



**Policy Brief 4**

**Innovative Vertical  
Solutions Enabled  
by Next Generation  
Networks:  
A Case for EU-US  
Cooperation**

**May 2020**

Policy Brief written by:  
Think NEXUS Innovation & Entrepreneurship Expert Group



Think NEXUS, an EC-funded project, aims at reinforcing EU-US collaboration on NGI-related topics in three focus areas: Science and Technology, Innovation and Entrepreneurship and Policy. The aim is to boost strategic research, industrial partnerships and policy compliances in order to gain socio-economic benefits in both the EU and US regions.

In the framework of this project, we are regularly publishing several short articles aiming at comparing the US and the EU approaches in different topics of NGI. The present document is focusing on Artificial Intelligence.

THI \_

\_ NK

NEX \_

\_ US



## Innovative Vertical Solutions Enabled by Next Generation Networks: A Case for EU-US Cooperation

Even prior to the COVID-19 crisis that has highlighted the critical need for broad access to telecommunications networks, Europe had already decided to “enhance its industrial capacity in digital infrastructures” and more specifically “be a frontrunner in 6G networks”<sup>1</sup>. The Digital Strategy from the European Commission (EC) goes even further, by stating that “European technological sovereignty starts from ensuring the integrity and resilience of our data infrastructure, networks and communications” and that “Europe must invest more in the strategic capacities that allow us to develop and use digital solutions at scale and to strive for interoperability in key digital infrastructures, such as extensive 5G (and future 6G) networks”<sup>2</sup>.

In the US, President Trump signed in March 2020 a pair of bills, *The Secure 5G and Beyond Act and The Broadband Deployment Accuracy and Technological Availability*, designed to boost wireless and broadband networks by ensuring the availability and security of next generation networks in the country, recognising that “the need for connectivity is even more critical now that millions of Americans are teleworking and learning from home in response to the coronavirus pandemic”<sup>3</sup>.

In parallel, because technological sovereignty is at stake, the EC also highlights that “the EU will remain open to anyone willing to play by European rules and meet European standards, regardless of where they are based”. This means that “businesses need a framework that allows them to start up, scale up, pool and use data, to innovate and compete or cooperate on fair terms”<sup>4</sup>. The US has also recognised that 5G is critical to its technological leadership, placing it at the heart of the EU-China trade war, taking measures to prevent US deployment of network equipment from the Chinese manufacturer Huawei, and even considering buying one of the two leading European 5G equipment manufacturers Nokia or Ericsson<sup>5</sup>.

*A fair global framework needs to be put in place for businesses to start up, scale up, and innovate in 5G and beyond.*

1 “A New Industrial Strategy for Europe”, European Commission, 10/03/2020, [https://ec.europa.eu/commission/presscorner/detail/en/fs\\_20\\_425](https://ec.europa.eu/commission/presscorner/detail/en/fs_20_425)

2 “Shaping Europe’s Digital Future”, European Commission, 19/02/2020, [https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/shaping-europe-digital-future\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/shaping-europe-digital-future_en)

3 “Trump signs laws to boost 5G security, broadband availability”, CNET, 24/03/2020, <https://www.cnet.com/google-amp/news/trump-signs-5g-and-broadband-mapping-legislation-into-law>

4 “Shaping Europe’s Digital Future”, *Ibid.*

5 See for example <https://www.mobileworldlive.com/featured-content/home-banner/us-ag-moots-government-move-for-ericsson-nokia/> and <https://www.lightreading.com/mobile/5g/attorney-general-barr-the-us-allies-should-take-nokia-or-ericsson-stake-for-5g/d-d-id/757341>.

This paper suggests a few specific solutions to support dedicated investment in key 5G and beyond domains and for key stakeholders – and explains why those solutions should preferably involve both the EU and the US.

## Vertical sectors and 5G

Since its inception in 2014, the European 5G Public-Private Partnership (5G PPP), the largest 5G research & innovation initiative in the world with a combined public-private investment in the order of €3.5 billion<sup>6</sup>, has had a strategic plan to involve vertical stakeholders in the projects, that were already connecting large players from the telecommunications and ICT ecosystem with small and medium-sized enterprises (SMEs).

