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RSC PP 2021/02
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Europe and the US-China Tech War:
Enhanced Competition in the post-Trump Era

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ISSN 1830-1541

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Published in March 2021 by the European University Institute.
Badia Fiesolana, via dei Roccettini 9
I – 50014 San Domenico di Fiesole (FI)
Italy

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Abstract

The policy paper analyses the influence of the US-China tech war on Europe's ability to play a leading role in the economic, industrial, security and military sectors at global level. It is argued that Europe has the innovative industrial basis and the big companies to develop an autonomous cellular network and artificial intelligence solutions, provided EU member states focus on digital cooperation.

Keywords

Technology; artificial intelligence; United States; China; competition.

Highlights:

- Europe's economic growth, innovation and warfighting capability is determined by assessing access to cutting-edge cellular network infrastructure and artificial intelligence applications.
- Europe's weak position in the global technology market leaves it at a disadvantage in terms of standard setting and competitiveness.
- The United States and China will remain fierce tech competitors under US President Joe Biden, as they work to digitalise all major sectors of society to strengthen their influence on the economic, security and governance choices of other countries.
- Transatlantic agreement that protective measures are necessary against China's approach to digital infrastructure and artificial intelligence is growing. At the same time, Europe's tech sovereignty agenda contributes to enhanced transatlantic tensions.
- Europe has the innovative industrial base and the big tech companies to pursue increased digital autonomy from the United States and China.
- For fear of being left out, most companies accept short-term gains in exchange for the transfer of know-how, even if Europe suffers long-term economic losses and European companies lose competitive advantages.

Introduction: Europe's perspective in the US-China tech competition

When US President Donald Trump held office from January 2017 to January 2021, technology emerged as a major area of US-China strategic competition. Standards is one theme that is at the centre of strategic competition. Standards have established boundaries for technology usage, specifying the type of technology to be used and restricting access to technology outside these limits. There is a marked controversy over Huawei's potential use of network devices and telecommunications components to provide data access to the Chinese government, and over Facebook's use of its dominant market position. The lack of legislation regulating the collection of data from users have made this issue an urgent European concern. In 2018, the EU General Data Protection Regulation (GDPR) went into force, requiring private and public organisations to gain consent before using data and to protect the data in their possession. As artificial intelligence, which feeds on data, becomes a key driver of economic development, Europe is challenged to ensure competitiveness while shaping the conditions for the development and use of technology through instruments that honour the GDPR.¹ Data security for individuals and governments and the potential security challenges emanating from China's major involvement in US and European soft infrastructure became a salient theme of controversy and debate across major capitals in America and Europe. At the dawn of a fourth industrial revolution, network infrastructure and artificial intelligence will determine the relative economic and military power of states; in fact, there is general agreement that those powers who take the helm in these areas are also likely to be the leading global powers.

What is at stake in the US-China tech war? The emerging digital development facilitates phenomena such as smart cities, industrial digitalisation, virtual reality, autonomous cars and artificial intelligence. The realisation of these digital possibilities depends on the availability of stable and fast wireless connections. The fifth generation cellular network infrastructure, 5G, is a precondition of economic growth, innovation and modern warfare because it allows economies, societies and militaries to take advantage of these new possibilities. All the machines and devices that need to communicate with each other to implement digital possibilities such as telemedicine and robot soldiers require 5G to establish

¹ European Commission, "Digital Single Market: Policy: Artificial Intelligence", 4 July 2019, <https://ec.europa.eu/digital-single-market/en/artificial-intelligence>.

the so-called Internet of Things. The 5G network is 10 to 100 times faster than the 4G network. In addition, increased bandwidth in 5G allows for more connected devices operating at the same time and acting in concert. Finally, low latency, the expected decrease in lag time in communications between devices and servers, allows for the near-instantaneous communication necessary for technologies such as autonomous cars. Many of the possibilities opening up with 5G may not be realised until the advent of 6G, which is expected to be the end of the smartphone era.

This article first examines the American and Chinese advantages and drawbacks in the ongoing tech war, discussing the initiatives taken on both sides to ensure their leading roles in digitalisation of the economic, technological, societal, security and military sectors of the world. The second section examines Europe's response to the US-China tech war. Finally, the conclusion discusses the best route for Europe to take to maintain a strong position in the technological competition and hence, to ensure that the region remains a global force to be reckoned with.

US and Chinese advantages and drawbacks in the tech war

The United States and China host 79 per cent of the world's most valuable tech companies.² Europe's weak position in the global technology market leaves it at a disadvantage in terms of both standard setting and competitiveness. Due to government incentives and policies, the strategic sectors of US technology industry, such as telecommunications, are basing their long-term strategic plans on balkanisation, relying on regionalised supply chains that decrease economic and technological interdependence between the United States and China.³ The United States has adopted punitive measures against Chinese tech companies, for example, denying them access to necessary supplies from the United States, thus forcing the companies to restructure their supply chains. This process has hastened China's tech indigenisation and its growing reliance, as a more mature economy, on its own domestic market. At the fifth plenary session of the nineteenth Central Committee of the Communist Party of China held in 2020, top party officials announced the elevation of the role of the domestic market and homegrown technologies in China's social and economic development, with emphasis on self-reliance in core technologies.⁴ It may take years for Chinese companies to match foreign companies in advanced tech sectors, and perhaps even in basic manufacturing and design expertise. At present, China imports more than US\$300 billion worth of integrated circuits every year and Chinese semiconductor developers rely on US-made chip design tools and patents. In November 2020, China launched new anti-monopoly draft rules that limit over-concentration of user data and algorithms by the country's big tech companies such as Tencent and Alibaba. These are crucial to leveraging artificial-intelligence applications. The anti-monopoly rules are intended to nurture homegrown innovation and limit the influence of Chinese tech giants.⁵ In December 2020, a new Chinese export control law came into force, providing the country with the first comprehensive regulatory framework for restricting exports of controlled goods for national security and public policy reasons. The law encompasses areas such as sensitive technology, military goods, and dual-use items. The law also allows for retaliatory measures against countries that abuse export controls to harm China's interests and national security.⁶ In addition, in January 2021

² Casper Klynge, "Tech Diplomacy", Ministry of Foreign Affairs (Denmark), 3 September 2019.

³ Off-the-record briefing with a chief technology officer, retired in 2020, at a major US telecommunications company, Hudson Institute, Washington, D.C., 29 April 2019.

