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**The Geopolitics of 5G Networks: The bipolar axis between China
and US**

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Abstract

The thesis is an investigation of the strategic, ideological, and geopolitical aspects of the world race in the 5G technology, with particular attention to the growing competition between the United States and China. It examines the way that 5G has changed over time to become a source of international power projection, national security, and digital sovereignty. This paper follows the development of China as the pioneer in 5G innovation, the American strategic responses and the implications on third-party nations and the European Union. By analyzing the diplomatic alliances, technological benchmarks, and infrastructure politics in detail, the thesis unveils how 5G has turned into a major frontier in the battle to determine the future of the world order. The results indicate that such a fight is not merely over market control but also over different types of governance and values in the digital age. The conclusion notes the possible dangers of the global digitalization of fragmentation and the necessity to find multilateral cooperation, norm-setting, and inclusive governance mechanisms as soon as possible.

Keywords: 5G geopolitics, China, United States, digital sovereignty, technological rivalry, international security.

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Introduction

The arrival of fifth generation (5G) wireless technology has brought with it a new digital interconnectivity across all of mobile, smart infrastructure and the Internet of Things (IoT). However, it has also become the arena in the contest for geopolitical supremacy between China and America's global superpower, the United States. The global roll-out of 5G networks has become as much a topic of international relations, and national security, as it is of engineering and telecommunications. It is not only a generational leap in telecommunications, but a paradigm change in how states perceive and exercise power in the digital age (Triolo, Allison & Brown, 2018).

5G is strategically significant in that it is able to change all sectors of the modern society. This technology would be expected to set the basis of autonomous vehicles, smart cities, remote health care, military applications and real time industrial automation. Leading in 5G will give the country unparalleled advantages, in surveillance, in cyber warfare resilience, in economic dominance, and in infrastructure dominance (Bartholomew, 2020). As such, 5G infrastructure has moved beyond its technological aspect to become a problem of strategic leverage and national prestige. In this light, the setting of the rules, the control of the hardware and the network security is a defining trait of the contemporary geopolitics.

China and the United States have become the main players in this contest, with the contest taking on a distinctly bipolar character. The gains to U.S. national competitiveness from wide deployment of 5G in this country are likely to exceed the potential losses that stem from slowing the Schedule 40 roll out. However, the interpretive basis for China's aggressive international 5G expansion, particularly through telecom giants Huawei and ZTE, comes down to one word: Surveillance. Having witnessed its long held technological superiority contested, the United States has responded by imposing an uncompromising position to constrain Chinese influence through export restrictions, diplomatic pressure and alliance building (Kitchen, 2019). Not only are both powers deploying technological assets — in some ways to rival one another — but they are employing diplomatic, economic and ideological tools as well to tip the balance in digital conflict.

This conflict has its origins in the general shifts in international power dynamics. China has risen as a global technological leader by means of deliberate state planning, massive investments in R&D, and strategic internationalization of its corporations (By Prestes, 2022). Beijing has been looking to dominate future industries in policies, such as “Made in China 2025,” and the “Digital Silk Road” initiative. At the same time, the U.S. has seen this technological leap as undermining its national security and international leadership role, triggering a wider tech from semiconductors, artificial intelligence up to standardization organizations like Telecommunications Information (Danilin, 2022).

The shift of 5G into a geopolitical weapon is not a vacuum. It represents the combined trend of the national security policy with digital infrastructure. 5G networks are no longer seen as simply commercial infrastructure, but are also considered as an extension of state power. The intrusion of Chinese technologies is especially suspect in liberal democracies, where this paradigm shift is especially pronounced. The bans and restrictions across the U.S., Australia, and several European countries against Huawei hardware have been due to the allegations of threats related to espionage, data theft, and the inclusion of backdoors within their hardware (Friis & Lysne, 2021). On the other hand, China has characterized these concerns as the American techno-nationalism and protectionism and has criticized the West for using security discourse to maintain its economic dominance (Tekir, 2020).

Such a strategic bifurcation has had profound consequences for the third party states enmeshed between the confrontation. The United Kingdom, Serbia, and Indonesia were forced to walk a fine diplomatic tight rope between the necessity of affordable, state of the art infrastructure, and the necessity of secure and trusted international partnerships (Healy, 2023; Bojic, Djukanovic & Nikolic, 2021). A result is a highly fragmented 5G ecosystem around the globe, which is as much a result of the political alignment, as it is of the technology’s merits.

