

The US–China 5G Contest: Options for Europe

by Lorenzo Mariani with Micol Bertolini

ABSTRACT

5G infrastructures are a reality. Because this new wireless technology is expected to bring great changes to our economy and society, its deployment has triggered a fierce race between tech titans. The rapid growth of China's 5G industry is challenging the United States' historic "edge" in technological innovation. The US, for its part, considers the expansion of Chinese 5G not only an economic challenge but also a geopolitical threat, as 5G technology could provide China's government with access to critical information. Despite considerable investment in 5G technology in several member states, the European Union struggles to find its place in this changing environment. Nevertheless, the race to 5G offers the EU an excellent opportunity to strengthen its technological sovereignty through a common strategy towards foreign telco (telecommunications) companies and a coherent cybersecurity policy.

US foreign policy | China | European Union | Communications | Digital policy

keywords

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Introduction

From the development of the first receivers in the 1980s to the introduction of smartphones, four different generations of telecommunications technology have followed one another. Each has contributed to the expansion of the types of services on offer while at the same time trying to improve the rate, reach and sustainability of the entire network.

Over the preceding decade, the number of people and enterprises that benefit from telecommunications services – voice, text or data – has risen exponentially. Along with tariff reductions for services and with the growing automation of production processes, the dramatic increase in the commercialisation of products capable of using an internet connection has led to a rapid digitalisation of the global economy and society. Between 2012 and 2017, mobile data traffic grew seventeen-fold worldwide, with an increase of 71 per cent in 2018 alone.¹ The number of industrial and commercial devices that use these connections has risen accordingly: 17.8 billion devices connected to the network were registered in 2018, a third of which are smartphones.²

The fifth generation of telecommunications technologies (5G) represents developers' responses to three modern needs: (1) ensuring a stable connection for a dense "ecosystem"; (2) allowing the continuous streaming of a massive quantity of data; and (3) guaranteeing communications with an extremely high-speed transmission rate.

¹ Cisco, *Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2017–2022. White Paper*, February 2019, <https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white-paper-c11-738429.html>.

² Knud Lasse Lueth, "State of the IoT 2018: Number of IoT Devices Now at 7B – Market Accelerating", in *IoT Analytics*, 8 August 2018, <https://iot-analytics.com/?p=122887>.

* Lorenzo Mariani is Research Fellow at the Istituto Affari Internazionali (IAI). Micol Bertolini has been intern at IAI from May to July 2019.

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Unlike with previous generations, the definition of 5G standards does not have the sole objective of enhancing connections between individual users. This new infrastructure has been built with the purpose of providing essential technical requirements for the development of new technologies such as high-precision robotics, Artificial Intelligence (AI), autonomous vehicles and all those devices that constitute the Internet of Things (IoT). Therefore, 5G technologies represent the framework within which the next Industrial Revolution will unfold: a technological leap that the Massachusetts Institute of Technology's *Technology Review* has compared with the transition from the typewriter to the computer.³ Decisions taken today will inevitably influence the development of future digital technologies.

The need to allow different types of connections to coexist has forced developers to rethink the entire wireless-communication architecture, leading to new transmission technologies and the search for new radio frequencies on which data can travel. Having to serve multiple purposes, the 5G network will not be uniform. Instead, it will be composed of "slices", each of which will have a specific application. There will be three main slices:⁴

1. *Enhanced mobile broadband (eMBB)*: this 5G-architecture slice will be dedicated to the transmission of mobile communications, including traditional human-to-human communications. Thanks to the new transmission technology, the rate of data exchange will increase tenfold compared with the current one, reaching a peak of 10 gigabytes per second.
2. *Ultra-reliable low-latency communications (uRLLC)*: thanks to low latency – i.e. the gap between command and execution – in the communication between devices, this section of the 5G network will convey all communications for which speed is essential for their proper functioning – such as autonomous vehicles or medical robotics (especially surgical ones).
3. *Massive machine-to-machine communications (mMTC)*: in order to face the increasing density of devices connected to the network, mainly prompted by the spread of the Internet of Things, this component of the network will make the simultaneous connection of devices sustainable.

The transition towards the new generation will be completed within the next ten years, and it will not take place homogeneously. Considering the fact that 5G's complex architecture encompasses radical changes in several sectors and that its realisation requires massive investments, the entire process will necessitate high-level coordination between enterprises, international organisations and governments.

³ Qualcomm, "The 5G Economy: How 5G will Impact Global Industries, the Economy, and You", in *MIT Technology Review*, 1 March 2017, <https://www.technologyreview.com/s/603770>.

⁴ Paul Triolo, Kevin Allison and Clarise Brown, *Eurasia Group White Paper: The Geopolitics of 5G*, 15 November 2018, <https://www.eurasiagroup.net/live-post/the-geopolitics-of-5g>.

Given the sizeable commercial interests at stake, the new mobile-communication broadband (eMBB) will be the first slice of the network to be developed. In order to reduce the time needed for its implementation, the process has been split into two phases. The first one, called *non-standalone* (NSA), includes the introduction of the new eMBB technologies to support the current 4GLte network, enhancing its rate and capacity in data reach. The second phase, *standalone* (SA), will coincide with the complete replacement of the current network.

NSA started in 2018, when producers launched their first 5G mobile devices and mobile carriers began to offer 5G hotspots. At the end of 2018, trials and pilot projects for 5G networks were initiated in the main developed countries. First, 5G services were launched successfully in the European Union and United States, closely followed by states in the Middle East and Asia that will run 5G pilots in the coming months.