⁴ Chen Qingqing and Shen Weiduo, "Honor sell-off 'warning bell' to tech sector amid US political crackdown", *Global Times*, 17 November 2020, <https://www.globaltimes.cn/content/1207162.shtml>.

⁵ "Crackdowns Everywhere Show Xi Strengthening Party Grip on China", *Bloomberg News*, 17 November 2020, <https://www.bloomberg.com/news/articles/2020-11-16/crackdowns-everywhere-show-xi-strengthening-party-grip-on-china>.

⁶ Sidney Leng, "China tightens export rules for sensitive tech, boosts power to retaliate against foreign sanctions", *South China Morning Post*, 1 December 2020, <https://www.scmp.com/economy/article/3111972/china-tightens-export-rules-sensitive-tech-boosts-power-retaliate-against>.

China's Ministry of Commerce issued the Rules on Counteracting Unjustified Extraterritorial Application of Foreign Legislation and Other Measures as protection against the extraterritorial application of foreign laws where these, in Beijing's view, harm the interests of the Chinese state or Chinese nationals or companies.⁷

Punitive US measures have had adverse effects on China's tech industry. However, in the United States there is also general agreement among industry representatives and policy-makers that a constructive strategy that allows the United States long-term global technological leadership is the only way to maintain a leading role in the tech race. There is consensus in the United States that achieving a competitive edge on the standards and key components of 5G infrastructure will allow for industry and application dominance and for the permeation of governance structures, although uncertainty prevails as to how to achieve this objective. Consensus has so far only been reached on how to slow down Chinese companies such as Huawei.⁸

China is already working to try to get a head start on 6G network infrastructure. The country is focusing on shaping 6G in accordance with authoritarian norms of control. In November 2019, the Ministry of Science and Technology, together with six other ministries in China, organised a 6G technology research and development conference in Beijing. On this occasion, a national 6G technology research and development group and an overall expert group were established. China aims to form 6G overall development ideas in 2020. Manufacturers such as China Mobile and Huawei have stated that research on 6G technology is already taking place internally in their companies. At the International Telecommunication Union (ITU), China is actively engaged in influencing the future standards for 6G, which have not yet been determined.⁹

In building the 5G network which is currently rolled out across the world, China has some advantages. For example, the country is competitive in spectrum-sharing technologies and radio hardware. Although companies such as Nokia and Ericsson provide alternatives to these, they lag behind Huawei in terms of research and development. According to some analysts, the United States is helped by remaining competitive in network architecture such as virtualised networks and in cloud computing. These areas have been developed by major companies, such as Amazon and Microsoft. Importantly, the heart of the US tech industry is semiconductors, and semiconductors form the centre of any digital system. For now, China has negligible cutting-edge semiconductor fabrication and hence remains heavily dependent on overseas supplies, mainly from the United States and Taiwan.¹⁰ Moreover, Chinese 5G products have limitations. For example, Huawei offers a highly integrated hierarchical solution which makes advanced functions available to all users. Thus, there may be a vacuum for numerous lower end users who require less functions and prefer a cheaper price. The US Congress is processing legislation that is intended to encourage networking and cloud specialists to work together to develop an open radio access network (RAN) ecosystem with many providers and to pioneer the development of what many in the tech industry see as the 5G infrastructure of the future.¹¹ However, it

⁷ Freshfields Bruckhaus Deringer, "China Issues Blocking Rules", *Lexology*, 11 January 2021, China Issues Blocking Rules - Lexology.

⁸ Drew FitzGerald and Sarah Krouse, "White House Considers Broad Federal Intervention to Secure 5G Future", *The Wall Street Journal*, 25 June 2020, White House Considers Broad Federal Intervention to Secure 5G Future - WSJ.

⁹ "International Telecommunication Union launches 6G research", *cnTechPost*, 3 March 2020, <https://cntechpost.com/2020/03/03/itu-launches-6g-research/>.

¹⁰ Mathieu Duchâtel, "The Weak Links in China's Drive for Semiconductors", *Policy Paper*, Paris: Institut Montaigne, January 2021, <https://www.institutmontaigne.org/en/publications/weak-links-chinas-drive-semiconductors?&extc=MQP94iZ>; Rob Spalding, "Heart to Heart: How the U.S. and Taiwan Can Save the Chip Industry From China", *Real Clear Defense*, 12 November 2020, https://www.realcleardefense.com/articles/2020/11/12/heart_to_heart_how_the_us_and_taiwan_can_save_the_chip_industry_from_china_583796.html.

¹¹ Bryan Clark, speaker at "Creating an American 5G Advantage", video event, Washington, D.C.: Hudson Institute, 13 November 2020, <https://www.hudson.org/events/1888-video-event-creating-an-american-5-g-advantage112020>.

remains to be seen if this approach can compete with the technologically advanced solutions of Huawei, Nokia and Ericsson.

China has gradually increased its role in international standard-setting forums to promote its technology norms. China's technology serves its authoritarian regime by allowing for comprehensive social control. This technology is sold to other authoritarian regimes, hence influencing international tech standards in ways that are detrimental to liberal civil and human rights norms. For example, Huawei's Safe City technology involves all-seeing artificial intelligence which collates all sources of information, including surveillance cameras and electronic communications. This data can be used to predict human behaviour and intervene in the prevention of crime as defined by the regime. For the citizens, it means that there is nowhere to hide, and hence the technology is a useful tool for authoritarian governments aiming to control the movements and interactions of their populations.¹² Rumours that China is considering the establishment of an Asian standard organisation – which would be available to Asian partners of China's version of a global economic order, the Belt and Road Initiative – is another indication that global standards may not have a future. Alternatively, standards may develop in a direction that renders them irrelevant for the United States, Europe, and other liberal democracies alike because they will increasingly be based on authoritarian norms of governance.¹³ This development would leave Europe with little influence on standard setting, which is an area of major importance for economic growth and security because those countries and companies that determine technological standards do so according to their own technological strengths and their ideas of a desirable model for state-society relations.