The technological rivalry has also carried over into the international standards setting process. Now the battlegrounds are organizations such as the International Telecommunication Union (ITU) and 3GPP that once operated under largely apolitical consensus. China has taken strategic steps to enhance its presence in these bodies and is pushing technical standards that suit its domestic technologies. In response to this, the United States and its allies have ramped up the support of alternative frameworks that enable open source innovation and oversight under

democracy (Seaman, 2020). The contest over who establishes the rules of the game has been as important as who plays it.

Theoretically, this emerging 5G bipolarity is understandable through a paradigm of offensive realism, which asserts that as great powers are inherently predisposed to compete in an anarchy of international system. Functional capability is but one path to technological supremacy, under this framework it is also a zero sum struggle for global preeminence (Golota, 2023). The spread of China's 5G infrastructure is a strategic push for China to be a leading power in the international order. Limiting the influence of this power on the United States is crucial to preserving its unipolarity and ideological sphere.

The US-China confrontation claims headlines, but Europe finds itself with a ministry in a perplexingly difficult posture. From its position as a global economic powerhouse juggling the competing imperatives of national interests as a patchwork of diverse nations through to its endeavours in securing the EU against external interference, and also maintaining a competitive edge for the wider bloc in the fight for economic prowess, competition for digital sovereignty has been one more task that EU officials have needed to navigate. While European policymakers have wavered between welcoming Chinese investment and acting cautiously, one can say that there is an uneven policy landscape (Rühlig & Björk, 2020). However, a number of EU member states has chosen the path of what Sartori (2020) has named the deflected hardline approach, while the United States continues to pressure to take a hardline stance regarding Huawei (Hankla and Christian, 2019).

However, the EU is getting more and more involved in defining its own course in the global digital space. The European Union 5G Toolbox and the wider Digital Compass strategy recognize that Europe cannot be technology dependent on external powers, either Chinese or American (Liaropoulos, 2023). Underpinning issues from supply chain resilience to cybersecurity, the EU's ambition to become 'strategically autonomous' is a pillar of the bloc's digital policy. But it is an open question as to whether this vision will be realized while under internal fragmentation and external pressures.

As global digital networks become more and more intertwined as well as increasingly distrustful and antagonistic towards each other, these developments paint a picture of an internet 'splintering' (a splinternet) divided into competing standards, governance models and access policies (Maxigas

& ten Oever, 2023). In this case, the 5G infrastructure becomes a new kind of Cold War dividing line between spheres of influence. The world is not fully bipolar digital order yet, but current developments are increasingly suggesting that such a situation is increasingly plausible.

This thesis attempts to critically examine the geopolitical aspects of 5G technology in particular the bipolar axis between China and the United States. The study will examine the evolution of Chinese and American strategies and motivations, and Chinese and American policy tools in the global 5G race in order to reveal the deeper dynamics behind the new digital world order. In addition, the thesis will examine the role of third party states, mainly in Europe, and their role in mediating this digital rivalry and how international institutions and alliances are adapting to this new digital landscape.

The study will have several chapters to achieve these objectives. In the following chapter, Chapter 1 will then discuss the strategic value of 5G and its part in the digital transformation of society. Chapter 2 will look at how China has risen in the telecoms sector, examining the state led model that has given rise to Huawei as one of the world's leading companies. In Chapter 3, the United States countermeasures will be discussed, such as its ban on Huawei and the attempt to construct alternative ecosystems. In Chapter 4, the core reasons for the Sino-American rivalry in 5G will be evaluated in geopolitical theory and practice. In chapter 5, third party country experiences of this bipolar tension will be considered. In Chapter 6, Europe will be explored as the EU's complex and evolving response to the 5G challenge. Finally, Chapter 7 will conclude by discussing the future of global digital competition with concluding remarks about how 5G is altering the balance of global power.

The methodology of the thesis is qualitative, using the resources of rich scholarly literature, policy papers and official sources of the government. The references that make use of in this thesis draws from a number of varied disciplinary perspectives — international relations, security studies and technology policy — and provides a balance in relation to these unfolding geopolitical contest. Nocetti (2022), Gonzales et al. (2022), Wu (2020), and Reilly (2022) offer important information on the strategic motivations of both U.S. and China, and Hoffmann, Bradshaw and Taylor (2019) explain how network architecture has become another medium of great power rivalry.

All in all, 5G marks a turning point of international politics. With increasing digitization and interconnection of the world, control over the critical technological infrastructure has become a

top domain in power competition. China and the US are currently engaged in a bipolar struggle over 5G networks, not just about faster data transmission, but for economic, ideological and strategic security in the 21st century. This dynamic becomes essential to the future vision of those publishing a revised international order and American sovereignty, as well as politics of technology.