1. 5G: a high-level competition

Due to the multiple implications embedded in the realisation of a new telecommunications network, the 5G race has, since its inception, taken the form of a global multi-level competition in which industrial and political interests are interconnected. The competition – between and amongst companies and states – is mainly of an economic nature. Because of the progressive digitalisation of society, telecommunications nowadays represents one of the leading sectors of the global economy. It is estimated that fifth-generation technologies will contribute to the growth of global gross domestic product (GDP) by 0.2 per cent per year between 2020 and 2035. That will generate an economic impact to the total value of 12,000 billion US dollars.⁵

It is obviously in the interest of the companies operating in this sector to excel in their own market segment. Succeeding in *patenting* technologies that will turn out to be essential for the development of the network's physical component means securing considerable financial gains. In such a dynamic sector, the revenues generated by the exploitation of patents are a fundamental asset to ensure sustainable investment in research and development (R&D), which keeps firms highly competitive.

Another "battlefield", arguably even more relevant than patents, concerns *standards*. Standards definition is a multi-year process that involves different international entities and continues even after the effective commercialisation of the technologies concerned. International standards are established chiefly by groups such as the International Organization for Standardization (ISO), the Global Standards Collaboration (GSC) and the 3rd Generation Partnership Project (3GPP),

⁵ Karen Campbell et al., *The 5G Economy: How 5G Will Contribute to the Global Economy*, IHS Markit, January 2017, <https://cdn.ihs.com/www/pdf/IHS-Technology-5G-Economic-Impact-Study.pdf>.

which gather the world's leading telecommunications-standards development organisations. All these networks work in close cooperation with the International Telecommunication Union (ITU), a specialised United Nations (UN) agency in charge of elaborating recommendations regarding the "IMT-2020" standard, meaning the requirements for the incoming 5G technology. The 3GPP released the specifications for the NSA phase in April 2019,⁶ while the complete standards for the SA infrastructure are still at the development stage.⁷

It makes sense that, within standard-development organisations, those enterprises that manage to impose their own technical specifications will have a considerable strategic advantage in the deployment and in the exploitation of 5G networks. Establishing global standards for mobile communication technologies is crucial to operators because through standards they secure and expand their own market share. Manufacturers consider standards definition so critical that they often take the risk of launching the production of their commodities before the ratification of standards.⁸

In analysing the transition from 4G to 5G standards, a crucial element is the *radical change in the balance of power* between states as well as between global firms. Western hegemony over the international decision-making process is now challenged by new economic and technological powers, especially in Asia, who want greater influence over the establishment of global rules and the future 5G infrastructure.

This is particularly the case with China and Chinese telecoms groups such as Huawei, which cannot be excluded from the development of global standards considering the prominent role that they already play in the process. China's influence in international standard-setting bodies like the 3GPP has increased steadily thanks to Chinese representatives holding high-level posts: the ITU Secretary General and the International Electrotechnical Commission (IEC) Vice President are both Chinese nationals, while 3GPP's chairman is a Huawei executive.⁹ The 3GPP claimed that the threat of a ban on Huawei, as championed by the US (see below), would be harmful for the global standard-setting system.¹⁰

⁶ 3GPP, *Release 15*, update 26 April 2019, <https://www.3gpp.org/release-15>.

⁷ 3GPP, *RAN Rel-16 Progress and Rel-17 Potential Work Areas*, 18 July 2019, <https://www.3gpp.org/news-events/2058-ran-rel-16-progress-and-rel-17-potential-work-areas>.

⁸ Samsung, *Who & How: Making 5G NR Standard. Understanding Key Features of 5G NR Standards and Samsung's Contribution*, June 2018, https://www.samsung.com/global/business/networks/insights/white-paper/who-and-how_making-5g-nr-standards.

⁹ Kristin Shi-Kupfer and Mareike Ohlberg, "China's Digital Rise. Challenges for Europe", in *MERICs Papers on China*, No. 7 (April 2019), <https://www.merics.org/en/node/9046>.

¹⁰ Louise Lucas, "Standards Body Warns on US Blacklisting of Huawei", in *Financial Times*, 9 June 2019, <https://www.ft.com/content/7e510cc0-88ea-11e9-97ea-05ac2431f453>.

The financial gains of this technological transition are not only in the interest of economic operators: the auction for the exploitation of radio frequencies alone generates a significant return for national treasuries. Moreover, several studies have demonstrated that countries who manage to adapt their network promptly gain the greatest macroeconomic benefits.¹¹ For instance, it is estimated that US leadership in the transition towards 4G produced a 100 billion US dollars return for the United States' economy.¹² Furthermore, as a result of its revolutionary nature, 5G is expected to contribute to the creation of new markets and consequently new jobs (thanks to the so-called "technology push" effect). The European Commission has estimated that, in the face of an investment of 56 billion euro, the introduction of 5G technologies will eventually generate 2.3 million jobs in the European market.¹³

States often politicise private competition, ending up creating notable market distortions that affect the expansion of global value chains. Political interference is nothing new: it also characterised the development of previous generations of technology. What makes the race for 5G unique is the rise of China as a major player in 5G's development. China's dominant presence has given this competition the veneer of a more fundamental clash between opposed economic and political models: democracy and authoritarianism, market economy and state capitalism.

2. China and 5G: a leadership in the making

While the US, the EU, Japan and South Korea were the major players in the definition and the development of previous generations, today China leads the technological revolution. Although it is not possible to define in a quantitative way who is "winning" the 5G race, most analysts agree on the fact that Chinese firms have a net advantage.¹⁴

Until a few years ago, the prospect of China holding such a position was implausible. In the first and second generation of telecommunications technology, China was forced to import most of its equipment. In the framework of the deployment of 3G, the country chose not to comply with international standards and pushed its own companies to develop the network independently. This decision resulted in less competition in the domestic market, while avoiding developing an overdependence on foreign devices. However, this strategy had significant repercussions both for consumers, who had access to the 3G network eight years later than the rest of the

¹¹ Dan Littmann et al., *5G: The Chance to Lead for a Decade*, Deloitte, 2018, <https://deloi.tt/2O1Wyxr>.

¹² Recon Analytics, *How America's 4G Leadership Propelled the US Economy*, 16 April 2018, p. 9, <https://www.ctia.org/news/how-americas-4g-leadership-propelled-the-u-s-economy>.

