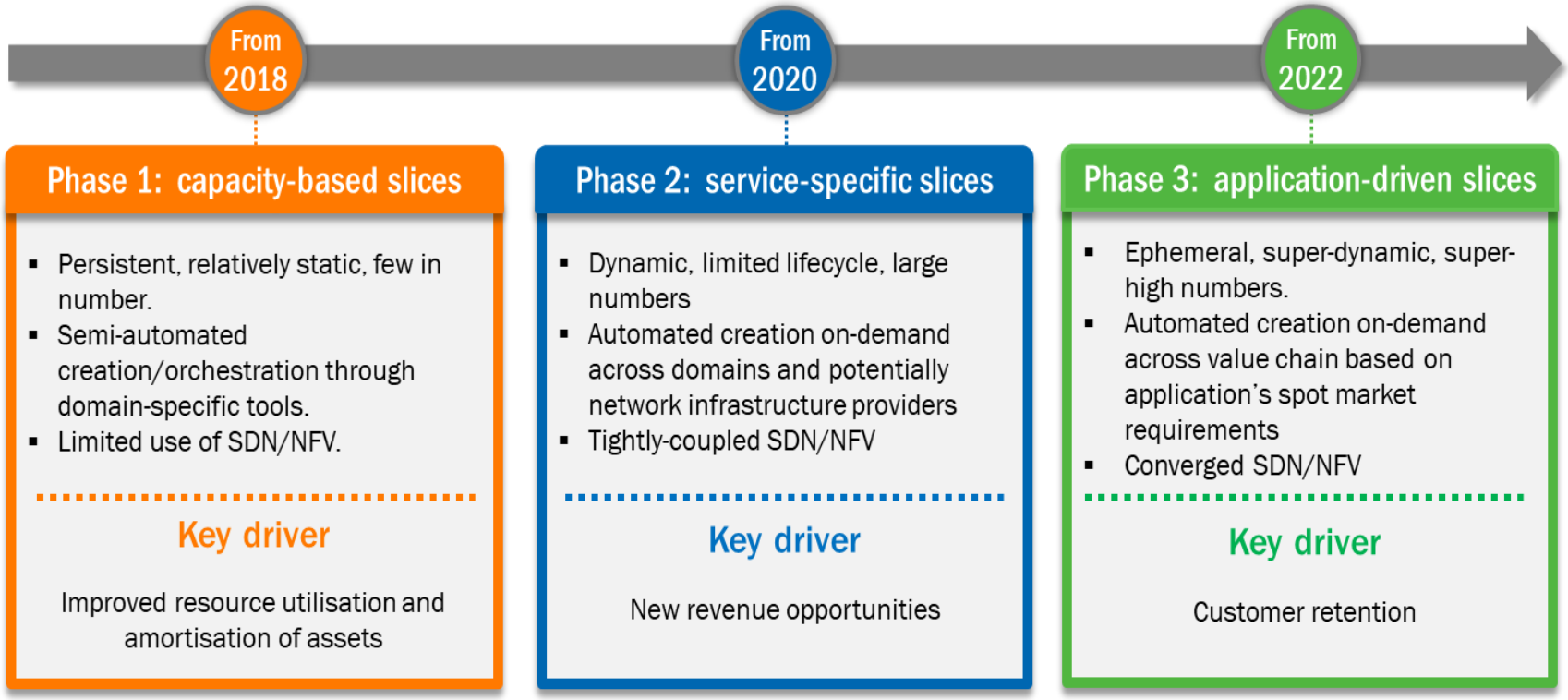
Network slicing concept

- Network Slicing enables to dynamically configure the virtualised network element
- The network need not be designed for a specific service/use case
- Each slice has its own properties and is logically separated from other slices
- Operator can create multiple slices on demand serving different needs (IoT, eMBB…)