Chapter 1: The Strategic Importance of 5G in Global Politics

Fifth generation (5G) wireless technology is at a revolutionary turning point in the development of the world's digital architecture. It is not just an efficiency factor for present telecommunications networks; it is the revolutionary platform that will support the future of social interaction, industrial productivity and governance. For that reason, 5G has become a battleground for major power strategic competition, especially between the United States and China. This is thought to go much further than mere gains for commercial companies and consumer connectivity, and to be on its way to become a foundational technology for how global power will be distributed over the next decades (Friis and Lysne, 2021).

In essence, 5G technology is intended to provide ultra-high speed wireless communication, minimal latency and the capacity to connect billions of devices at the same time. Unlike the previous ones, 5G can support complex application, real time artificial intelligence, autonomous transportation, augmented and virtual reality and smart city architecture (Goggin and Villanueva Mansilla, 2024). It also brings in a large attack surface and enormous opportunities for innovation and economic growth, and ones that are vulnerable to cybersecurity, surveillance, and foreign providers of infrastructure.

1.1 The Economic and Technological Significance of 5G

The 5G stakes are enormous globally. According to various estimates, the 5G global value chain is expected to produce trillions in output over the next decade. It is likely to have a greater effect on productivity, supply chains and innovation than previous mobile network generations. 5G is a general purpose technology (GPT) that can change multiple sectors at the same time from the manufacturing and healthcare to agriculture and logistics (Reilly, 2022). Thus, early adopters and developers of 5G infrastructure will have a large competitive advantage in the global digital economy.

The competition to deploy 5G conceptually transcends the economic dimension and is significant for control of standards and global technology governance. Technological leadership has always

meant strategic influence. For most of the later 20th and early 21st century, the USA's geopolitical power has been underpinned by its U.S. dominance in internet governance, software ecosystems, and semiconductor innovation. Recently, and with surprising speed, China has come up in the telecommunications technology, with many firms such as Huawei—great challenges are this dominance and show that a reconfiguration of what we called international technology order is possible (Wu, 2020).

1.2 Infrastructure as Geopolitical Territory

This development has transformed telecommunications infrastructure from a neutral foundation for market and societal growth into a contested strategic asset within an evolving geopolitical landscape. By exercising control over the network hardware, software and data routes, international dependencies can be shaped and leverage in foreign policy can be created (Maxigas and ten Oever, 2023). However, with 5G, this dynamic is intensified, since the decentralized 5G network architecture brings core network functionalities to the 'edge,' i. e. to local antennas, sensors and routers instead of to a central data center. This shift increases the exposure to the external manipulation, but improves the efficiency.

As a result of this evolution, states are beginning to regard 5G as critical infrastructure in the same way as energy grids, financial systems and defense assets. Foreign control over 5G networks implies espionage, data interception and crisis disruption. Therefore, telecommunications has been securitized to an increasing degree, and in this securitized domain, private sector entities operate under high levels of state surveillance and geopolitical pressure (Herzog, 2021). The rollout of 5G networks now becomes a security matter at the national level and bans, regulatory intervention, and international coordination among allies ensue.

1.3 Cybersecurity, Surveillance, and Sovereignty

The cybersecurity is one of the most prominent concerns associated with 5G. 5G networks carry more and more sensitive data, increasing the volume and sensitivity of data that can be attacked

by cyber threats to users, corporations, and governments. However, these risks are not only technical, but they are also political — the precise parties who build and maintain the networks end up providing the hinges on whether or not they have the ability to access them. As a result, fears over state sponsored surveillance have been a key part of the U.S. campaign to deny Huawei and other Chinese vendors access to allied nations’ telecom infrastructures (Kitchen, 2019).

It has also caught the attention of surveillance capabilities, especially in authoritarian regimes. Chinese 5G systems have been criticized by critics as they could help facilitate ‘digital authoritarianism’ and facilitate greater state control over populations and reinforce repressive regimes abroad (Tang, 2020). As such, they have been a source of debate around the issue of digital sovereignty, a term that refers to a state’s right to be in charge of its own digital infrastructure, data flow and technological ties. In the 5G context, sovereignty goes beyond securing data from foreign hands to the freedom to determine one’s digital future unfettered by the politics of another country (Liaropoulos, 2023).