The signing of the Regional Comprehensive Economic Partnership (RCEP) agreement in November 2020 may increase incentives to establish Chinese-led technology standards, although ratification and liberalisations will take years. The RCEP is an Asian-led initiative that has been a long time in the making. It encompasses the ten member states of the Association of South-East Asian Nations (ASEAN) and Australia, China, Japan, New Zealand and South Korea. The pact formalises rather than remakes business between the member states. It signals that Asia will not wait around for the United States to get its house back in order while Biden re-commits to multilateral agreements and free trade. The RCEP eliminates tariffs mainly for goods that already qualify for duty-free treatment under existing free trade agreements. It allows countries to keep tariffs for imports in sectors they regard as especially important or sensitive. The pact's so-called rules of origin will set common standards for how much of a product must be produced within the region for the final product to qualify for duty-free treatment. These rules could make it simpler for companies to set up supply chains that span several countries. The RCEP has little impact on legal work, accounting or other services that cross borders, and it does not venture far into the often-divisive issue of ensuring greater intellectual property protections. The RCEP also skirts broad issues such as protecting independent labour unions and the environment or limiting government subsidies to state-owned enterprises. The RCEP gives foreign companies enhanced flexibility in navigating between the United States and China, increasing the value of operating within the Asian region and bypassing the United States.¹⁴

The signing of the RCEP positions Asia as the economic powerhouse of the world at a time when China looks set to come out of the Covid-19 crisis far better than the United States and Europe with the resumption of surging economic growth rates in the second half of 2020. To make matters worse from a US and European perspective, the RCEP free trade area ignores the concerns that Europe and the

¹² Lindsay P. Gorman, "A Future Internet for Democracies: Contesting China's Dominance in 5G, 6G, and the Internet-of-Everything", Washington, D.C.: Alliance for Securing Democracy: German Marshall Fund, 2020, pp. 8-9.

¹³ Björn Fagersten and Tim Rühlig, "China's Standard Power and Its Geopolitical Implications for Europe", Swedish Institute of International Affairs, Brief, no. 2, 2019, <https://www.ui.se/globalassets/ui.se-eng/publications/ui-publications/2019/ui-brief-no.-2-2019.pdf>.

¹⁴ Keith Bradsher and Ana Swanson, "China-Led Trade Pact Is Signed, in Challenge to U.S.", *The New York Times*, 15 November 2020, <https://www.nytimes.com/2020/11/15/business/china-trade-rcep.html>.

United States have regarding Chinese economic industrial and trade practices, making it even harder to standardise world economic interaction, such as intellectual property protection and limitations on government subsidies and state-owned enterprises. Although it will take years to roll out the RCEP, it is likely to encourage China to take the lead in establishing technological supply chains and standards that focus on the subscribers to China's vision of a global economic order. Alongside this, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) has been pushed forward by Japan. China is not yet a member of this initiative, which would require China to liberalize its economy considerably. The CPTPP is more ambitious in scope than RCEP and may challenge China's ability to dominate supply chains and set standards, especially if the United States signs up.

The US-China tech war is not merely about economic and industrial leadership. The security and military realms are equally affected. China seeks to control the development of its technology sector so as to bolster its military. China has applied a top-down approach to developing cutting-edge technologies with military applications. Chinese President Xi Jinping launched the Central Commission for Integrated Military and Civilian Development in 2016 with the objective of developing dual-use technology and integrating existing technology for the benefit of the People's Liberation Army (PLA).

China's efforts to militarise its technology base have huge costs in terms of time and expenses. Western institutions and companies may ultimately contribute to the PLA's development without knowing it since China's opaque civil-military integration system involves numerous contractors, subcontractors, academic institutions and semiprivate investment institutions.¹⁵ The efforts to foster military technological innovation are accompanied by a broadening of China's strategic approaches to allow China to become a global leader in military technological innovation. Xu Qiliang, vice-chairman of the Central Military Commission, announced in 2020 that China's five year development plan for the military is to surpass and accelerate the transition from passively adapting to war to actively designing how war is fought; that requires an innovative PLA. This strategic guidance implies that in coming years, the PLA intends to introduce disruptive or invasive innovation through new technologies such as artificial intelligence, autonomous systems, hypersonic missiles and space warfare at a faster pace than that of the United States. China has already boosted research and development spending to produce advanced sixth-generation fighter jets, high-energy weapons like laser and rail guns, quantum radar and communications systems, new stealth materials, autonomous combat robots, orbital spacecraft, and biological technologies such as prosthetics and powered exoskeletons. All these initiatives have helped China to become the strongest rival of the United States in cutting-edge military technologies such as artificial intelligence and quantum computing.¹⁶ A good indicator of China's progress in military innovation is its combat aircraft development. Compared to Russia, China has spearheaded the development of sensors, datalinks, weapons, and low-observable technology, arguably leaving Russia with an advantage only in aircraft engines. Some analysts conclude that over the course of the 2020s, we are likely to see Russia importing sensor and missile technology from China.¹⁷

In response, the United States has attempted to limit the access of Chinese students and researchers to domestic science and technology programs. Washington has also tightened export controls and restrictions on Chinese investments in US tech companies. In August 2020, Washington announced that it is blocking the use of any US technology in microchips powering Huawei's smartphones and networking equipment. From 15 September 2020, the United States limited supplies of high-end chipset supplies to Huawei. Huawei has stated that ultimately, it is Europe's and the world's consumers that

¹⁵ Anja Manuel and Kathleen Hicks, "Can China's Military Win the Tech War?", *Foreign Affairs*, 29 July 2020, <https://www.foreignaffairs.com/articles/united-states/2020-07-29/can-chinas-military-win-tech-war>.

¹⁶ Kristin Huang, "As China's military confidence grows, it's now looking to 'design' how war is fought", *South China Morning Post/yahoo!news*, 12 November 2020, <https://sg.news.yahoo.com/china-military-confidence-grows-now-101408180.html>.

¹⁷ Greg Waldron, "China surpassing Russia in airpower technology: RUSI", *Flight Global*, 10 November 2020, <https://www.flightglobal.com/defence/china-surpassing-russia-in-airpower-technology-rusi/141053.article>.

will suffer due to the US decision, which could cause Huawei to run out of stocked components in early 2021. The punitive measure has led Huawei to announce the sell-off of its mid-range smartphone brand 'Honor' in November 2020. The decision will allow 'Honor' to buy supplies that Huawei cannot access.¹⁸ In November 2020, US President Trump announced an executive order, prohibiting American investments in Chinese companies that are owned or controlled by the Chinese military. The order is designed to deter financial capital such as US investment firms and pension funds from buying and selling shares of thirty-one Chinese companies that were identified by the US Department of Defense to be backed by the Chinese military earlier in 2020. The order could impact some of China's biggest companies, including telecoms firms China Telecom, China Mobile and surveillance equipment maker Hikvision.¹⁹ This tough US approach is likely to be continued by Biden.

