





OXFORD COMPETITION
ECONOMICS

Telecommunications Regulation for the Digital Economy

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Telecommunications Regulation Seminar
Authority for Info-Communications Technology Industry, AITI

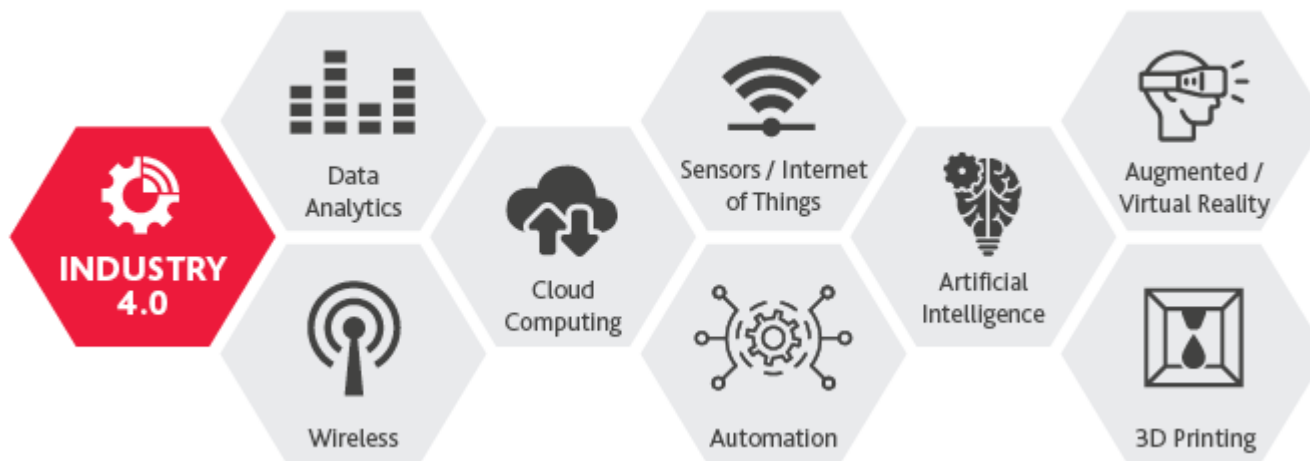
Brunei Darussalam

Bandar Seri Begawan • Mexico City • Oxford

July 27, 2020

IR 4.0: Digital Transformation

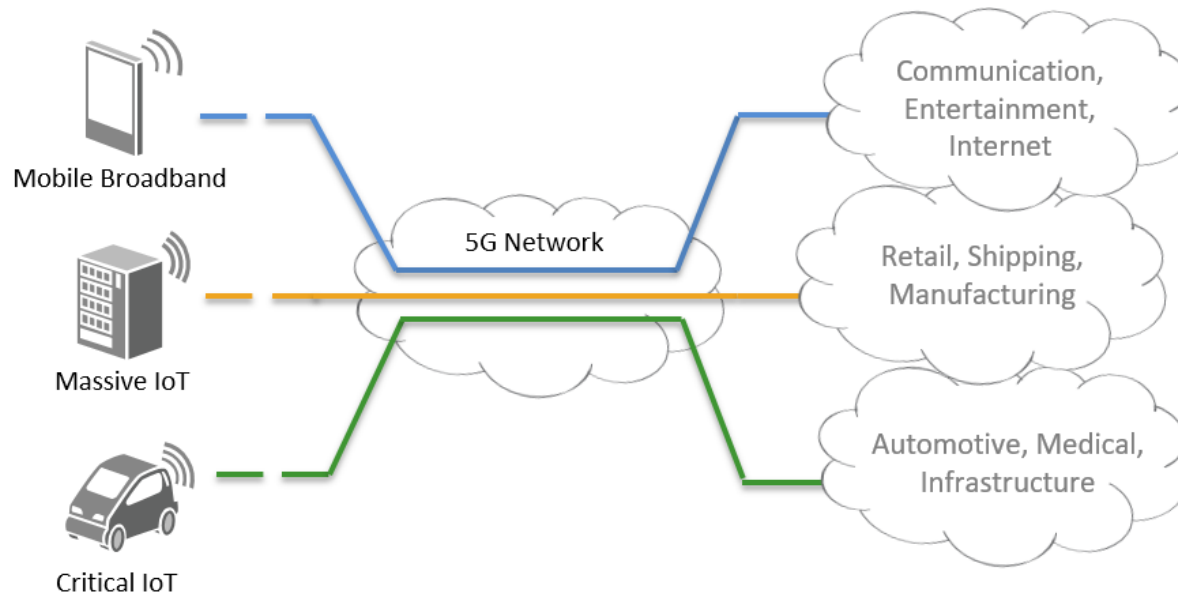
□ Industry 4.0 is about **digital transformation**. Digital transformation requires a **new way of understanding and regulating ICT** markets.