1.4 5G and Military-Civil Fusion

Another important reason 5G has become geopolitically important is due to its dual use potential. While the 5G networks were designed to be used as civilian communication devices, they are also used for military communication, real time battlefield intelligence and as a base for autonomous defense systems. In this regard, 5G is an enabler military-civil fusion, a term heavily promoted by the Chinese government to integrate civilian technological innovation with national defense capabilities (Danilin, 2022). The integration of these countries raises alarm in other states, especially the United States, as it fears that such developments could pose a threat to its strategic military advantage.

The systems of the future defense will include all things created such as drone fleets, cyber command infrastructures, battlefield command and control systems, all of which will depend on the 5G networks. These applications have strategic value, and as a result, national security institutions such as NATO, the Pentagon and intelligence agencies have included 5G in their threat

assessments. As such, this race for 5G is also about who can secure the civilian telecommunications, as much as about who can retain battlefield supremacy.

1.5 The Role of Technological Standards and Norm-Setting

The battle over technological standards is a less visible, yet equally critical, dimension of 5G geopolitics. The rules for compatibility, interoperability and market access are set by standard setting. For years, this is the space that was controlled by the Western led organizations — IEEE, ITU and 3GPP. But China has been aggressively expanding its presence in these institutions, frequently submitting the most technical proposals and even bringing with it delegations with deep state–industry coordination (Seaman, 2020).

It is part of a wider push by China to ‘write the rules of the future’ by shaping international standards that will help Chinese firms to lock in technological advantages, export favorable norms, and decrease their dependence on foreign innovation. On the contrary, the United States and its allies have started to form coalitions for advocating the open, secure and democratic way for 5G and its upcoming network generations. The winner of this competition over norm setting will not only determine which technologies prevail but also which political values underpin the digital world order (Gonzales et al., 2022).

1.6 Alliances, Diplomacy, and Network Influence

The 5G race has also evolved into a diplomatic contest, with the United States actively seeking to exclude Chinese vendors from the national networks of its allies. They tried to initiate efforts like the “Clean Network” to assemble coalition of likeminded countries to build secure and trusted digital infrastructure. Washington has used these frameworks to place bilateral and multilateral pressure, portraying 5G decisions as political alignment tests (Healy, 2023).

In response, China has used its economic partnerships and trade agreements, infrastructure investments, but especially under its Belt and Road Initiative, to promote its own 5G infrastructure. Huawei is popular as a turnkey solution provider in many developing countries as it is affordable.

In fact, these states and territories — without domestic alternatives or comprehensive risk assessments — are becoming more and more embedded within Chinese digital ecosystems. Therefore, 5G has turned into a tool of influence for Washington and Beijing, as it allows the extension of their technological spheres of influence (Bojic, Djukanovic and Nikolic, 2021).

1.7 The Risk of Technological Decoupling and the “Splinternet”

5G’s geopolitical implications also feed into wider talks about the veneration and division of the global internet. As technological ecosystems diverge due to competing standards, governance models and political ideologies, scholars and policymakers have scrambled to urge potential ‘splinternet’ (delegating the world into incompatible digital blocs), spelling out the development of 5G since it determines the base hardware (hardware and software architecture) and software architecture that facilitates national networks (Rühlig, Seaman and Voelsen, 2019).

Such process is accelerated by technological decoupling, especially between the U.S. and China. A bifurcated technological world is created by export restrictions on semiconductors, software blacklists and bans on telecom equipment manufacturers. In this context, 5G becomes a geopolitical wedge that splits third party countries into the U.S.-led or Chinese led digital camps. A permanently divided across the web, bringing down commerce, governance and global cooperation (Sartori, 2020).

1.8 The 5G Race and Authoritarian vs. Liberal Models

The competition over 5G is not merely geopolitical but also deeply ideological, reflecting a broader clash between competing models of political governance in the digital era. Unlike liberal democratic values of privacy, transparency and open access, as the sway over which part of the world has true power of the Internet shifts, China is promoting a centralized, surveillance-enhanced digital system. Since this is a proxy for this struggle, the 5G race becomes the place where each system exports its vision of digital governance to the world (Hoffmann, Bradshaw and Taylor, 2019).

This is particularly an ideological aspect of digital infrastructure when it's brought into countries in the global South, as there are times when infrastructure brings with it governance expectations or embedded surveillance. As they do so, these states also adopt, implicitly or explicitly, the political logics associated with either Chinese or Western technologies as they develop their digital infrastructure. Consequently, 5G deployment serves as a soft power projection in which great powers shape the political character of connected states (Panidis, 2023).