In addition to the punitive approach, the United States is adopting a more proactive response by promoting partnerships between the US Department of Defense and cutting-edge private tech companies to foster service-specific military innovation and conduct experiments such as the Defense Innovation Unit and the Defense Digital Service. These efforts have so far been a success and such initiatives can be expected to be expanded in future. The United States has also started to invest federal money in research and development of critical technologies such as quantum computing, synthetic biology, semiconductors and military-use artificial intelligence.²⁰ Biden's focus on fostering manufacturing and encouraging innovation in his Build Back Better plan for US economic recovery implies that his administration is likely to continue these efforts.²¹

Today, the United States and China are fierce tech competitors in their attempts to digitalise all major sectors of society. Each seeks technological development sufficient to position that country as the principal global power. Each angles to strengthen its influence on the economic, security and governance choices of other countries. In the following section, this policy paper discusses where this tech race leaves Europe and the initiatives Europe is taking to remain at the front end of the digital era.

Europe's response to the US-China tech war: An industrial and technological policy for Europe?

The US-China dispute over Huawei illustrates Europe's vulnerability in the tech war. In May 2019, the United States took retaliatory action against Huawei, warning that Chinese state-owned companies are legally obliged to share information of importance to state security with the Chinese government. The US government understood Chinese technology through thick security lenses and therefore embarked on an overseas campaign against the inclusion of Chinese technology in strategic sectors, such as telecommunications.²² Compared to the United States, Europe has taken a more mixed approach to Huawei. Huawei equipment has already been incorporated into the 4G networks of numerous European countries. In 2018, Huawei controlled more than 40 per cent of the European base-station market, surpassing the market shares of the European companies Nokia and Ericsson.²³ Huawei has ongoing

¹⁸ Chen Qingqing and Shen Weiduo, "Honor sell-off 'warning bell' to tech sector amid US political crackdown", *Global Times*, 17 November 2020, <https://www.globaltimes.cn/content/1207162.shtml>.

¹⁹ "Trump Administration Bans US Investments in Firms Linked to Chinese Military", *Reuters/Voice of America*, 12 November 2020, <https://www.voanews.com/east-asia-pacific/voa-news-china/trump-administration-bans-us-investments-firms-linked-chinese>.

²⁰ Anja Manuel and Kathleen Hicks, "Can China's Military Win the Tech War?", *Foreign Affairs*, 29 July 2020, <https://www.foreignaffairs.com/articles/united-states/2020-07-29/can-chinas-military-win-tech-war>.

²¹ Jennifer Epstein, "Biden Offers 'Build Back Better' Plan to Revive Economy", *Bloomberg*, 9 July 2020, <https://www.bloomberg.com/news/articles/2020-07-09/biden-offers-build-back-better-approach-to-reviving-economy>.

²² Giulio Pugliese, "Italy and China: Much Ado About and MoU", *East Asian Policy*, 12:4, 2020, pp. 73-89 (pp. 83-84).

²³ Minoru Satake, "Europe Adopts Huawei Gear into 5G Networks over U.S. Objections", *Nikkei Asian Review*, 16 May 2019, <https://asia.nikkei.com/Spotlight/5G-networks/Europe-adopts-Huawei-gear-into-5G-networks-over-US-objections>.

contracts to provide telecoms gear for 4G networks in all but one EU country: Slovakia. In January 2020, the EU member states agreed to reduce their dependency on Chinese equipment for 5G networks. However, European capitals have differed in their reading of how urgent it is to implement this decision. Countries such as Britain and France have committed to phasing out Huawei equipment later in the 2020s, whereas Germany has not yet adopted an official position.

Adding insult to injury, the US decision to block the use of US technology in microchips powering Huawei's smartphones and networking equipment not only dealt a hard blow to Huawei supplies and plans for new product launches, but also to European telecoms operators, which were locked into contracts with the Chinese telecoms giant. The decision can also jeopardise Europe's own telecoms networks, ramping up costs and creating delays to the implementation of 5G networks in Europe. US President Biden is not likely to ease the hardline approach to China in the technology sphere since there is bipartisan support in Congress for a tough trade and tech policy towards China. Hence, operators with Huawei contracts face a choice. They can maintain contracts with Huawei for future 5G networks, assuming that the company can restructure its supply chain and that European governments will continue to take a relaxed approach to Chinese tech companies. Alternatively, they can opt for a safer but costlier supplier such as Nokia or Ericsson, one that does not face the same challenges to its supply chain. Either way, delays and additional costs for deploying 5G kit in Europe is a likely outcome, putting Europe even further behind economic rivals when it comes to getting 5G networks up and running.²⁴ This development has underscored the need for an EU approach that carries sufficient weight to enable Europe to compete with the United States and China.

Export controls are central to Europe's role in the US-Chinese economic competition, since export controls are closely connected to the technological standards on which export licenses are based. Technological standards regulate data protection and access and hence also determine which entities can get a license to be involved in sensitive sectors with dual-use technology and patented intellectual property. Export controls highlight the weakness of existing EU regulatory mechanisms at a time when Europe shares US concerns about Chinese forced technology transfers and intellectual property theft. Export controls limit the spread and use of specific goods and services for purposes of national security; export controls are also aimed at eschewing a potentially repressive end use and the diversion of those goods and services. Regional and national export control regimes are challenged by technological developments. Intangible technology transfers occur in the form of foreign direct investments, mergers and acquisitions, research and education cooperation, and the transfer of data in non-physical forms. These transfers have helped China's arms industry, for example, compete with more established arms exporters on global markets. The key question for Europe is to what extent the EU should build more restrictive export controls for European industry and research and development at a time when Europe is already facing serious issues of competitiveness in the technology industry as a result of the growing US-China rivalry.

US-China tech rivalry poses a challenge to Europe which relies on global standards and markets. The escalating rivalry looks set to continue under Biden, which will encourage the EU to put regional interests first, diversifying its portfolio of partners and facilitating regional collaboration on an industrial and technological policy that would make Europe more self-reliant and competitive. It should be noted that on industrial policy, the EU performs an advisory role, with some powers of enforcement toward the member states, making it harder for the EU to act as a unified bloc. China has implemented its version of global economic order: the Belt and Road Initiative, with negligible European participation in the process. Although the majority of EU member states have signed a Belt and Road Initiative memorandum of understanding, these are for the most part pro forma with no practical consequences.