¹³ European Commission, *5G Deployment Could Bring Millions of Jobs and Billions of Euros Benefits, Study Finds*, 30 September 2016, <https://europa.eu/!vb48jK>.

¹⁴ Elizabeth Woyke, "China Is Racing Ahead In 5G. Here's What That Means", in *MIT Technology Review*, 18 December 2018, <https://www.technologyreview.com/s/612617>.

world, and on Chinese enterprises, which were not able to export their products.¹⁵

This failure not only pushed the country to look for an alternative strategy, it also contributed to the creation of an economic philosophy that is now inspiring the Chinese Communist Party's (CCP's) leadership: long-run economic growth can be achieved not only through capital accumulation but also through technological innovation. Chinese leadership in the development of the new telecommunications network is therefore not accidental. Although China already played a fundamental role in the fourth generation, technological development has become the pivot of Chinese strategic vision under Xi Jinping's presidency. One of the main goals of Xi's political agenda is to turn China from being the "factory of the world" into an innovation hub.¹⁶ Winning the 5G race would thereby represent not only an economic success but also a fundamental political achievement.

Beijing's strategy for securing its leadership in 5G – and in all those industrial sectors linked to this technological innovation – relies on four principles, discussed below.

2.1 Planning and vertical control of innovation

The main strength of China's strategy for the development of 5G is the existence of a *dirigiste* system in which the central government intervenes directly in the economy in order to pursue efficiency of production, the shielding of domestic firms from foreign competition and a politically driven allocation of investments. Central planning provides China with a comparative advantage in the 5G race compared with the US and the EU – especially because it ensures excellent coordination between telco companies, facilitating the creation of synergies in innovation and R&D and of national champions. It also involves public funding in support of innovation.

An emblematic example in this sense is the IMT-2020 Promotion Group, established by China in 2013 with the goal of coordinating efforts between firms and government bodies for the commercialisation of 5G technologies by the end of 2020. As of 2019, the government has succeeded in coordinating universities, research centres, and both public and private enterprises, limiting domestic competition and accelerating development projects regarding 5G technology.¹⁷

¹⁵ Lilian Rogers, *What's at Stake in China's 5G Push?*, APCO, December 2016, <https://apcoworldwide.com/?p=1830>.

¹⁶ Lorenzo Mariani, "La Cina tra riforme interne e nuove proiezioni internazionali", in Fabrizio Saccomanni and Simone Romano (eds), *Global Outlook 2017: rapporto finale*, Rome, IAI, 6 July 2017, p. 64-70, <https://www.iai.it/en/node/8000>.

¹⁷ Institute for Security and Development Policy, *Made in China 2025*, June 2018, <http://isd.dp.eu/?p=31432>.

Along with the IMT-2020 Promotion Group, another key policy of Xi's presidency is the Made in China 2025 strategic plan, a national directive launched in 2015 with the aim of transforming China into a superpower in ten strategic sectors in the so-called high-added-value manufacturing industry, which includes robotics; information technology (IT); aerospace; biopharmaceuticals; and, crucially, telecommunications.¹⁸ Another fundamental goal of this strategy is reducing China's overdependence on imported technological components. By 2025, the country seeks to produce 40 per cent of the phone chips that it needs and 70 per cent of industrial robotics components.¹⁹

Through these projects, the economic *dirigisme* practised by the CCP has presided over the development of high-tech giants heavily subsidised and coordinated by central authorities. European and US firms struggle to compete with these state-controlled enterprises because their respective legislative systems do not allow for the creation of national "champions". A recent example of the efficacy of this CCP intervention is the merger between China United Network Communications and China Telecommunications, which has put even more pressure on Western telco companies.²⁰

Nevertheless, China's central planning in 5G development risks having serious repercussions for the freedom and rights of Chinese citizens using the technology. As some authors claim,²¹ the deployment of 5G technology is changing the Chinese governance system into a model of authoritarianism based on digital control. Internet and telecommunication technologies are progressively becoming the most effective instruments of the Chinese Government in securing tighter control on both data and people. Chinese telco companies and the new 5G technology, especially concerning its implications in the IoT and smart cities, provides the government with a powerful surveillance and interference tool – both internally and abroad.

An example of this development is the Internet Plus Action, announced in 2015, which aims to integrate the web into every economic area (agriculture, transports, logistics, etc.) in order to increase the efficiency not only of the economy but also of the control of society through mobile devices, the IoT or cloud computing.²²

¹⁸ Elsa B. Kania, "Made in China 2025, Explained", in *The Diplomat*, 1 February 2019, <https://thediplomat.com/2019/02/made-in-china-2025-explained>.

¹⁹ Jost Wübbecke et al., "Made in China 2025. The Making of a High-Tech Superpower and Consequences for Industrial Countries", in *MERICs Papers on China*, No. 2 (December 2016), p. 7, <https://www.merics.org/en/node/1706>.

²⁰ Ismail Shakil, Sija Jiang and Adam Jourdan, "China Explores Merger of Carriers China Unicom, China Telecom: Bloomberg", in *Reuters*, 4 September 2018, <https://reut.rs/2PD5Ndd>.

²¹ Danielle Cave et al., "Mapping China's Tech Giants", in *ASPI Issues Papers*, No. 15 (April 2019), <https://www.aspi.org.au/report/mapping-chinas-tech-giants>; Kristin Shi-Kupfer and Mareike Ohlberg, "China's Digital Rise. Challenges for Europe", cit.

²² Nicholas Borst, *China's Tech Rush. How the Country's Strategic Technology Campaign is Shaping Markets*, Seafarer, September 2018, p. 8-9, <https://www.seafarerfunds.com/commentary/chinas-tech-rush>.