5G is of strategic importance. Now, digital infrastructure has become part of a new era of geopolitics where digital infrastructure is the keystone of not just economy, but distribution of power across the globe. 5G is a general purpose technology that impacts every part of modern life, and so control of it is a matter of national security and global influence. 5G is economically exploitable, has potential military applications, surveillance capabilities and is a vehicle through which ideology is projected via infrastructure.

As it stands in this nascent digital landscape, the competition over who's wireless network construction will dominate the future of 5G in the USA and China is not in a vacuum and represents a new way of competition that reflects a deeper transformation of global politics. Just as declining technological independence leads to greater appreciation of political consequences, so will design (including security), control and governance of digital systems increasingly become vitally important to international relations. In the following chapters, we will look at how China and the United States have set themselves up in this relation, by examining their reasons, their tactics, and the implications of pursuing 5G.

Chapter 2: China's Rise in 5G Technology

The reason China is leading in fifth-generation (5G) infrastructure is careful planning by the state and a new approach to technology as a form of national strength. For the past twenty years, China has advanced from a minor position in world telecommunications to being a major competitor to Western countries in this field. The most noticeable change can be seen in 5G, since companies like Huawei and ZTE from China are in the lead for global equipment manufacturing, filing patents and deploying the technology on a wide scale.

This chapter looks into how China started, how it works and the results of its 5G rise. It starts by looking at the history and politics involved in China's telecom scene, reviews the national strategies that led to this success, analyzes how Chinese 5G networks are expanding globally and reviews the concerns regarding the way Beijing handles these matters. Overall, these factors make it clear that 5G represents China's economic growth and allows it to influence global digital regulations.

2.1 From Imitator to Innovator: The Development of China's Telecom Sector

Early in the 2000s, most technology used in China's telecommunications industry was from abroad. Ericsson, Nokia and Cisco from the West were leading the market, while Chinese firms were known as inexpensive manufacturers and copycats. It was in the mid-2000s that the Chinese government made changes by putting in place industrial plans to limit the use of foreign technologies and develop leading companies in high tech. This change was driven by the indigenous innovation strategy which gave significant assistance, special regulations and research support to top technology companies (Prestes, 2022).

The most notable outcome and beneficiary of China's move was Huawei which launched in 1987. Because of preferential state loans, government contracts and protection of their home market, Huawei was able to grow rapidly. It channeled a lot of resources into research and development

by opening various laboratories and building ties with universities and research groups outside Japan. Before the global community considered 5G, Huawei had taken the lead by providing 3G and 4G infrastructure in numerous emerging markets.

There were changes not only in technology but also in thinking. China started treating advances in technology as crucial for national defense, staying economically strong and gaining influence. Under the Made in China 2025 program, the government selected telecommunications equipment as a priority and aimed to produce and control this sector's supply chains as well as become a leader. By emphasizing this policy, China made it clear that its tech growth was key to the country's rebirth (Bartholomew, 2020).

2.2 Huawei and the Globalisation of Chinese 5G

China is relying on Huawei Technologies as the driving force behind its 5G development. In 2019, Huawei surpassed its rivals in the West to lead the world in telecom equipment and account for more than 30% of the market. Its way of working allowed it to offer competitively priced, quality products and services valued mainly by low- and middle-income countries. Thanks to swift financing and quick setup times, Huawei deployed 5G systems and full networks in Africa, Southeast Asia, Latin America and some European regions (Vicioso Benítez, 2020). By late 2019, it had secured over 50 commercial 5G contracts-more than Nokia and Erikson combined- including 28 in Europe alone. These contracts reinforce Huawei's leadership in global rollouts, especially in developing regions seeking cost-effective and rapid deployment (Wong, 2021).

The Chinese government helped Huawei become a major player in the global market. Under BRI, Beijing financed and aided with the construction of roads, railways and digital infrastructure. The Digital Silk Road allowed China to share its technology and also introduce its technical standards, how it operates and its rules to other countries. The internationalisation process gave China control over digital industries of many countries (Panidis, 2023).

At the same time, Huawei's achievements led to further examination and opposition. As a result of these concerns, several countries decided to reconsider doing business with Chinese telecom

companies. Yet, the speed and low cost of Chinese 5G networks drew significant attention in areas where safety was not as important.

2.3 The Architecture of State-Driven Innovation

Examining the political economy of China is necessary to understand how it has succeeded in 5G. Unlike in liberal markets, where companies initiate most new ideas, the government in China is responsible for guiding technology. Here, public policy, private businesses and party supervision are all connected. Generally, leaders in the Chinese technology sector are organized into party cells and are given instructions following the country's national objectives (Healy, 2023).