The main difference between 5G and the previous generations of telecommunications networks is that it is expected to be a major enabler of new vertical solutions and applications, in sectors such as transport and logistics, manufacturing, media and content, smart cities, agriculture, energy, healthcare, public safety and others: “a significant trend observed is the penetration of global 5G infrastructure across the range of end-user industries. The rising demand from various [vertical] applications [...] has been recognized as the major drivers for the 5G infrastructure market growth”<sup>7</sup>. By 2035, 5G may contribute up to \$13.2 trillion potential global sales activity across multiple industry sectors enabled by 5G, representing 5% of global real output and 22.3 million jobs generated by the 5G value chain<sup>8</sup>.

*Vertical industrial sectors such as transport, manufacturing, smart cities, media, and others will be the main beneficiaries of 5G-enabled solutions.*

Nevertheless, companies in a position to take advantage of 5G to develop next generation solutions and applications in vertical sectors are facing a series of issues. On the one hand, the lack of understanding of what 5G can actually bring and which 5G features they could or should use; on the other hand, the lack of an easily accessible 5G-ready test infrastructure that could be widely used for pre-commercial trials, leading in particular SMEs and start-ups to accelerate the deployment and commercialisation of innovative products.

The 5G PPP has been supporting the set-up of test beds, but they are still mostly designed as research infrastructures and operated by research organisations, and their access is limited and accessible either to the project partners or via open calls. The Canadian ENCQOR initiative is another example of such 5G test bed -which they call ‘5G corridor’, in their case implemented and run by large companies. But once again the access is limited by open calls on topics selected by those large companies<sup>9</sup>. The latter example could however be relevant as the US, like Canada, tends to directly support SMEs and research organisations in cooperation with large industry, rather than funding large companies for research and innovation projects.

6 <https://5g-ppp.eu/>, <https://5g-ppp.eu/the-5g-ppp-has-started/>

7 “5G Infrastructure Market Size, Share and Analysis”, Fortune Business Insights, July 2019, <https://www.fortunebusinessinsights.com/industry-reports/5g-infrastructure-market-100869>

8 “5G special report”, The Times, 19/02/2020, <https://www.raconteur.net/5g-2020>

9 <https://www.encqor.ca/>

## Promoting transatlantic 5G/6G related innovation partnerships

China is today's world's largest economy. The EU is in second place, and the U.S. is No. 3. According to forecasts, the EU and US economies together would represent 28.5% of the world share in 2024, when China is projected to represent 21.4%<sup>10</sup>. When it comes to 5G, although the largest market is currently the US, forecasts show that Europe is the fastest growing market, due to the large presence of large software providers and the high investment planned in 5G by carriers<sup>11</sup>.

An EU-US cooperation would greatly strengthen the creation of 5G-enabled vertical solutions with global standards in key vertical sectors. Industrial partnerships involving all the pieces of the value chain of a given industrial sector should be encouraged and supported, as one of the means to achieve global success.

Indeed, to strengthen the know-how of large companies and SMEs working on vertical solutions, Open Innovation 5G partnerships can accelerate the market uptake of the technology. Such partnerships, if they were open to both Europe and the US, would not only strongly enhance the pool of expertise both in verticals and in 5G, but would also greatly facilitate the market access for innovators and entrepreneurs on both continents. Thanks to this approach, EU-US solutions could be quickly deployed both in Europe and in the US in sectors such as automotive, industry and media. If this were to happen, those solutions could become global standards and provide European and American industries with a great advantage against competition from China and the rest of the world. This would certainly support the willingness of the EU to be "able to forge global high-quality standards which bear the hallmark of Europe's values and principles", allowing Europe to "strengthen [its] strategic autonomy and industrial competitiveness"<sup>12</sup>.