Slicing technologies must become more-embedded, end-to-end and elastic

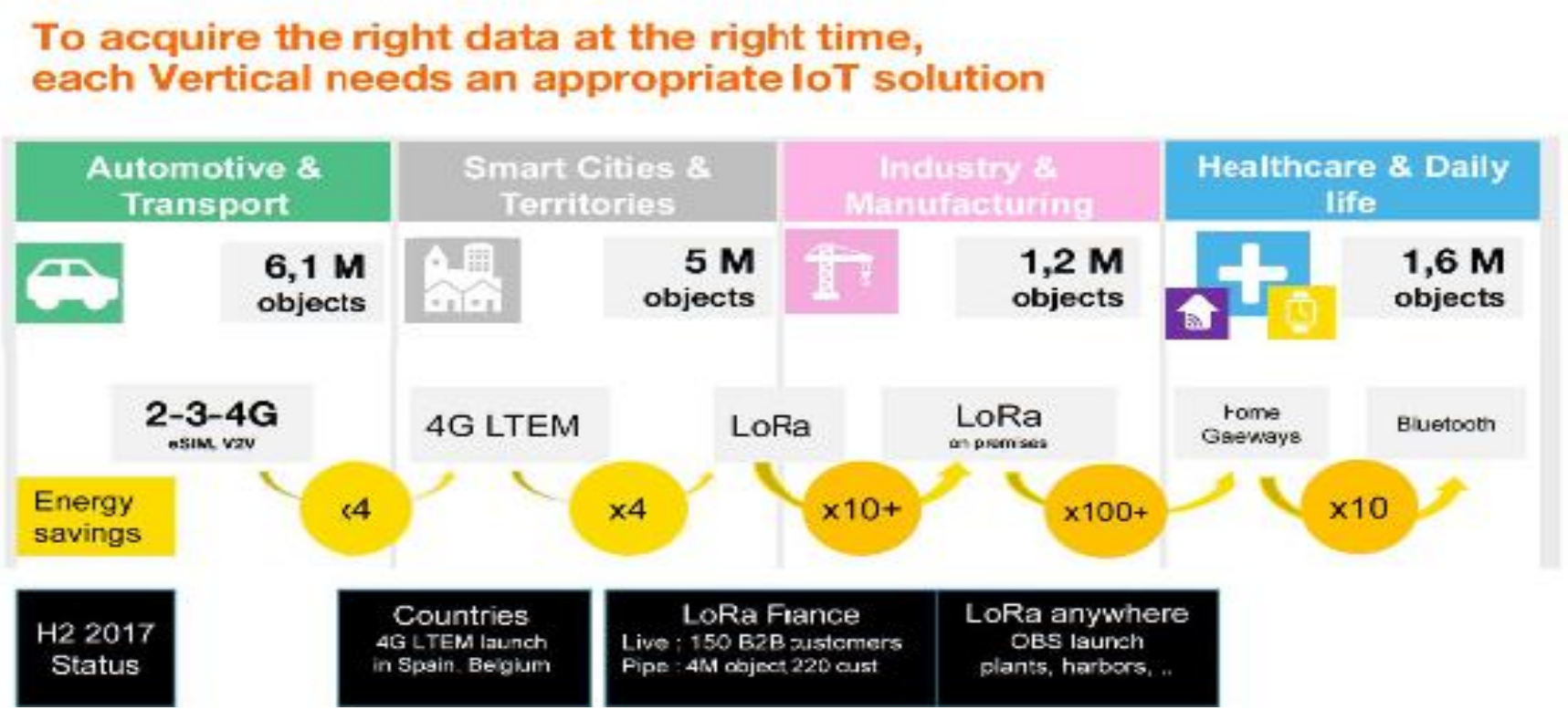
(Analyssys Masson, 2018)

Figure 7. Key drivers and enablers of the three phases of network slicing, with an increasing focus on automation and elasticity



Capacity-based network slices can be created today using point tools that address specific network domains and early forms of network virtualisation. Such slicing can help operators to manage physical infrastructure resources more cost-efficiently. As orchestration/SDN technologies mature (becoming more-dynamic and ubiquitous), service providers can automate the creation and management of many more service-specific slices, supporting a larger universe of business cases. The evolution of SDN/NFV and server-less cloud technologies will eventually enable applications to trigger the creation of service-specific slices while they execute, creating a compelling customer experience.