“Military-civil fusion” is a concept endorsed by the Chinese state to highlight the strong connection between civilian fields and national defense. Using this strategy, advancements in telecommunications such as fast wireless, are quickly applied in various forms of surveillance, defense systems and cyber security. Because Huawei and other firms are seen as part of the Chinese government's influence, foreign governments are very concerned about this merging of boundaries (Gonzales, et al. 2022).

Besides, the distinct Chinese data management system makes its 5G different from others. Due to the 2017 National Intelligence Law, all Chinese organizations have to help with intelligence work whenever the state requests it which makes it questionable whether Huawei is really separate from the government. Despite Huawei claiming it would never share user data with Chinese officials, having legislation like this has made many abroad more suspicious of the company (Tang, 2020).

2.4 Exporting Infrastructure, Importing Influence

Beijing is using its efforts to internationalize its digital infrastructure to achieve strategic goals. When another nation depends on another's technology and agreements for services, it stays tied to that nation in the long term. They result in having more influence in diplomacy, the economy and sometimes in politics. When infrastructure links to national security, countries with Chinese-built networks might struggle to make certain foreign policy decisions (Seaman, 2020).

China also shares its technical standards and governance systems with other countries. Many nations using Chinese 5G technology start to apply the same cybersecurity, surveillance and web rules. Because of this effect, people worldwide are discussing digital authoritarianism and what will happen to internet governance in the future (Kalantzakos, 2019).

While China wants to improve its economy, its strategy is also meant to change the way the world deals with each other. Across many parts of the world, where there are few other options, buying out your competitor has been successful. However, opposition to it is increasing in liberal democracies.

2.5 Risks and Global Reactions

Even though it has advanced in 5G, China has met criticism from the United States and its allies. Claims about espionage and stealing technology, along with hidden corporate administration, have prompted authorities to investigate and ban companies from certain networks and business supply chains. When Donald Trump issued his executive orders against Huawei, it led to a formal division in technology between the United States and China (Herzog, 2021).

Furthermore, people are now talking worldwide about digital sovereignty and making sure supply chains do not depend heavily on China alone. Many countries that allowed Huawei's inexpensive equipment now want to limit their exposure to risks. In particular, in Europe, the process of banning Huawei has happened gradually, as some countries just forbid it while others apply strict review standards (Nocetti, 2022).

It is no longer only about Huawei; countries must now decide if they can remain self-sufficient in technology when working with China's infrastructure. Here, 5G acts as a way to display the main concerns of the 21st century—trust, control, dependence and sovereignty.

2.6 A Challenge to the Existing International Order

The main reason China's 5G approach is highly disruptive is that it implicitly opposes the liberal international order. Beijing is using 5G to highlight its technology and also build a digital future where it controls everything, watches over its citizens and uses forms of governance different from the West. This model is attractive to those in power, since it helps them maintain authority and improve the economy, spreading China's ideology further.

The sale of 5G systems comes with training, advice and cooperation on standards which are handled by different Chinese ministries and their organizations. Because China takes a comprehensive approach, it is difficult to separate its business and governmental roles in digital development. Alternatively, responses in the West are often divided, respond to threats quickly and are driven by profits. With this gap, China is still able to obtain key positions in key areas despite increasing tension in diplomatic relations.

Besides, Chinese companies are increasingly present in global organisations that set standards such as the International Telecommunication Union (ITU), to ensure their technology standards are adopted. Previously, standardization mainly related to technology, but the current contest is driven by political considerations. Setting the rules allows companies to shape the future market, compatibility and determines which technological innovations succeed or fail (Rühlig and Björk, 2020). As of 2020 Chinese firms held roughly one third of all 5G standard-essential patents (SEPs), a shift that allowed Beijing to influence licensing arrangements and future digital architectures.

2.7 The Internal Contradictions of the Chinese Model

China's achievements have not come without problems within the country. Depending excessively on state organizations for infrastructure development may prevent innovation from occurring in the future. When decisions are centralized, opportunities for different ideas and efficient work may be reduced. Moreover, as global markets show more resistance, mainly due to fears of monitoring, this could limit Chinese companies' access to the latest global technologies.

The state of the country's economy is also a factor. The Chinese economy is confronted with problems such as its workers getting older, slow economic growth and higher attention from

foreign investors. If export markets resist Chinese technology more, the model used by the Chinese government could be challenged (Bojic, Djukanovic and Nikolic, 2021).