As the Australian Strategic Policy Institute claims, thanks to cooperation in the building up of 5G infrastructures, China also aims to export this digital-control model to other non-democratic countries, such as Belarus and Zimbabwe.²³

2.2 Large state subsidies and tax reliefs

Chinese enterprises, especially in strategic sectors, benefit from generous subsidies and tax cuts from the government, which allow them to develop a competitive advantage over foreign firms and establish closer ties with the CCP. Huawei's rise, for instance, was facilitated by grants from the state amounting to 228.2 million US dollars between 2008 and 2011 and 190 million in 2016 alone. ZTE, the telecommunication-hardware manufacturer, enjoyed greater access to loans from the state-owned China Development Bank (CDB), which also financed Huawei's projects abroad to a total value of 9.8 billion US dollars in collaboration with Eximbank between 2012 and 2018.²⁴

Ad hoc regulatory interventions, such as the 2007 Enterprise Income Tax Law, guaranteed important tax relief for firms in technological sectors.²⁵ Recently, the Chinese Government announced additional tax breaks for some firms in the circuit-design and the software industry as a response to new US restrictions on exports of telecoms equipment – in particular, of semiconductors – to China.²⁶ This extensive intervention by the central government in firms' activities encounters strong criticism from the international community because of the market distortions and unfair competition that it generates.

Furthermore, since 2006 the Chinese Government has been carrying out the National Medium and Long Term Programme for Science and Technology Development (MPL), which, amongst other things, requires allocating to R&D activities not less than 2.5 per cent of annual GDP until 2020. With the implementation of Made in China 2025, the government has also established two new investment funds to finance research: the Advanced Manufacturing Fund (with a capital budget of 2.7 billion euro) and the National Integrated Circuit Fund (19 billion euro). To date, it is estimated that China's investment in fifth-generation technologies has exceeded 400 billion US dollars.²⁷

²³ Danielle Cave et al., "Mapping China's Tech Giants", cit.

²⁴ RWR Advisory Group, *A Transactional Risk Profile of Huawei*, 13 February 2018, <https://www.rwradvisory.com/?p=2161>.

²⁵ Zhao Chen, Sang-Ho Lee and Wei Xu, "R&D Efficiency in High-Tech Firms in China", in *Asian Economic Papers*, Vol. 16, No. 3 (Fall 2017), p. 193-208, <https://mpra.ub.uni-muenchen.de/84414>.

²⁶ Yuan Yang, Nian Liu and Sue-Lin Wong, "China Pushes Self-Made Chips in Response to US Threats", in *Financial Times*, 30 May 2019, <https://www.ft.com/content/f2695456-7d2c-11e9-81d2-f785092ab560>.

²⁷ Jill C. Gallagher and Michael E. DeVine, "Fifth-Generation (5G) Telecommunications Technologies: Issues for Congress", in *CRS Reports*, No. R45485 (30 January 2019), p. 8, <https://crsreports.congress.gov/product/pdf/R/R45485>.

2.3 Restriction of foreign competitors and forced technology transfer

While Chinese enterprises aggressively try to participate in the realisation of 5G infrastructures in foreign countries, Beijing has been careful to restrict foreign companies' access to its domestic network. The regulation of foreign firms' and capitals' entry into China divides the country's industrial sectors in three parts: those in which foreign enterprises' access is encouraged, limited or forbidden. Telecommunications constitutes a limited sector, in which foreign operators can act only through joint ventures with Chinese partners and are subject to multiple restrictions. The most controversial and most unfair rules – imposed as a prerequisite for access to the Chinese market – include the mandatory sharing with, or even transfer of intellectual property to, Chinese partners and the requirement to conduct R&D activity in China. In contrast with China's promise at the time of its admission to the World Trade Organization (WTO) in 2001, regulators continue to create market distortions. The text of the 2018 law on standards in China states explicitly that the government wishes to favour innovative indigenous enterprises at the expense of foreign competitors.²⁸

This extensive policy will have considerable strategic implications for the Chinese economy over the next few years. According to recent estimations, by 2025 China's domestic market for 5G technologies will rely on 428 million consumers and will contribute towards creating 8 million jobs by 2030.²⁹ This large portfolio of clients will enable Chinese firms to increase their economies of scale, which in turn will allow them to maintain competitive prices that foreign companies will struggle to match. Chinese companies will be able to sell without fearing domestic competition, and concentrate their efforts on expanding their market share in Asia, Europe and North America.

2.4 Expansion of China's telco companies abroad

Beijing's strategy – based on subsidies, restrictions and central planning – has helped to generate tech giants and national champions that not only monopolise the domestic market but are also emerging as leading players in the telecommunications and overall 5G-technologies sector in foreign markets – in particular, in emerging economies. Thanks to their comparative advantage due to low prices, firms such as Huawei are already in the front line for building and operating 5G infrastructures around the world, imposing fierce competition on leading Western telco companies.

²⁸ Nigel Cory, "The Ten Worst Digital Protectionism and Innovation Mercantilist Policies of 2018", in *ITIF Reports*, January 2019, p. 6, <https://itif.org/node/8213>.

²⁹ GSMA Intelligence and China Academy of Information and Communications Technology (CAICT), *5G in China: Outlook and Regional Comparisons*, GSMA Intelligence, 2017, <https://www.gsma.com/asia-pacific/resources/5g-in-china-outlook-and-regional-comparisons>.

The most blatant example of this trend is Huawei Technologies Co., China's main tech firm and the world's second-largest mobile-phone producer after Samsung Electronics Co., which is expanding rapidly outside Chinese borders. At present, Huawei has signed 46 commercial contracts for the construction and implementation of 5G networks around the world, 25 of them in Europe, exporting approximately 100,000 5G base stations so far.³⁰ Huawei's equipment is reported to have played a crucial role in the deployment of 5G infrastructures in more than 288 cases, accounting for almost 30 per cent of the fifth-generation telecommunications equipment used worldwide.³¹

Chinese 5G technology is especially gaining support in emerging economies in South America, Africa and Asia. At the end of May 2019, Huawei signed a Memorandum of Understanding with the African Union, boosting an already consolidated partnership that began with the deployment of the 3G network. Philippe Wang, Huawei's Vice President for North Africa, has defined the company as "the strategic partner for the digitalization of Africa".³² In Latin America, countries like Brazil, Chile and Mexico also are welcoming Chinese technology in the establishment of 5G infrastructures.³³ Today, tech giants such as ZTE and Huawei are the favourite partners and main providers of technology to South America thanks to their competitive prices, which helps them to undercut competitors from the US and Europe.