□ Brunei has already started a process of re-organization of its telecom industry in order to foster its digital transformation as a **Smart Nation** (Digital Economy Masterplan 2025).

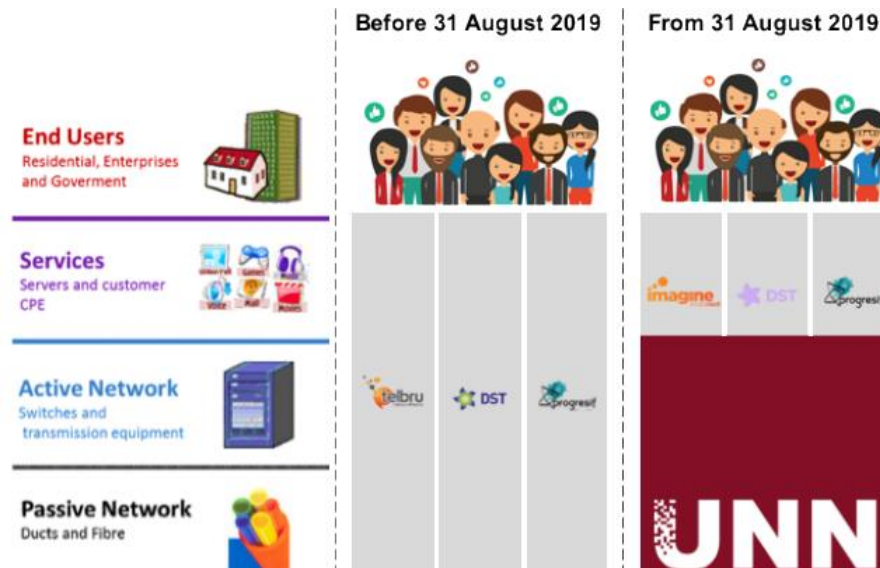
Network Capacity

□ The digital transformation is requiring the deployment of **5G Networks** (ultra-low latency, ultra-high data transmission rates and better reliability). 5G network slicing allows multiple logical networks within a single physical network having specific QoS by slice.