In addition, Chinese companies are now dealing with harm to their reputation in states that used to welcome them. The belief that working with Huawei or ZTE could align a country with China has brought extra challenges to how countries shop for and negotiate with each other.

The reason for China's success in 5G is due to China's thoughtful approach, exceptional government action and a change in seeing infrastructure as a way to achieve power. Because of Huawei and other Chinese firms, Beijing is now active globally in telecommunications and is challenging the Western dominance in this field. Because it is guided by the country's main strategic aims, it has been successful in sending its infrastructure, influence and beliefs abroad.

Still, this growth has caused changes in the way technology politics operate worldwide. As a result of worries about being watched, dependence and politics, new partnerships, discussions about standards and inspections of infrastructure have started. While China's state-led approach to innovation works well, many still argue against it. 5G sees the world around it embracing new tech and also being affected by its problems. We will explore at the next chapter at what steps Washington has taken to oppose China's plans for 5G across the globe.

Chapter 3: The US Response and Strategic Position on 5G

As China dominates in 5G networks, it has made the U.S. feel threatened in technology and in matters of national security. With China's 5G spread, the United States began to think of 5G as a boundary for global competition and a platform for spreading ideological views. This view led to a response that covered security, ensuring American industries remain competitive and maintaining democracy online. The U.S. has taken stronger and more coordinated steps such as not allowing Chinese equipment vendors and recommending alternative models, to address the 5G challenge.

This chapter investigates how the US has planned its strategy in the global 5G competition. It involves four important themes: national security, policies related to industry and technology, forming alliances and the way 5G competition is presented as a matter of ideology. As a result, the U.S. tries to ensure its networks are safe and influence the worldwide digital environment to suit its values and interests.

3.1 National Security: 5G as a Vulnerability

The United States is mainly concerned about how 5G networks could affect its national security. Because functions in 5G networks are handled at the edge, instead of in the centre, it introduces a new range of cybersecurity issues. If the US depends on equipment provided by companies linked to rival nations, it increases the risks too much (Kitchen, 2019). American intelligence has repeatedly warned that companies such as Huawei and ZTE from China could access phone and internet networks to spy on users, interrupt services or retrieve confidential information during a conflict.

Because the 2017 National Intelligence Law in China requires citizens and companies to collaborate with state intelligence if requested, this caused more concern for the United States. Huawei has always denied the accusations, but the laws in the countries where it operates have

worried the United States. So, American policymakers believe excluding Chinese companies is necessary, even if backdoor access has not been confirmed.

In 2019, the Trump administration announced that there was a national emergency about information and communications technology. As a result, American companies were not allowed to trade with Huawei and the company was included on the Entity List, preventing it from receiving American hardware and software. As a result of these actions, the United States started to consider China's lead in 5G as a threat to its national security, not only to its economy. The National Emergency Declaration in 2019 marked a U.S shift from a market-centered telecoms policy to one centered on strategic security logic, redefining telecoms infrastructure as a domain of geopolitical competition (Wong, 2021).

3.2 Defensive and Offensive Industrial Strategy

Industrial policy matters are behind much of the U.S. approach to China's 5G growth. Over the years, the U.S. has not developed telecom equipment suppliers as fully as Huawei, Nokia or Ericsson. Because of this issue, the country relies on foreign countries for important infrastructure. After noticing how dependent the country was, Washington started finding ways to secure its supply chains and regain its competitive advantage.

When it came to defense, the U.S. encouraged businesses to offer products that could be used together instead of just one large system. Open Radio Access Networks (Open RAN) is an initiative that allows telecom operators to combine hardware and software from different vendors. The U.S. government is promoting Open RAN to challenge China, make it easier for customers to switch vendors and boost innovation within the country (Gonzales et al., 2022).

The U.S. has supported and contributed funds for research in modern telecom technologies. The CHIPS and Science Act of 2022 contains funding to increase semiconductor production in the U.S., a need for 5G and the next wave of 6G networks. They are meant to help America regain its leading position in key technologies and create the next wave of inventions within its country.

Some argue that the U.S. takes a long time to form a strong industrial strategy, but recently, there has been more collaboration among federal agencies, private businesses and universities. Through

these efforts, the government is moving away from laissez-faire and entering a new period of techno-industrial policy.

3.3 The Global Campaign Against Huawei

The effort to prevent Huawei from gaining influence overseas is the most noticeable action by the U.S. Under the “Clean Network” initiative set up by the U.S. State Department in 2020, the U.S. called on countries to exclude untrusted vendors from taking part in their 5G networks. Clean Carrier, Clean Store, Clean Apps, Clean Cloud and Clean Cable were all part of the campaign to prevent Chinese interference with data and networks (Sartori, 2020).