In Asia, the export of China's 5G technology received a boost with the launch of Beijing's global connectivity strategy known as the Belt and Road Initiative (BRI) in 2013. Among the countries that have already joined this project, Kazakhstan, Thailand, the Philippines, Cambodia, Malaysia and Indonesia are concluding multiple agreements with Chinese companies for the deployment of 5G networks.

The Chinese presence is also massive even in advanced economies. The omnipresence of the country's telco companies and their successful integration into the global value chain has made China a vital economic partner for the Western world. Chinese advanced 5G technology plays a crucial role in the deployment of the fifth-generation network in European countries, which have not yet fully developed an autonomous capability in this high-tech sector. Indigenous companies such as Nokia and Ericsson struggle to preserve their competitiveness and low prices, although they have reached a level of technological progress comparable to that of Huawei.

³⁰ "Huawei Obtains 46 Commercial 5G Contracts in 30 Countries", in *Xinhuanet*, 6 June 2019, http://www.xinhuanet.com/english/2019-06/06/c_138122365.htm.

³¹ Edward White and James Kynge, "Huawei Blacklisting Creates Opening for Samsung's 5G Push", in *Financial Times*, 25 May 2019, <https://www.ft.com/content/bafaa30c-7dfa-11e9-81d2-f785092ab560>.

³² Tom Wilson, "Huawei and African Union Boost Relationship with Deal", in *Financial Times*, 31 May 2019, <https://www.ft.com/content/30ec5c54-83aa-11e9-b592-5fe435b57a3b>.

³³ Andres Schipani, Jude Webber and Benedict Mander, "Latin America Resists US Pressure to Exclude Huawei", in *Financial Times*, 9 June 2019, <https://www.ft.com/content/38257b66-83c5-11e9-b592-5fe435b57a3b>.

3. The US and 5G: between competition and security

Although China has proved able to bridge the technological gap with other innovative countries, US enterprises continue to play a prominent role in the definition of global standards and the deployment of the new 5G networks. Companies that pioneered the implementation of the 4G network still aim to “win” the 5G first phase and begin to commercialise the first NSA-phase products sooner rather than later. After initial tests in 2017, leading telco companies had already launched the first 5G services in some pilot cities by the end of 2018. For instance, on 25 June 2019 T-Mobile announced the launch of 5G services in Atlanta, Cleveland, Dallas, Las Vegas, Los Angeles and New York, while AT&T expanded its 5G infrastructure to Austin, Los Angeles, Nashville, Orlando, San Diego, San Francisco and San Jose. The US Congress and Federal Communication Commission have already tried to accommodate service providers’ demands, accelerating the process of allocation and clearance of the required radio frequencies.³⁴

Alongside the development of the national network, the US can rely on important strategic leadership in the field of semiconductors, on which Chinese firms are still dependent. In August 2018, President Donald Trump decided to leverage this factor to strengthen the US negotiating position in the country’s tariff stand-off with Beijing. The US President forbade the Chinese company ZTE from buying American technology.³⁵

Eventually, however, the Trump Administration withdrew the measure. One reason was that Trump’s policy against Chinese tech firms may have serious implications for the US economy – in particular, for manufacturers of key technological components for which China is a major customer. Considering that China still constitutes one of the largest recipient markets for US exports of components, American companies such as Intel and Micron went as far as to ignore a ban on technology sales to China issued by the Trump Administration in spring 2018, and continued to sell chips to Huawei.³⁶ In the light of the risky economic burden that this decision imposed on US firms, President Trump lifted the ban after meeting President Xi at the 2019 G20 Summit.³⁷

Trump’s threats have, however, worked as an incentive for China to accelerate its development of indigenous technology. The trade-and-tech war with the US has led the government to invest massively in the development of a domestic Chinese

³⁴ Jill C. Gallagher and Michael E. DeVine, “Fifth-Generation (5G) Telecommunications Technologies: ...”, cit.

³⁵ Claire Ballentine, “U.S. Lifts Ban That Kept ZTE fFrom Doing Business with American Suppliers”, in *The New York Times*, 13 July 2018, <https://nyti.ms/2mf9toP>.

³⁶ Paul Mozur and Cecilia Kang, “U.S. Tech Companies Sidestep a Trump Ban, to Keep Selling to Huawei”, in *The New York Times*, 25 June 2019, <https://nyti.ms/2KEDcpo>.

³⁷ Shona Ghosh, “Trump Says US Firms Can Sell to Huawei”, in *Business Insider*, 29 June 2019, <https://www.businessinsider.com/trump-to-allow-us-firms-huawei-deal-2019-6>.

semiconductor industry, which could affect American producers even more than the results of the now-lifted bans.³⁸

From a strategic point of view, the US is struggling to find the appropriate tools with which to tackle Chinese competition without prejudice to its own economic principles. Washington cannot count on telecommunications giants capable of competing against the heavily subsidised and protected Chinese companies. Nor can the US Government intervene in a pervasive way in the market. This dilemma causes US policies to oscillate between the enforcement of tariffs and restrictions against Chinese firms and government bills in support of competition and free-market principles, such as the legislation prohibiting the nationalisation of 5G networks introduced by the US Senate at the end of May 2019.³⁹

Faced with a loss of competitiveness amongst US companies, the Trump Administration has begun framing the technology contest in ever starker national-security terms. Chinese big-tech firms have long been accused of contributing actively to the espionage activities of China's intelligence services. The main concern is that Chinese enterprises insert in their products backdoors or malwares that can be used by China's intelligence services to obtain information or even control of the devices. Huawei, ZTE and other companies repeatedly deny that this practice takes place, and point to the lack of evidence in support of such accusations.