²⁴ Laurens Cerulus, "Europe's 5G plans in limbo after latest salvo against Huawei", *Politico*, 23 August 2020, <https://www.politico.eu/article/europe-5g-plans-in-limbo-after-latest-salvo-against-huawei/>; Achour Messas et al., "5G in Europe: Time to Change Gear!", *institut Montaigne*, May 2019, <https://www.institutmontaigne.org/ressources/pdfs/publications/5g-europe-time-change-gear-part-1-note.pdf>.

Some Chinese practices such as intellectual property theft, forced joint ventures and unfair competition due to state subsidies demonstrate that that country is a strong economic competitor to the EU, in the pursuit of technological leadership.

The unfair advantages of Chinese industrial giants such as Huawei has sparked a debate in Europe about how to ensure competitiveness. The EU Commission's ten action points that include industrial policies to protect member states against the downsides of Chinese economic practices provide a platform of knowledge and networking that is intended to facilitate cooperation on defining best practices when entering into investment arrangements with Chinese actors.²⁵ In January 2020, EU member states adopted the EU Toolbox for 5G Security and EU Toolbox of Risk Mitigation Measures for cybersecurity of 5G networks that provide guidance on holistic ventures, including high risk vendors and potential mitigations.²⁶ The EU leaves it up to individual member states to implement the toolkit as they see fit.

In November 2020, in the face of mounting US pressure the UK government introduced legislation to tighten investment screening against Chinese efforts to gain access to cutting-edge technologies and thereby create vulnerabilities in the UK's critical infrastructure. Some European countries, such as France, already have similar investment screening mechanisms in place.²⁷ In July 2020, France moved to phase out Huawei by restricting the renewal of Huawei licenses once they expire, a decision which amounts to a de facto exclusion by 2028. Conversely, in the fall of 2020, Chancellor Merkel's cabinet in Germany considered legislation that, if passed, defines trustworthy suppliers so vaguely that in practice it is unlikely to force operators to phase out Huawei equipment.²⁸ Poland is considering legislation that would restrict the new purchase of Huawei equipment, but will not require that Huawei be removed from 4G networks.²⁹ Sweden and Estonia have opted for a case-by-case approach to Chinese firms that involve security services, and Spain has started to reduce the Huawei kit for its core 5G network while maintaining it for the peripheral radio equipment. Since 2019, Italy's defence mechanisms on foreign investment screenings and 5G technology are among the strictest in Europe, creating significant barriers for Huawei 5G implementation. However, the Italian government has left the door ajar for potential openings at the international political level, pending a decision in Germany and the approach to investment screening of the Biden administration.³⁰

Irrespective of European countries' response to Huawei, one unresolved issue is how to balance competitiveness regionally and globally if Europe intends to remain a leading industrial and technological force. Mergers must be allowed to ensure that European companies are sufficiently sizeable to enjoy economies of scale that allow them to compete with gigantic US and Chinese companies with major financial resources in the technological sphere. On the other hand, the concern for global European competitiveness must be balanced by the concern not to violate European consumer interests in maintaining multiple European companies in any given manufacturing and service sector to

²⁵ European Commission, "EU-China - A Strategic Outlook", 12 March 2019, <https://ec.europa.eu/commission/sites/beta-political/files/communication-eu-china-a-strategic-outlook.pdf>.

²⁶ European Commission, "Secure 5G networks: Questions and Answers on the EU toolbox", Brussels, 29 January 2020, file:///C:/Users/lodga/Downloads/Secure_5G_networks__Questions_and_Answers_on_the_EU_toolbox.pdf.

²⁷ Department for Business, Energy & Industrial Strategy and the Rt Hon Alok Sharma MP, "Press release: New powers to protect UK from malicious investment and strengthen economic resilience", 11 November 2020, <https://www.gov.uk/government/news/new-powers-to-protect-uk-from-malicious-investment-and-strengthen-economic-resilience>.

²⁸ Noah Barkin, "Watching China in Europe – December 2020", *GMF Asia Program Newsletter*, 1 December 2020.

²⁹ Lindsay P. Gorman, "A Future Internet for Democracies: Contesting China's Dominance in 5G, 6G, and the Internet-of-Everything", Washington, D.C.: Alliance for Securing Democracy: German Marshall Fund, 2020, p. 16.

³⁰ Giulio Pugliese, "Italy and China: Much Ado About and MoU", *East Asian Policy*, 12:4, 2020, pp. 73-89 (pp. 84-85).

ensure reasonable price levels and long-term industrial interests that allow innovative start-up companies to enter European markets.³¹

Europe recognises that the issue of standards will be key to the development of new technologies. The lack of unified EU rules brings additional costs to companies and constitutes a security problem. In 2019, the president of the European Commission, Ursula von der Leyen, pledged that upgrading safety and liability rules for the development of digital platforms, services, and products and for the completion of the EU's proposed digital single market – which would eliminate internet barriers within the bloc – is a priority. In attempting to standardise the patchwork of national regulations, the EU intends to put particular emphasis on regulating artificial intelligence by harmonising rules across the bloc and creating a dedicated regulator to ensure oversight and enforcement.³²

Negotiations for a comprehensive EU-China agreement on investments that have been ongoing since 2013 were concluded in December 2020 in principle, awaiting ratification by 2022. The agreement is seen as 'a key tool in rebalancing investment relations and in securing fair and equal treatment for EU companies operating in China', also in the technological sector.³³ The EU-China Comprehensive Agreement on Investment (CAI) includes EU market access to the Chinese telecoms equipment sector and EU access to invest in Chinese sectors such as cloud services. In the sectors covered, China will no longer be able to prohibit access or introduce new discriminatory practices. The agreement also commits signatory parties to increase transparency regarding subsidies to Chinese state-owned enterprises, prohibits forced technology transfers and other distortive practices, and secures European companies' access to Chinese standard setting bodies.³⁴ The conclusion of the EU-China CAI signals to the United States that Europe will continue to use diplomatic instruments and its economic power, combined with a watchful eye on China's willingness to honour agreements, to provide incentives for China to change what is seen as illicit economic and industrial practices rather than comply with US preferences on how to deal with the problematic aspects of China's international behaviour. In December 2020, the EU also published an ambitious transatlantic agenda, calling for US-EU economic coordination to deal with China.³⁵ In 2019, an EU investment screening system entered into force. Chinese acquisitions in strategic sectors, such as semiconductors, robotics, and aerospace, have helped promote European unity on the need for screening Chinese investments in particular.³⁶ The screening system affects intangible technology transfers as well as China's targeting of Europe to acquire control over European undertakings that may have repercussions for critical technologies, infrastructure, or sensitive information.³⁷ Although this leaves out export controls in areas such as education and research, it is a promising beginning to the restructuring of EU-China relations in a way that takes the competitive elements seriously. Altogether, these European initiatives are intended to provide reassurance to the United States that Europe is equally concerned about Chinese industrial and market economic practices.