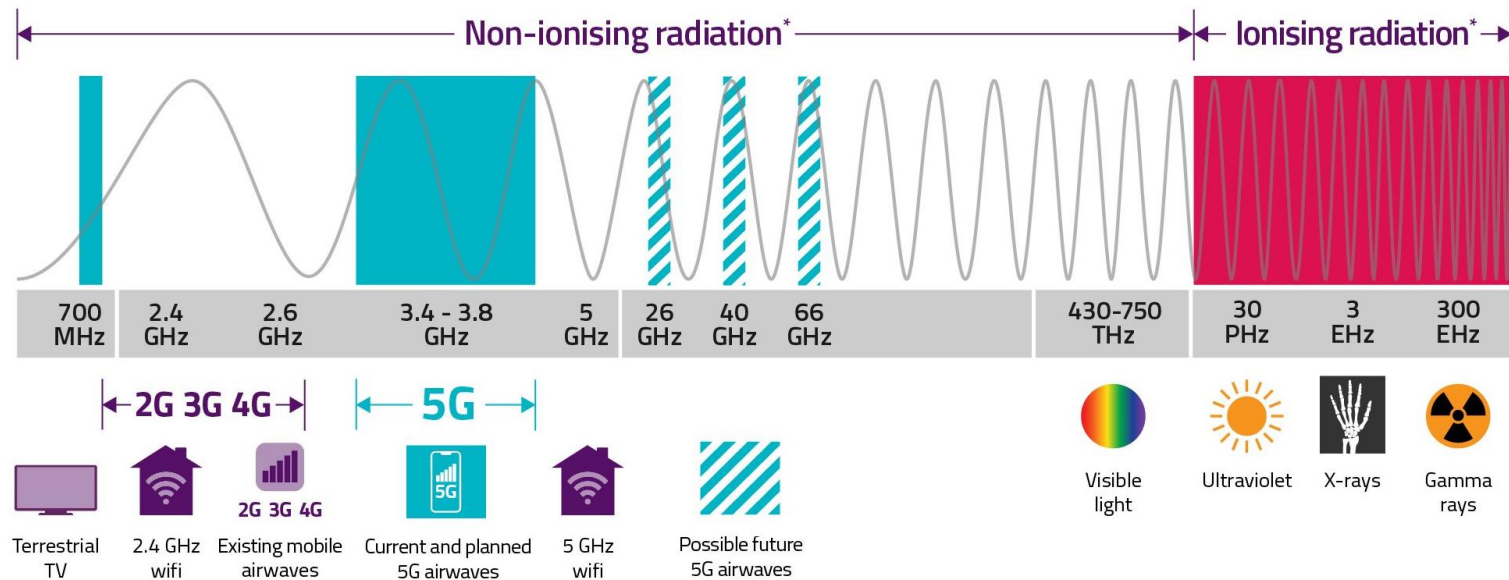
Regulatory Challenge: Asset Sharing

- ❑ 5G deployment is costly. **Cost sharing** is necessary:
 - ❑ **Voluntary sharing** (AT&T & Telefonica Mexico);
 - ❑ **Mandatory network sharing** (active, passive);
 - ❑ **Wholesale Open Access Network (WOAN)**



Spectrum Management

□ 5G will require the use of **licensed & unlicensed frequency bands**. The range 3.4 to 3.8 GHz is the first band to be used for 5G. Future 5G usage considers 26 GHz, 32 GHz, 40 GHz and 66-71 GHz bands.



Source: Ofcom

Regulatory Challenge: **Common Use & Pricing**

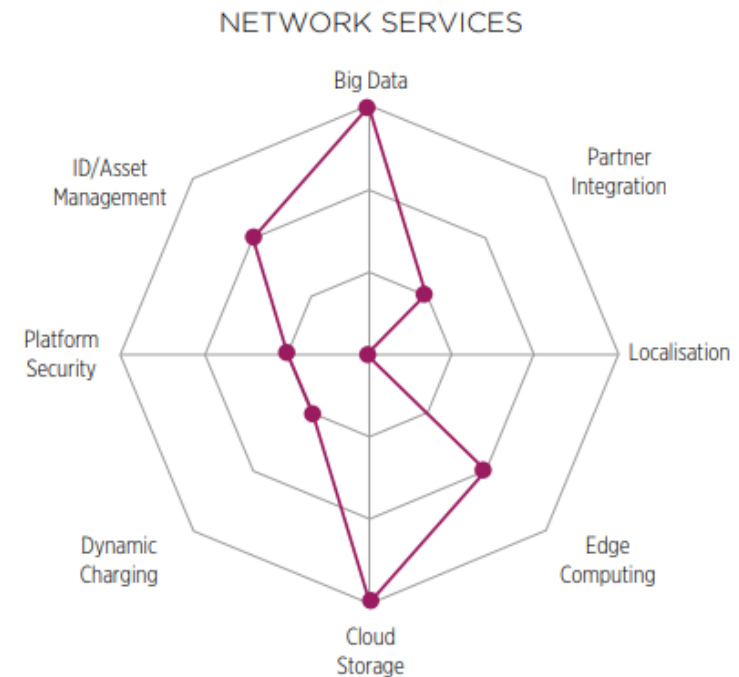


❑ Common use of spectrum will be necessary (allocation of **3,330 - 3,400 MHz in China 5G indoor coverage**). This implies a new spectrum policy framework since in many countries spectrum licenses are given to specific network operators.

❑ **Re-farming policies** are being more common and relevant;

❑ **Spectrum Pricing** (service provision vs revenue maximization);

❑ **Spectrum for Verticals**: outside mobile bands; sub-leasing for verticals; dedicated spectrum for verticals in mobile bands; spectrum sharing.



