

Discussion Paper

Digital Industry Governance and 5G

Prof Rahim Tafazoli

Regius Professor, FREng, FIET, WWRF e

As changing user needs and advancing technologies lead to the evolution of a more diverse and complex ecosystem centred on communications this project will focus on understanding how an effective and efficient governance system needs to evolve.

The discussion below is organised around a series of key questions as follows:

- What challenges will the roll out of 5G and the emergence of new use cases in different vertical sectors and the involvement of new players create?
- What can we learn from the successes and failure of 3G and 4G governance in the past?
- What are the lessons can draw from the rapid development and huge success (in terms of usage and value creation) of the Internet. What does it tell us about the advantages and disadvantages (in terms of the rate of innovation, access, security, privacy, etc) of uncontrolled development versus regulation?
- On which governance areas is it useful or even essential for government to focus if we are to develop an effective and efficient next generation ecosystem?
- What governance areas are best addressed by industry organisations and initiatives? What aspects should be left to emerge from the operation of the market?
- What would an ideal digital governance system look like assuming global cooperation were possible?

1. What challenges will the roll out of 5G and the emergence of new use cases in different vertical sectors and the involvement of new players create?

5G overview

ORAN architecture is based on many open interfaces as can be seen in Figure 1 compared with traditional closed RAN. However, the greater the number of open interfaces the more architecture is prone to network security and risks of interoperability between different products from different vendors. And

For mass connectivity, again the standardisation work is in progress in the Release 17 of 3GPP.⁵ These are mainly technical and standardisation issues that have contributed to 5G deployment delay. From non technical points of view

industries are: security, latency, reliability (resilience) and interoperability with legacy IT system.

To help with faster adoption of 5G technologies and establishment of common understanding more joint technology and use case trials need to be conducted between actors from different sectors. It is not too late to do so as future development of 5G standards in Release 17 and possibly 18 and 19 are about industrial 5G use cases and its autonomous operation.

3. What are the lessons can draw from the rapid development and huge success (in terms of usage and value creation) of the Internet. What does it tell us about the advantages and disadvantages (in terms of the rate of innovation, access, security, privacy, etc) of uncontrolled development versus regulation?

Internet is based on simple IP (Internet Protocols) that enable a variety of systems to be easily integrated. This simplicity in networking is at the expense of compromising quality, reliability, security and privacy.

sp e` b MP QPP

Frequency spectrum availability is key enabler for tetherless connectivity, mobility for anywhere and anytime and overall system cost. More spectrum in useful part of radio spectrum needs to be farmed so as to enable cost effective coverage and capacity. Current licensing regimen need to be changed from nationwide blanket license to location based and on principle of acknowledged coexistence between different deployment of networks whether in form of public, private (non public) or a hybrid of them. This will enable proliferation of many networks in support of many businesses and hence positive impacts on society and economy. Another important consideration is that instead of moving up in frequency spectrum, radio regulators need to move down and allocate or re farm sufficient radio spectrum to help network operators to provide cost efficient coverage.

Digital infrastructure must adopt open, secure and standardised interfaces so that any business could outsource or develop its own services and applications. Open infrastructure with open and standard interfaces will help with diversification in technology and the services/content ecosystem. The interfaces should be based on a common standard to ease interoperability at different layers of protocol stack. This way mobile standards will enable service/application innovation as Internet has enjoyed by being an open architecture. The more important layers in a protocol stack are: the application layer, network layer, media (physical layer) and hardware (devices) layer where common and standard interfaces should be on global standardisation agenda.

Future communications will be more and more about connecting machines to the extent that at anytime and in any location there will be more than 1000 devices per person. Machines of different types in capabilities and functionalities and different sizes ranging from small

temperature sensors to machines as large as vehicles, drones, trains etc will be commonly deployed as combination of wearables, short range environment and ambient information sensing/actuating networks to wide area networks. Future networks will be a network of networks in providing complementary coverage whilst enabling different and smart services. Such devices need to certify each other in order to form a network. This certification process and its related algorithm needs to be dynamic and efficient in terms of signalling load and energy consumption as the network size and member devices in a network could dynamically change. This requires an efficient and multilateral trust framework to automatically and dynamically verify, negotiate and certify

con to Digital Network to enhance global

5. What governance areas are best addressed by industry organisations and initiatives? What aspects should be left to emerge from the operation of the market?

Governments need to be forward looking and adopt digital transformation as their national strategy. It is important to put in place appropriate standard processes and regulatory policies with respect to the important 4 factors outlined above. This in turn will pave the way for creating market opportunities, competition and diversification in supply chain. Global standards facilitate the creation of a global market and faster return on investment due to economies of scale. With respect to standards, gen wi



Global Issues Dialogue Centre
Jesus College
Cambridge
CB5 8BL

www.jesus.cam.ac.uk/research/global/Global-Issues-Dialogue