³¹ Konstantinos Efstathiou, "The Alstom-Siemens Merger and the Need for European Champions", Bruegel, 11 March 2019, <https://bruegel.org/2019/03/the-alstom-siemens-merger-and-the-need-for-european-champions>.

³² Valentina Pop, "No Relief for Big Tech under New EU Leadership", *The Wall Street Journal*, 2 September 2019, <https://www.wsj.com/articles/no-relief-for-big-tech-under-new-eu-leadership-11567428651>.

³³ European Commission, "EU-China - A Strategic Outlook", 12 March 2019, <https://ec.europa.eu/commission/news/eu-china-strategic-outlook-2019-mar-12-en>.

³⁴ European Commission, "EU and China reach agreement in principle on investment", *Press Release*, 30 December 2020, Brussels, EU and China reach agreement in principle on investment (europa.eu).

³⁵ European Commission, "EU-US: A new transatlantic agenda for global change", *Press Release*, 2 December 2020, https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2279.

³⁶ Mathieu Duchâtel, "EU-China Relations Face a Bumpy Road in the Year Ahead", *South China Morning Post*, 5 January 2019, <https://www.scmp.com/news/china/diplomacy/article/2180817/eu-china-relations-face-bumpy-road-year-ahead>.

³⁷ "Regulation (EU) 2019/452 of the European Parliament and of the Council of 19 March 2019 Establishing a Framework for the Screening of Foreign Direct Investments into the Union", *Official Journal of the European Union*, 19 March 2019, <https://eur-lex.europa.eu/eli/reg/2019/452/oj>.

They also demonstrate that Europe's methods for dealing with this concern are different from the heavy-handed US approach.

The EU's industrial policy initiatives address long-standing complaints in European business communities that Brussels has not offered guidelines for proper conduct regarding investment agreements with China. Companies focus on making a profit, and the Chinese market is attractive. For fear of being left out, most companies accept short-term gains in exchange for the transfer of know-how, even if Europe suffers long-term economic losses and European companies lose competitive advantages as a result.³⁸ It remains to be seen whether Chinese and European businesses comply with the EU's industrial policy guidelines. This will partly depend upon the member states' adoption of legislation that reflects EU recommendations, and partly on the EU's ability to develop coherent and enforceable regulations. Recent developments indicate that, although Europe may have a long way to go before its industrial policies offer sufficient protection against illicit Chinese business practices, progress has been made.

An additional cause for hope that progress can be made is the leaders' joint communiqué at the second Belt and Road Initiative Forum held in April 2019. It stressed the importance of debt sustainability, environmental sustainability and the rule of law.³⁹ At the inaugural forum two years earlier, Beijing was not willing to adopt such language, despite the fact that doing so might have persuaded the EU to endorse the Belt and Road Initiative.⁴⁰ China is known to be long on words and short on actions when it comes to committing to demands that are not aligned with its interests and practices. Nevertheless, widespread criticism of China's Belt and Road Initiative practices and cancellations of projects could ensure greater future compliance with such agreements.

Europe is also adopting offensive mechanisms to address the challenges posed by the Belt and Road Initiative. The 2018 Europe-Asia connectivity plan offers alternatives to China's model for global economic growth and development across a wide range of security, trade and cultural issues.⁴¹ Although it is too early to assess its effects, the plan complements similar initiatives from the United States, which launched the Indo-Pacific infrastructure initiative in 2018, and from Japan, which established the Partnership for Quality Infrastructure Initiative in 2015. Multiple liberal alternatives to the Belt and Road Initiative are arising, increasing the likelihood of greater Chinese compliance with standards that Europe considers preconditions for economic cooperation. Europe and the United States largely agree on the substance of their responses to illicit Chinese trade, investment and industrial practices. However, growing US willingness to question the benefits of multilateral regulatory standards has prompted the emergence of independent European responses to China's challenges. These responses are founded on conditional cooperation with China rather than the US model of competing with China across the board.

Both Europe and the United States have adopted policies intended to challenge the problematic aspects of China's approach to digital infrastructure and artificial intelligence, although the European approach is more open to continued but guarded cooperation with China. However, transatlantic agreement that China's tech strategies entail economic, industrial, political, security and military challenges to the existing principles of a liberal world order based on freedom and transparency does not mean that transatlantic relations look set to be dominated by coordination to achieve common objectives in the technological realm. On the contrary, tensions between Europe and the United States

³⁸ Author's interview with a Danish executive officer from the Danish Industry Association", Copenhagen, November 2018.

³⁹ "Joint Communiqué of the Leaders' Roundtable of the 2nd Belt and Road Forum for International Cooperation", Ministry of Foreign Affairs of the People's Republic of China, 27 April 2019, https://www.fmprc.gov.cn/mfa_eng/zxxx_662805/t1658766.shtml.

⁴⁰ Mathieu Duchâtel, "China's Flexibility on Display at the Belt and Road Forum", Institut Montaigne, 25 April 2019, <https://www.institutmontaigne.org/en/blog/chinas-flexibility-display-belt-and-road-forum>.

⁴¹ European Commission, "Connecting Europe and Asia: Building Block for an EU Strategy", 19 September 2018, https://eeas.europa.eu/headquarters/headquarters-homepage/50724/connecting-europe-and-asia-building-blocks-eu-strategy_en.

have been on the rise in the digital area in late 2020, and Biden's presidency is unlikely to fundamentally change the dynamics of a relationship marked by growing differences over technological issues.