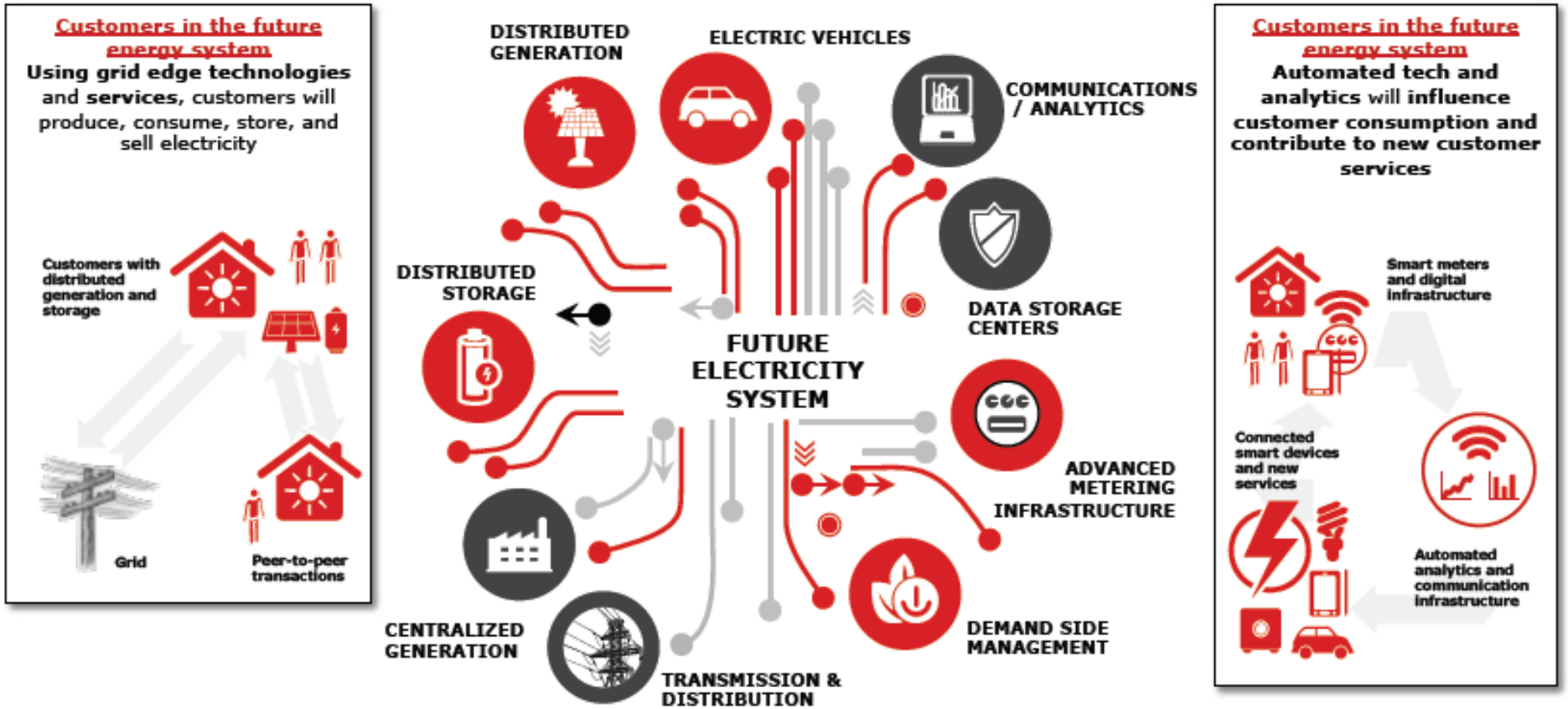
IoT and Energy Efficiency
(Orange 2017)



New Digital Technologies and the Future of Energy

The Future Of Electricity: New Technologies Transforming The Grid Edge (WEF, 2017)

Energy Transition:
De-carbonization, Digitalization, Decentralization and Energy Efficiency



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Merci, Thank you