China, however, finds it harder to deny its increasingly industrial and military cyber-espionage activities against the US and Europe. Between 2011 and 2018, the country was the source of about 90 per cent of cyberattacks reported to the US Department of Justice.⁴⁰ In response, since 2018 the US has been waging a political campaign aimed at excluding Chinese companies from the implementation of 5G networks. In August of last year, Trump partially banned Huawei and ZTE from participating in US' 5G infrastructure. Over the course of the following months, Australia, Japan and New Zealand decided to line up with Trump, excluding Chinese companies.⁴¹ Similarly, some European enterprises have chosen to cut ties with Chinese partners: British Telecom (Great Britain) and Orange (France) have officially removed Huawei from their suppliers' list for 5G components.⁴² In

³⁸ Huileng Tan, "Tech War with the US Is Spurring Chinese Firms to Develop Their Own Chips, Says Venture Capitalist", in *CNBC*, 1 July 2019, <https://cnb.cx/2Yt3m1s>.

³⁹ John Eggerton, "Senate Bill Would Prohibit 5G Net Nationalization", in *Broadcasting & Cable*, 28 March 2019, <https://www.broadcastingcable.com/news/senate-bill-would-prohibit-5g-net-nationalization>.

⁴⁰ Kadri Kaska, Henrik Beckvard and Tomáš Minárik, *Huawei 5G and China as a Security Threat*, Tallinn, NATO Cooperative Cyber Defence Centre of Excellence, 2019, p. 11, <https://ccdcoe.org/library/publications/huawei-5g-and-china-as-a-security-threat>.

⁴¹ Li Tao, "Japan Latest Country to Exclude Huawei, ZTE from 5G Roll-out Over Security Concerns", in *South China Morning Post*, 10 December 2018, <https://www.scmp.com/tech/tech-leaders-and-founders/article/2177194/japan-decides-excludehuawei-zte-government>.

⁴² Jack Stubbs and Kanishka Singh, "Britain Does Not Support Total Huawei Network Ban: Sources", in *Reuters*, 17 February 2019, <https://reut.rs/2GOF63P>.

addition, Google and Facebook have announced that they will no longer provide Huawei with their services. Google has decided to block the Chinese giant from Android,⁴³ while Facebook has declared that its apps will no longer be pre-installed on Huawei smartphones.⁴⁴

4. The EU and 5G: the power of regulation

4.1 European strengths and weaknesses

The EU is the third global hub for 5G development, thanks to high-tech giants such as Ericsson and Nokia, which rank second and third respectively – after Huawei – in terms of 5G-technology market share. These two companies hold 27 per cent and 22 per cent of the global 2G/3G/4G equipment markets respectively,⁴⁵ and they are both well placed in the race for the deployment of 5G technology. Nokia says that it has signed 42 commercial 5G contracts around the world as of June 2019, while Ericsson has announced 22 5G orders so far. Both firms are very active in the construction of 5G networks not only in Europe but also further afield. For instance, Ericsson's technology is used extensively in 5G projects in the US, Africa, the Middle East and Asia – including China.

However, the EU is struggling to maintain its competitiveness on a global level and to develop its own 5G infrastructures without using foreign technologies, due to several issues that it still has to face in both the short and long term. For the Union, the main obstacle to becoming a credible leader in 5G is a fragmented approach to the development and deployment of this new technology on European soil. The lack of a single regulatory framework and common planning for 5G development has created an environment characterised by a multitude of small operators and different standards and technologies, which means that the EU is progressing at 28 separate paces in 5G deployment. Europe has not yet been able to establish a common telecommunications market, which means that every member state manages the allocation and clearance of radio frequencies on its own. This fragmentation has serious implications for the role that the Union can play in the definition of global 5G standards, to the advantage of China and the US.

Furthermore, the EU suffers from a considerable lack of investment in R&D and of cooperation between its member states towards the development of competitive and innovative 5G technology. European investments in 5G are not even remotely comparable with the 200 billion US dollars that China plans to spend on R&D over

⁴³ Louise Lucas and Nic Fildes, "Google Suspends Huawei from Android Services", in *Financial Times*, 20 May 2019, <https://www.ft.com/content/d8b3d6e6-7aaa-11e9-81d2-f785092ab560>.

⁴⁴ Hannah Murphy, "Facebook to Stop Huawei from Pre-Installing Apps on Phones", in *Financial Times*, 7 June 2019, <https://www.ft.com/content/2d1eb624-8960-11e9-97ea-05ac2431f453>.

⁴⁵ Mathieu Duchâtel and François Godement, *Europe and 5G: the Huawei Case*, Paris, Institut Montaigne, June 2019, p. 19, <https://www.institutmontaigne.org/en/node/6612>.

the next three years.⁴⁶ In particular, European countries are not able to develop these technologies on their own due to the significant amount of time and capital needed to acquire the capabilities and knowledge required to produce 5G services. The only states that promote effective cooperation on 5G networks are the five Nordic countries of Denmark, Finland, Sweden, Iceland and Norway (the last two are not even members of the EU, although Norway is fully integrated into the Single Market),⁴⁷ which aim to shape the first interconnected 5G region in the world.⁴⁸

The EU still largely relies on foreign suppliers – in particular, on US and Chinese 5G technology. This overdependence risks undermining European autonomy and sovereignty in the crucial area of 5G networks and all fields linked to this technology.