**If Europe and the US were to cooperate in finding a solution to put in place a fair global framework supporting the development of global 5G-enabled solutions for vertical sectors, such solutions could be deployed both in the EU and the US, i.e. the largest 5G markets, and could lead to global solutions and global standards in such critical domains as automated cars, manufacturing, and public safety.**

With this global digital market, technology innovators could help entrepreneurs working in vertical sectors better adapt and evolve their products with the latest 5G/6G features, thus delivering solutions that would always be at the cutting edge of innovation -while still in time for market. Those innovation and business partnerships would indeed benefit from the research and innovation performed by EU and US research organisations, already interacting heavily with SMEs and large industry via bilateral and multilateral agreements, often supported by the relevant public authorities, each with their own policy.

<sup>10</sup> "Largest Economies in the World", *The Balance*, 18/03/2020, <https://www.thebalance.com/world-s-largest-economy-3306044>

<sup>11</sup> "A New Industrial Strategy for Europe", *Ibid*.

<sup>12</sup> "Global 5G Market Size, Status and Forecast 2018-2025", *Valuates Report*, August 2019, [https://reports.valuates.com/sreport/QYRE-Othe-0Z147/global\\_5g\\_market](https://reports.valuates.com/sreport/QYRE-Othe-0Z147/global_5g_market); "5G Infrastructure Market - Growth, Trends and Forecast (2020 - 2025)", *Mordor Intelligence*, 2019, <https://www.mordorintelligence.com/industry-reports/5g-infrastructure-market>

*5G and beyond EU-US cooperation should encourage participation from industry, both large companies and SMEs, and focus on technology – vertical partnerships.*

## Setting up an EU-US 5G test and deployment infrastructure

Small and medium-sized enterprises (SMEs) and entrepreneurship are essential drivers of economic and social well-being. According to OECD, they represent 99% of all businesses, generate about 60% of employment and total between 50% and 60% of value added in the OECD area. Moreover, “Digital technologies are opening up new opportunities for young firms and SMEs to innovate and grow”<sup>13</sup>. SMEs have an important role to play in developing, piloting, and deploying 5G technologies, both to help with disruptive technologies and to address the needs of various vertical sectors.

Providing industry – and in particular SMEs – with a 5G infrastructure that allows them to test and deploy their vertical products, solutions and applications in an environment that is similar to (future) commercial 5G networks, will ensure that those solutions can be immediately deployed and commercialised both in Europe and in the US. This would provide European and American SMEs with a competitive advantage in key sectors benefiting from 5G to innovate and invent the automotive of the future, the plant of the future, and the media of the future.

The importance of test infrastructures has already been recognised for a long term as a key asset of EU-US cooperation in the telecommunications sector. A long-term cooperation has been going on between the EU FIRE initiative and the US GENI programme; and the main running EU-US cooperation in the 5G and beyond domain focuses on advanced wireless infrastructures, with the EU EMPOWER project and the US PAWR initiative<sup>14</sup>. This joint cooperation has been focusing on medium to long term needs.

**What is required is an infrastructure that would serve the needs of industry in the key stage where innovative solutions should be tested on a large scale** before their actual deployment on commercial networks. Such a « pre-commercial » infrastructure would allow innovators and entrepreneurs to test their solutions on platforms that would be like the commercial network that will be available in the next 1 to 3 years.

To solve this, **a global 5G business-oriented test infrastructure shall be put in place**. This infrastructure should be permanently and broadly accessible and be maintained with the latest 5G and beyond technology to allow and test 5G- and 6G-enabled vertical solutions to be deployed and commercialised in a 1-3-year time to market. Of course, such an infrastructure should consider using already existing public, private or public-private test beds, if they are (or become) interoperable with each other.

<sup>13</sup> “OECD SME and Entrepreneurship Outlook 2019”, <https://www.oecd-ilibrary.org/docserver/8ac063a4-en.pdf>

<sup>14</sup> Future Internet Research and Experimentation (FIRE), <https://ec.europa.eu/digital-single-market/en/future-internet-research-and-experimentation>; Global Environment for Networking Innovations (GENI), [https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=501055](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=501055); EU-US joint development of advanced wireless research platform targeting new connectivity frontiers beyond 5G (EMPOWER), <https://www.advancedwireless.eu/>; Platforms for Advanced Wireless Research (PAWR), <https://advancedwireless.org/>.