One major argument has arisen over the National Security Agency (NSA) within the US Department of Defense. This national-level intelligence agency has been conducting major surveillance, using soft infrastructure to gather data that violates the European GDPR by means of secret agreements with European intelligence agencies that had been approved by national European governments. In the United States, legislation is now considered in Congress to allow for greater public scrutiny of the NSA and to curb the agency's ability to, for example, hold bulk telephone data. The US position that a multi-stakeholder model which encompasses allies and partners can be used for the future internet has been challenged by these revelations, emphasising the movement towards a balkanisation of the internet despite the huge costs involved in this development. Swing states in Asia, America, Africa and Europe are less inclined to caucus with the United States on this issue, undermining the US ability to repair transatlantic relations regarding the future development of the internet.⁴²

Europe's plans for digital taxes and the collapse of a transatlantic data protection agreement have contributed to transatlantic tensions over the way ahead for a digital infrastructure. Europe's so-called tech sovereignty agenda which involves reining in the power of US tech giants such as Google, Facebook and Amazon to facilitate the emergence of European competitors further deepens the divisions. France has taken the lead in arguing that tech companies in the United States avoid paying their fair share of taxes. So far, Europe has not had much luck constraining the US tech giants. France gave in to US threats of retaliatory tariffs and renounced its plans to start collecting digital services tax in 2020. Moreover, the legal processes in Europe take too long. For example, the European search engine Kelkoo was long gone when it won a case about unfair competition against Google in 2017. The first case of unfair competition raised against Google in 2010 has not yet been concluded. And sometimes the tech giants win against the EU. In the summer of 2020, the European Court of Justice overruled an enormous tax bill for Apple.⁴³

Despite the bleak EU track-record in curbing the power of US tech giants, Washington claims that Europe's position on digital taxes unfairly punishes US tech companies and hence the action will trigger retaliatory tariffs. The EU's actions to keep data at regional level and away from cloud storage providers such as Amazon and Microsoft have caused great concern in the United States. US voices on the democratic side points to the possibility of offering Europe safeguards on surveillance to meet Europe halfway on the issue of data privacy. Such an agreement might be approved under Biden's presidency, but it is unlikely to satisfy Europe to an extent that will end the disagreement over data privacy and transatlantic data flows. Transatlantic agreement that there is a need for defining international standards for artificial intelligence is unlikely to mend fences or have a huge impact on digital developments, given the reality that cellular network infrastructure and artificial intelligence are closely connected issues. And the European Commission's launch in December 2020 of the legislation proposals the Digital Services Act and the Digital Markets Act, which are intended to improve law enforcement against intermediate platform providers and prevent them from preferential treatment to exclude competition,⁴⁴ is certain to exacerbate transatlantic tech disagreements. Worryingly, a digital-first trade war and divergent views on the idea of a free and open internet between Washington and Brussels will

⁴² Meredith Broadbent, "Internet or Splinternet? The Consequences of European Tech Sovereignty", *Commentary*, 10 August 2020, Washington, D.C.: Center for Strategic and International Studies, <https://www.csis.org/analysis/internet-or-splinternet-consequences-european-tech-sovereignty>.

⁴³ Simon Kruse, "Vestager får kritik for at nøle i opgøret med techgiganterne" [Vestager is criticized for hesitating in the showdown with the tech giants], *Berlingske*, 20 November 2020, p. 20.

⁴⁴ Werner Stengg, Senior Member of the Cabinet of Executive Vice-President Margrethe Vestager, European Commission, *speech*, "Transatlantic Perspectives on the Digital Services Act & Digital Markets Act", German Marshall Fund virtual event, 16 December 2020.

likely mainly benefit China's tech efforts to take the lead on 5G and 6G. Nevertheless, both the United States and Europe say that the ball is in the other side of the court.⁴⁵

In view of continuous transatlantic disagreements on the way ahead for digital infrastructure, Europe needs to go on the offensive when it comes to building its own cellular network infrastructure. Europe is already behind US and Chinese performance. About 70 per cent of European cellphone subscribers used 4G networks in Europe in 2019, compared with 90 per cent in the United States and China. More than half of the EU member states have not yet launched 5G services by the fall of 2020, while the US launched initial services in 2019. Spectrum availability is an area where Europe is performing poorly. European countries have failed to allocate sufficient bandwidth as well as adequate planning and construction permits for cell towers, adding to uncertainty and difficulties planning for a 5G future. Regulatory delays combined with local opposition to building 5G antennae across Europe have slowed the process. By contrast, China completed the process of allocating spectrum to operators in 2019. The EU's 27 member states had deployed only about ten 5G base stations per million citizens by the end of 2019, while South Korea had deployed 1,500 per million. Similarly, EU member states had only upgraded one per cent of base stations to 5G, while South Korea had upgraded 98 per cent of theirs by the end of 2019. While Europe took the lead in the transformation from analogue to digital infrastructure, it has become a reactive continent as the digital infrastructure develops.⁴⁶

Europe's failure to rollout 5G technology across the region can leave supply chains uncompetitive and lead to declining investments. The 5G network is key to having the infrastructure that European companies need to grow and innovate and remain competitive. It is becoming a main driver of innovation that spearheads the automation of industry. It is also a precondition for a green deal to reduce carbon emissions that European companies remain competitive by having access to 5G infrastructure. 5G-related equipment, such as autonomous vehicles and smart factories, are not available to companies who do not have access to 5G at a reasonable cost.⁴⁷ Ironically, Europe can compete with the United States and China on 5G patents.⁴⁸ A stronger policy in national capitals to rollout 5G might encourage European telecoms leaders Nokia and Ericsson to maintain innovation as wireless architectures continue to transition to a more software-centric future. The EU's announcement in 2020 of a 1.8 trillion euro stimulus package designed to build a greener, more digital and more resilient Europe might help turn around the vicious circle. The plan places a strong emphasis on Europe's digital transformation: 20 per cent of the planned investment is earmarked for digital initiatives.⁴⁹ Brussels-based resources and mechanisms to push forward digitalisation of Europe might provide the incentives national capitals need to move forward on 5G in a coherent and sustained effort to keep Europe in the running of the tech race.

Another worrying tendency is the region's struggle to produce initial public offerings (IPO) in the tech realm. In the period January to October 2020, Europe has seen a mere 26 venture capital-backed IPOs. This compares poorly to the United States, with 70 IPOs and China, with 92 IPOs. In the same period, European tech companies fetched a total value of US \$6.7 billion compared to US\$72.8 in China and US\$118.19 in the United States. The numbers underscore Europe's need for more tech IPOs listings, especially in Europe itself, to make sure that European tech companies do obtain funding not only in the

⁴⁵ Nicholas Vinocur, "Europe and the US are drifting apart on tech. Joe Biden wouldn't fix that", *Politico*, 17 November 2020, <https://www.politico.eu/article/europe-us-technology-drifting-joe-biden/>.

⁴⁶ Daniel Michaels, "Europe Is Falling Behind on 5G Rollout, Top Companies Warn", *The Wall Street Journal*, 18 September 2020, <https://www.wsj.com/articles/europe-is-falling-behind-on-5g-rollout-top-companies-warn-11600408801>.