This risk is particularly evident against the backdrop of the trade war between Washington and Beijing, and especially concerning the Huawei case. The Trump Administration has been threatening its EU allies with a restriction of US cooperation (even in critical sectors such as intelligence sharing) if they do not line up with the US ban on the use of Huawei technology in the creation of domestic 5G networks. Nevertheless, while some countries have followed Trump's approach of blocking Huawei from selling them technology, most European states have not yet chosen such a drastic policy, opting for a more pragmatic strategy. Even though Europe shares US concerns about the threats to national security posed by Chinese companies, restrictions discriminating against specific firms do not form a suitable legal option for the EU. Banning Chinese technology would not only be against European principles on competition but could also be counterproductive, considering the crucial role that China's telecommunications firms play in today's global value chains.

Europe's pragmatism has not extended to agreeing on a common course of action, however. After the arrest of a Huawei employee for espionage, Poland now seems keen to ban the company, whereas Italy is more forthcoming towards Chinese technological equipment, on which it heavily depends. German Chancellor Angela Merkel has claimed that her country will set its own security standards for 5G, despite US threats not to share intelligence with Germany if Huawei was allowed to participate in 5G network deployment. The same threat was addressed to the UK, one of the US' closest allies, which has nonetheless defied Trump by declaring China a "crucial bilateral partner" and by allowing in principle the use of Huawei's equipment.⁴⁹ The French Government has stated that it does not want

⁴⁶ Ibid., p. 15-16.

⁴⁷ "5 Nordic Countries Aim to Be 1st Interconnected 5G Region in the World", in *Technology Blog*, 6 June 2018, <https://techblog.comsoc.org/?p=10098>.

⁴⁸ Sweden, *Letter of Intent. Development of 5G in the Nordic Region*, 23 May 2018, <https://www.government.se/49b8be/globalassets/government/dokument/statsradsberedningen/letter-of-intent--development-of-5g-in-the-nordic-region-.pdf>.

⁴⁹ Delphine Strauss, "Hammond Rejects US Calls for Harder Line on Beijing", in *Financial Times*, 17 June 2019, <https://www.ft.com/content/a2cba054-9125-11e9-b7ea-60e35ef678d2>.

to follow the US into a “trade or tech war” against China, claiming that, by virtue of its values of multilateralism and cooperation, “[France’s] perspective is not to block Huawei or any company”.⁵⁰ Overall, the European Commission has left the Union’s member states free to conduct their own risk assessments with a view to issuing a coordinated risk assessment by October 2019. As of 19 July 2019, 24 European countries have completed national risk assessments. Commissioner for the Security Union, Julian King, and Commissioner for the Digital Economy and Society, Mariya Gabriel, hailed members’ prompt response “to our call for concrete measures to help ensure the cybersecurity of 5G networks across the EU”. Additionally, they urged “all key players, big and small, to accelerate their efforts and join us in building a common framework aimed at ensuring consistently high levels of security”.⁵¹

4.2 Policy recommendations for Europe

Europe is still in search of its own way in which to deal with the need for modernising its technological infrastructure while protecting its security interests. Despite the progress made over the last few years, the EU has yet to solve a number of issues in order to build a competitive and protected 5G network. The Union should focus in particular on the following:

- *A common strategy for 5G technology development and deployment.* European countries should overcome their fragmented approach to both economic and security issues concerning 5G infrastructure. It is crucial that the EU institutes a single market for telecommunications, which includes a genuine mutualisation of R&D and an efficient alignment of major member states’ markets, as highlighted by CERRE, a Brussels-based think tank.⁵² Pooling and sharing knowledge, capabilities and capital would allow the Union to develop a credible and competitive 5G hub. In addition, the harmonisation of standards and legislation at the European level is fundamental to ensure the establishment of an efficient and competitive ecosystem, ready for the deployment of this new technology at the lowest cost possible.
- *Technological sovereignty.* The 5G race and the US–China trade-and-tech war together represent the perfect opportunity for the EU to invest in indigenous technology and support European tech champions. According to a study by the Institut Montaigne, a think tank in Paris, the EU urgently needs to lessen its overdependence on foreign suppliers in order to avoid the risk of remaining stuck

⁵⁰ Laurens Cerulus, “Macron: Blocking Huawei ‘Not Best Way to Defend National Security’”, in *Politico*, 16 May 2019, <https://www.politico.eu/article/macron-block-huawei-not-best-way-to-defend-national-security>.

⁵¹ European Commission, *Security of 5G Networks: EU Member States Complete National Risk Assessments*, 19 July 2019, https://europa.eu/rapid/press-release_STATEMENT-19-4266_en.htm.

⁵² Wolter Lemstra, Martin Cave and Marc Bourreau, *Towards the Successful Deployment of 5G in Europe: What Are the Necessary Policy and Regulatory Conditions?*, Brussels, Centre on Regulation in Europe (CERRE), 30 March 2017, <https://www.cerre.eu/node/770>.

in a Sino–American duopoly.⁵³

- *More investment.* The Boston Consulting Group, among others, has pointed to incentivising investment in 5G technology as a priority for Europe.⁵⁴ The EU has acknowledged the necessity of boosting investments in R&D in support of companies in the 5G services sector. The Digital Europe programme launched by the European Commission in June 2018 is a good starting point for strengthening the EU’s telecommunication industry. However, the overall approved budget of 9.2 billion euro for the period 2021–7 is not ambitious enough if European countries aim to compete efficiently with Chinese and US tech giants and develop indigenous technology.
- *Improve R&D.* As Colin Blackman and Simon Forge argue, the EU should improve its research efforts with a long-term perspective, not only to avoid lagging behind the US and China but also with the aim of facing the wellbeing and security issues that the new 5G technology implies.⁵⁵ MERICS, a China-focused think tank based in Germany, underlines the fact that China constitutes an opportunity for Europe to increase efficiency and resources in R&D, thanks to the multiple collaborations that Chinese firms are undertaking with European research centres.⁵⁶
- *Regulate Huawei’s participation in the implementation of 5G architecture.* Huawei technology will play a crucial role in the deployment of 5G in Europe in the short term. Therefore, banning its technology is not a good strategy for European countries, which would risk either falling behind their competitors or reinforcing their dependence on US components. At the same time, the EU cannot ignore the threat posed by such Chinese companies as Huawei and the allegations of enabling espionage. Chinese enterprises should be prevented from participating in the realisation of sensitive branches of the network where key data is more easily accessible. That was the rationale behind the choice by the UK to exclude Huawei from participating in the core 5G structure.⁵⁷ Additionally, it is important that European countries agree on a single approach towards Huawei as soon as possible. The German think tank MERICS suggests the creation of a “Europe-China Economic Strategy and Digital Futures Task Force” in order to help European member states elaborate a common China policy in the short term.⁵⁸