The main reason for the US Government to ban Huawei network equipment was to declare that there were risks that information circulating on the network via this equipment was being disclosed and sent to the Chinese Government<sup>15</sup>. The implementation of GDPR, the General Data Protection Regulation, imposed by the EU as a global standard, has demonstrated if needed that user privacy and data protection in general is considered as a priority in Europe. There is therefore an opportunity for both the EU and the US to implement security and “privacy by design” features in this infrastructure<sup>16</sup>.

*A global EU-US 5G and beyond pre-commercial infrastructure should be put in place to provide industry with the capacity to test and deploy within 1 to 3 years, innovative and disruptive 5G and beyond-enabled vertical solutions. Such an infrastructure should be secure, trusted and implement “privacy by design”.*

## Policy implications

The main condition for setting up a sustainable 5G (and later 6G) pre-commercial test and deployment infrastructure is the active involvement of the stakeholders that are participating in the development and deployment of the commercial networks. This includes equipment manufacturers and telecommunications operators.

The main condition for establishing technology – vertical partnerships is the active involvement of all stakeholders involved in developing solutions for vertical sectors. The involvement of key industrial actors in vertical sectors is required, as they will be the main ‘end-users’ and will also be the ones commercializing solutions. They will also likely be in some cases operating specific infrastructures dedicated to serving customers in their own sector. The participation of SMEs is critical to achieve innovation and even disruption on vertical sectors, both in technology and in vertical solutions.

One of the conditions for making those industrial partnerships possible is the involvement of public authorities. Both the set-up of the test and deployment infrastructure and the promotion of the industrial partnerships should be strongly supported by public authorities. In Europe, the EC should be the driving force, reinforced by individual roadmaps from each Member State. This would allow speeding up both the set-up of the test and deployment infrastructure and allowing local access for SMEs. In the US, PAWR and NSF could play a role in mobilising US industry, as well as the local authorities that already have 5G roadmaps and infrastructures already deployed or planned.

<sup>15</sup> Many articles were published on this subject; one of them states that for example that “the US always suspected Huawei of using its technology to spy on other countries for the Chinese government”, cf. <https://marketrealist.com/2019/06/why-the-us-ban-on-huawei-is-probably-here-to-stay/>

<sup>16</sup> For further details on “privacy by design”, see for example <https://www.ericsson.com/en/reports-and-papers/white-papers/privacy-in-mobile-networks>



Involving all those private and public stakeholders would be consistent with the EU industrial strategy, stating that “[such] efforts should be supported by policies and financial instruments at EU and national level, as well as the private sector. Those who move first and move fastest will hold the greater competitive advantage”<sup>17</sup>.

*A main condition for success is to involve all stakeholders required to achieve success: industry (large companies and SMEs, both technological and verticals), research organizations, and public authorities, at European and national level in the EU, and at Federal and local level in the US.*

As already stated, the involvement of SMEs will be a key to the success of such an endeavour. Local access to the infrastructure, as well as local support and encouragement to establish partnerships, shall be made available. **The Digital Innovation Hubs<sup>18</sup> (DIHs)**, that will be deployed at EU level in the coming months and years, **shall prove to be a key instrument** in providing such services to SMEs -and could take advantage of the upcoming European network of DIHs to liaise with relevant counterparts in the US.

*Local access and support should be provided to SMEs. In the EU, this role could be performed by the Digital Innovation Hubs.*

<sup>17</sup> “A New Industrial Strategy for Europe”, *Ibid.*

<sup>18</sup> <https://ec.europa.eu/digital-single-market/en/digital-innovation-hubs>



[thinknexus.ngi.eu](http://thinknexus.ngi.eu) @ThinkNEXUS\_NGI



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 825189. This publication reflects only the author's view and the Commission is not responsible for any use that may be made of the information it contains