⁴⁷ Peggy Hollinger and Nic Fildes, "Slow 5G rollout a risk to Europe's supply chains, warn industrialists", *Financial Times*, 18 September 2020, <https://www.ft.com/content/6ce2a89c-7b54-4929-8a2f-09ac8e967147>.

⁴⁸ European Leadership Network, "The EU's approach to 5G and the reshaping of transatlantic relations", 10 September 2020, <https://www.europeanleadershipnetwork.org/commentary/the-eus-approach-to-5g-and-the-reshaping-of-transatlantic-relations/>.

⁴⁹ Council of the European Union, "A digital future for Europe", *Overview*, 11 December 2020, <https://www.consilium.europa.eu/en/policies/a-digital-future-for-europe/>.

early stages of their life cycle, but also at a later stage. Attracting capital to companies and their investors is essential to promote an ecosystem of competitive European tech companies.⁵⁰

In the security and military realm, the European Commission has stated that it is imperative for Europe to establish technological sovereignty in areas of key strategic importance, such as defence, space, mobile networks, and quantum computing. Without commanding digital technologies, Europe is in danger of losing influence, autonomy and the ability to deter and counter threats to Europe's safety and sovereignty. The plans to spend US\$20-30 billion annually on the modernisation and digitalisation of European armed forces in coming years is long overdue. Today, there is no EU strategy designed to understand how European armed forces could use technologies such as nanotechnologies and digital sensing, nor how they would counter their use by adversaries, for example, for stealth surveillance purposes. Moreover, Europe has not explored how the militaries can operate with analogue technologies in case of digital blackouts or electromagnetic disruptions.⁵¹ Even though several European companies are developing artificial-intelligence enabled military systems, the military implications of artificial intelligence are mostly absent from European military strategies.

In the United States and China, private sector partnerships with the military demonstrate that work is already done that makes use of artificial intelligence in a military context, for example to sift through mountains of data collected by drones, for image and face recognition, for speech recognition and translation and for finding the geographic location of images. Artificial intelligence can also be used for logistics, such as monitoring and predicting when aircraft parts will need to be replaced and hence strengthen military planning processes. Artificial intelligence is also important in making unmanned autonomous vehicles determine the best course of action and such features that can provide protection against missiles and rockets.⁵²

In spite of the European security and defence policy, as yet little headway has been made towards a coordinated European science and technology-based military innovation policy. One reason is that the EU does not have much decision-making power over the member states in this area; it remains an intergovernmental issue. Another difficulty is competition within Europe, which prompts states to preserve military advantages at national level against competitors in other European countries. The fragmented approach of Europe to integrating digital technologies into their militaries combined with the fact that Europe is behind the curve in implementing basic infrastructure such as 5G give rise to worrying scenarios for Europe's ability to defend itself as the United States transfers more and more responsibility for Europe's own security to Europe itself. It is essential that Europe make headway in coupling civilian tech companies to the development of military technological solutions, not just at national, but also at regional level.⁵³ The threats that face Europe from Russia, the Middle East and North Africa require an integrated regional response with close coordination and cooperation within and between NATO and the EU. As it is now, much of the investment and policy initiatives come from the civilian sectors, multinational companies and civil-military collaboration in the United States and China. If Europe is to be responsible for its own security and defence, it is essential that the EU play a larger

⁵⁰ Ryan Browne, "Why tech IPOs are flourishing in the U.S. and China – but not Europe", *CNBC*, 19 October 2020, <https://www.cnn.com/2020/10/19/why-tech-ipos-are-flourishing-in-the-us-and-china-but-not-europe.html>.

⁵¹ Daniel Fiott, "Digitalising Defence: Protecting Europe in the age of quantum computing and the cloud", Paris: European Union Institute for Security Studies (ISS), 2020.

⁵² Ulrike Esther Franke, "Not smart enough: The poverty of European military thinking on artificial intelligence", *Policy Brief*, Berlin: European Council on Foreign Relations, 18 December 2019, https://ecfr.eu/publication/not_smart_enough_poverty_european_military_thinking_artificial_intelligence/.

⁵³ Marta Kepe, James Black, Jack Melling and Jess Plumridge, "Exploring Europe's capability requirements for 2035 and beyond: Insights from the 2018 update of the long-term strand of the Capability Development Plan", Rand Europe and European Defence Agency, <https://www.eda.europa.eu/docs/default-source/brochures/cdp-brochure---exploring-europe-s-capability-requirements-for-2035-and-beyond.pdf>, June 2018, p. 40.

role in fostering civil-military cooperation to ensure that the region builds military forces prepared for a digital future where self-reliance is key to security.

Conclusion: A Way Ahead for Europe?

Cellular network infrastructure and artificial intelligence are hot topics across all major economic, industrial, security and military sectors. Currently, there is no shortage of advice to Europe on how to proceed to ensure that it remains a region with global influence in relation to China and the United States, as well as to other powers. There are many doomsday prophecies about Europe's lack of progress in fostering coherent and integrated digitalising economies, societies and militaries across the region. This analysis demonstrates that the technological policy choices made in the United States and China are too far from European interests and world outlook: it cannot be an option merely to adopt what they have to offer. China's potential militarisation of its tech sector and the use and export of technology which exacts extensive social control are some of the characteristics that make it unattractive for Europe to become too dependent on Chinese models for the development and use of technology. US balkanisation tendencies, the oligopolistic power accorded to big tech companies such as Google, Apple, Amazon, Facebook and Microsoft, and the ramping up of a tech war with China mean that the US model for technological development and use contains major elements which are unacceptable to Europeans who retain a more pragmatic approach to China and are unwilling to exclude China from supply chains. As in many other areas, Europe appears to have no sensible choice other than to develop its own alternative to stay in the tech game as a power to be reckoned with. Europe has the innovative industrial basis and the big companies to develop an alternative that allows the region some autonomy from both the United States and China. Europe has already made some headway towards coordination and integration of tech policies across sector and country barriers. Instruments such as the EU's allocation of funds to digitalise Europe's militaries and the EU toolboxes for 5G and cyber security are promising initiatives. President of the European Commission Ursula von der Leyen's focus on harmonising rules on artificial intelligence across the bloc indicates that the EU is aware that it is necessary to give priority to establish a regional strategy that integrates industrial, civilian and military technological needs, instruments and objectives into a European model for a digital future. However, it remains to be seen whether Europe's national capitals can cooperate sufficiently to translate such strategic thinking into action.

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With the support of the
Erasmus+ Programme
of the European Union

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