⁵³ Mathieu Duchâtel and François Godement, *Europe and 5G: the Huawei Case*, cit.

⁵⁴ Heinz Bernold et al., *A Playbook for Accelerating 5G in Europe*, Boston Consulting Group, 17 September 2018, <https://www.bcg.com/publications/2018/playbook-accelerating-5g-europe.aspx>.

⁵⁵ Colin Blackman and Simon Forge, *5G Deployment. State of Play in Europe, USA and Asia*, Luxembourg, European Parliament, April 2019, [http://www.europarl.europa.eu/thinktank/en/document.html?reference=IPOL_IDA\(2019\)631060](http://www.europarl.europa.eu/thinktank/en/document.html?reference=IPOL_IDA(2019)631060).

⁵⁶ Kristin Shi-Kupfer and Mareike Ohlberg, “China’s Digital Rise. Challenges for Europe”, cit.

⁵⁷ Peter Waldman, Sheridan Prasso and Todd Shields, “Another Reason U.S. Fears Huawei: Its Gear Works and It’s Cheap”, in *Bloomberg*, 24 January 2019, <https://www.bloomberg.com/news/articles/2019-01-24/huawei-stokes-u-s-fear-with-low-cost-networking-gear-that-works>.

⁵⁸ Kristin Shi-Kupfer and Mareike Ohlberg, “China’s Digital Rise. Challenges for Europe”, cit., p. 47.

• *Reinforcing cybersecurity and defence.* Chinese firms are not the only players capable of taking advantage of backdoors and loopholes in European 5G networks. The EU should enforce all European regulations in the field of cybersecurity – such as the Cybersecurity Act, which entered into force on 27 June 2019. Major improvements should be introduced into this regulation – like the imposition of common cybersecurity certification, which is currently pursued on a voluntary basis. According to MERICS, the EU should focus on the promotion of a joint approach to cybersecurity not only in the mobile-communications sector but in all sectors that will be involved in 5G architecture – especially the IoT.⁵⁹ By taking a firm stand on this issue, Western countries have already started to influence Beijing’s behaviour. Following the exclusion of Chinese companies from multiple 5G markets, China has started a veritable reassurance campaign to convince consumers and governments of its trustworthiness and of its sincere engagement in addressing their economic and security concerns. For instance, Huawei announced an investment of 2 billion US dollars to develop a dependable cybersecurity system.⁶⁰ Additionally, Chinese firms like ZTE are already cooperating with European countries in order to improve research on cybersecurity, as the new ZTE laboratory on cybersecurity in Rome demonstrates.⁶¹

Conclusion

The development of the new, fifth-generation telecommunications network has generated both expectations and concerns. On the one hand, the increasing digitalisation promised by 5G will create more efficiency. On the other, it will exponentially broaden the number of vulnerabilities in each sector in which these technologies will be introduced. Much of the entire global economy will inevitably be tied to the proper functioning of the network. If this reliance is not complemented by strong legal and technical guarantees, it will lead to an increase in the vulnerability of people, enterprises and even entire cities to coordinated attacks by groups of hackers or by intelligence agencies. The massive flow of data, distributed on different frequencies, risks intensifying the danger of damaged or unsafe connections, making the detection of malicious traffic more difficult.

The case raised by the US about Chinese producers’ trustworthiness has highlighted a problem of lack of confidence, which is intrinsic to this new type of technology and to its application to fields that may pose a risk not only for national security but also for citizens’ wellbeing.

⁵⁹ Ibid.

⁶⁰ Thomas Seal, “Huawei Is Planning a \$2 Billion Cybersecurity Reboot”, in *Bloomberg*, 7 December 2018, <https://www.bloomberg.com/news/articles/2018-12-07/huawei-is-said-to-prepare-2-6-billion-cybersecurity-reboot>.

⁶¹ “Zte battezza a Roma il primo Cybersecurity Lab d’Europa”, in *Corriere Comunicazioni*, 21 May 2019, <https://www.corrierecomunicazioni.it/cyber-security/zte-apre-a-roma-il-primo-lab-di-cybersecurity-in-europa>.

Therefore, the US–China clash represents the right occasion on which to urgently address growing cybersecurity issues, and China’s controversial role in the deployment of 5G technology and in the establishment of global standards. Nevertheless, the unilateral US strategy towards Chinese companies, based on tariffs and bans, risks being counterproductive as long as it is not shared by the United States’ allies. Europe’s more rational approach and its push towards a coordinated and multilateral strategy seems to be having a more positive and effective impact.

On one side, the race to 5G in Europe creates two main opportunities for the European Union. Firstly, member states can jointly put pressure on China to change its behaviour towards a tighter cooperation in fields that will be crucial for everyone in the foreseeable future. Secondly, the EU has the possibility of strengthening its own voice and sovereignty in the international arena, thereby lessening its dependence on the US. On the other side, this debate about China’s telco enterprises risks calling into question the relationship between two such historical partners as the US and European countries, leading to a potential rift between them to the benefit of China.

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Via Angelo Brunetti, 9 - I-00186 Rome, Italy

T +39 06 3224360

F + 39 06 3224363

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