Geographical Coverage

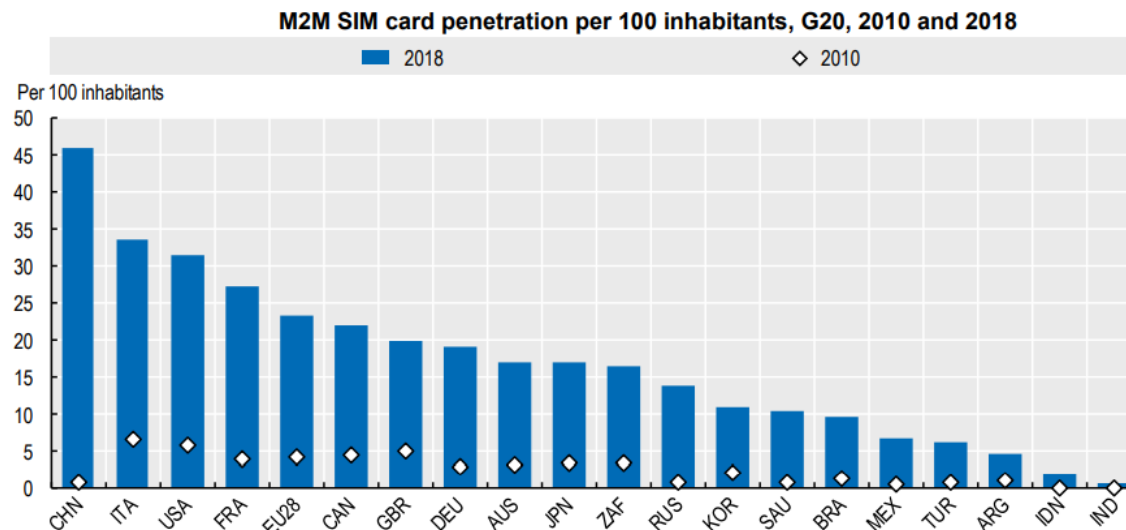
□ The value of many applications will depend on a truly seamless geographical coverage (autonomous driving across countries). A **new framework for roaming** can be useful to address this issue. Roaming increases sharing but reduces network differentiation.



Regulatory Challenge: Seamless Coverage



- ❑ In the digital economy, seamless coverage is key for the success of many IR 4.0 technologies.
- ❑ **Mandatory National Roaming** agreements will necessary;
- ❑ Negotiation of **M2M international roaming tariffs** (special prices for IoT/M2M traffic). To create & operate an MVNO in a foreign country can be cheaper that using a local MNO for roaming.



Source: OECD 2020

Essential Facilities

❑ Integrated streetlights with mini cells will be a trend. The deployment cost of this infrastructure can be shared between operators. How about the use of legacy infrastructure?

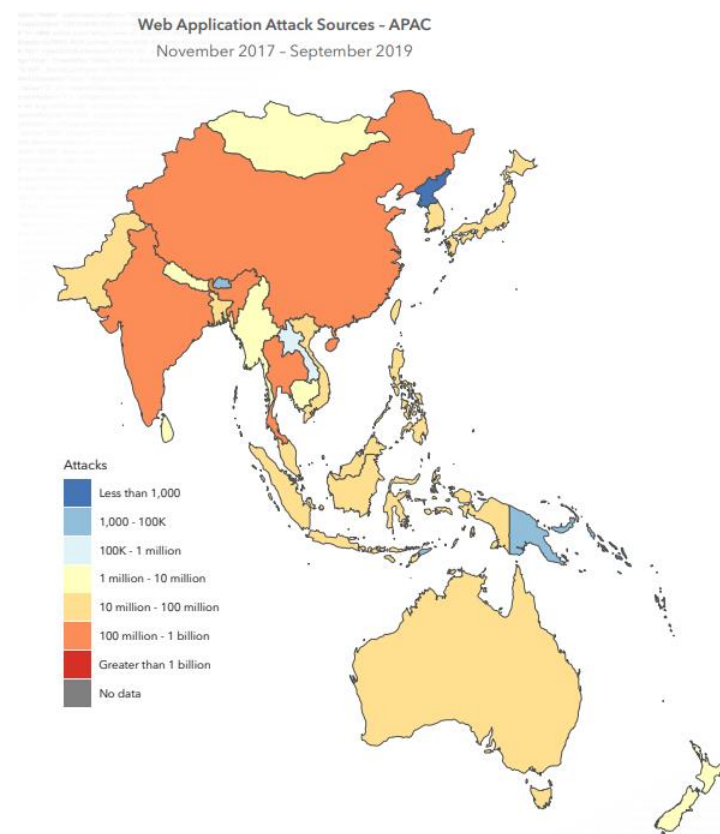
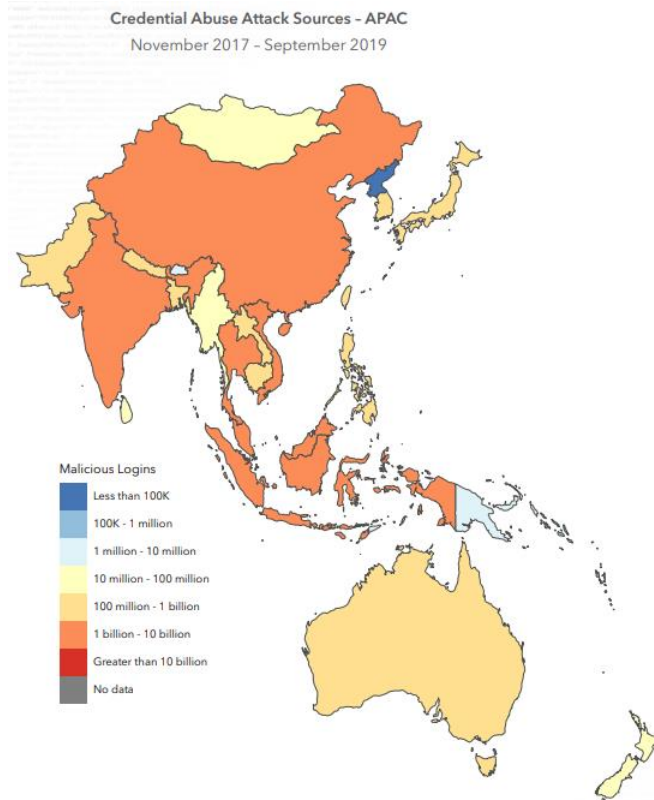
Regulatory Challenge: **RAND Access**

❑ In Brunei case, this is less relevant given the recent changes in the configuration of its telecom industry.



Cybersecurity

- Protection of data & networks is fundamental in the digital economy.

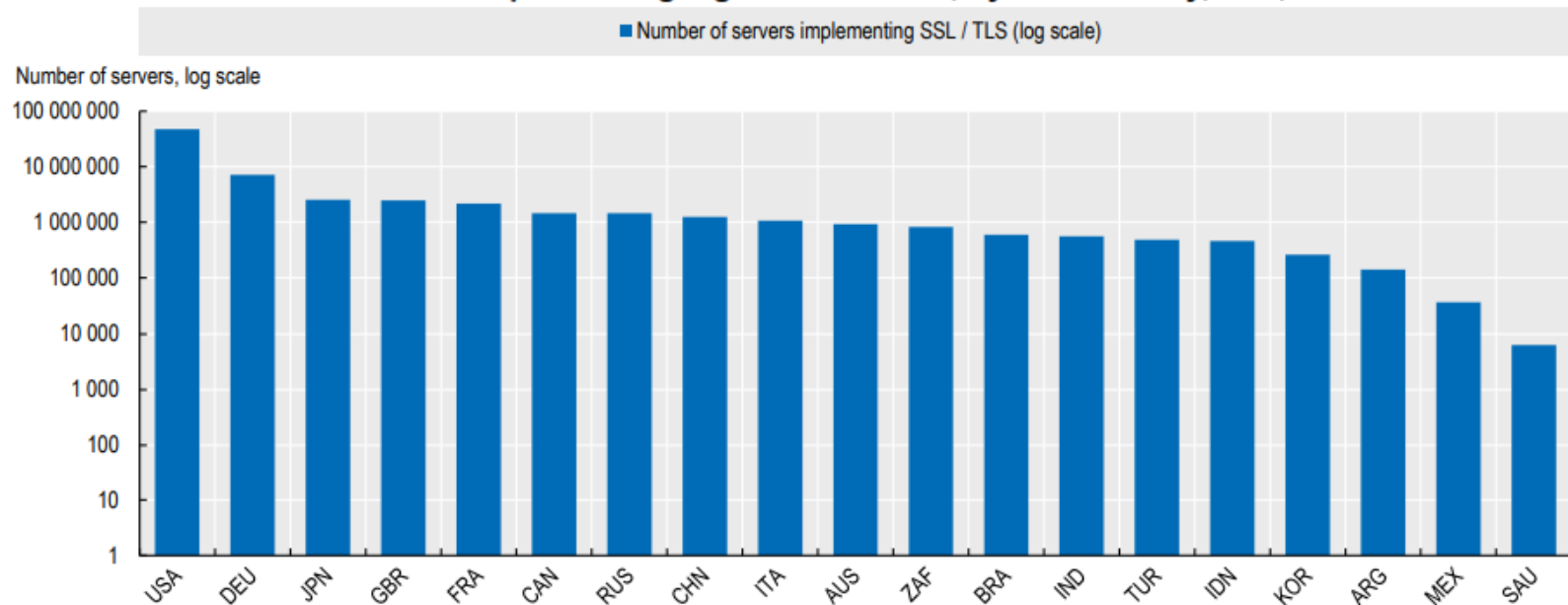


Source: State of the Internet Security, Akamai 2019

Regulatory Challenge: Cyber Protection

- ❑ Servers implementing SSL/TLS **digital certificate protocols** can be used for the exchange of sensitive information.

Web servers implementing digital certificates, by host country, G20, June 2020



Source: OECD 2020



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