It was not limited to talking about freedom. The United States urged its partners and allies to ban Huawei from using their networks. In certain instances, it meant suggesting that there would be less intelligence shared among the Five Eyes nations. In the end, the UK, Australia and Japan agreed with the U.S. and took actions to remove Huawei equipment from their networks for security reasons. Despite growing political pressure, Huawei retained strong market presence, especially in Asia and Africa, where many governments prioritized technical and economic benefits over alignment with US geopolitical preferences (Wong, 2021). Several European countries also favored regulatory scrutiny over outright bans.

Even so, the Clean Network initiative showed that there are differences among members of the Western alliance. In the beginning, Germany and France chose to introduce regulations for 5G technology instead of outright bans. The result showed how challenging it was for countries to unite against China due to differences in economic interests and national regulations (Rühlig, Seaman and Voelsen, 2019).

Even so, the U.S. was able to alter the way people looked at 5G, shifting from an economic focus to a focus on strategy. When telecom procurement became an issue related to national security and cooperation, the U.S. grew its impact over worldwide technology rules.

3.4 A Values-Based Technology Strategy

Besides security and economic matters, the United States has characterized the 5G race as a dispute over different political ideologies. Officials in the United States have advised against using Chinese technology, as this could lead to mass surveillance, censorship and more authoritarian practices. In other words, 5G serves as a vehicle for political ideas in this context (Tekir, 2020).

You can see this view in the U.S. positioning itself as a leader for a free, open and safe internet. The United States promotes democratic choices instead of digital authoritarianism in China to uphold the rules of the international community. It requires countries to team up to set up common standards for managing the internet, keeping data secure and ensuring cybersecurity.

The U.S. has also focused on human rights and ethical aspects when developing new technologies. While this narrative is not always followed, it has encouraged governments and companies to think about the future outcomes of their technology. It also balances China's strategy of building infrastructure for influence by offering another approach to developing technology.

However, some people have claimed that the U.S. often uses its values discussion only when it suits its business or political needs. Some also argue that the revelations from whistleblowers like Edward Snowden have weakened Washington's position when it comes to privacy and freedom. Even so, the United States places a key emphasis on ideology within its strategy for 5G.

3.5 Fragmentation of the Global Digital Order

One of the long-term effects of the U.S. strategy is the potential fragmentation of the global internet. As countries align with either U.S. or Chinese standards, a bifurcated technological ecosystem is emerging—often referred to as the “splinternet.” The 5G race accelerates this trend by hardwiring different norms, technical standards, and vendor ecosystems into national infrastructures (Triolo, Allison and Brown, 2018).

The risk of fragmentation extends beyond hardware. Competing cloud ecosystems, cybersecurity protocols, app stores, and data regulations are also diverging. This development raises profound questions about the future of global connectivity. Will cross-border communication remain seamless, or will it be constrained by incompatible standards and regulatory regimes?

From the U.S. perspective, fragmentation is a necessary cost to ensure security and sovereignty. By decoupling from untrusted systems, the U.S. aims to create a trusted technological zone among democratic allies. The risk, however, is that such decoupling may also reduce innovation, raise costs, and exclude emerging markets from shared growth. This kind of decoupling has also accelerated China's push for technological self-reliance while simultaneously limiting U.S. firm's integration into global innovation ecosystems, particularly in emerging fields like AI and cloud services (Wong, 2021).

To mitigate this risk, the U.S. has increased its engagement with multilateral institutions and technology alliances. The Quad (U.S., Japan, India, Australia), the EU-U.S. Trade and Technology Council, and initiatives such as the Blue Dot Network seek to provide financing, governance standards, and capacity building for global digital development. These efforts aim to offer alternatives to Chinese-led models and ensure that fragmentation does not result in authoritarian dominance.

3.6 The Role of Domestic Politics

Political factors within the United States influence the country's approach to 5G. Both sides in Congress are now in agreement that we should address China's rapid progress in technology. Both political parties in the U.S. have acted against Huawei, increased investments in domestic semiconductors and called for reliable supply lines. This is a rare case where the issue of China's intentions and U.S. digital security is still highly regarded.

Sometimes, differences within a country and tough regulations have prevented nations from acting as a group. America does not have a single authority for industrial policy, as China does with the NDRC. Instead, many federal agencies, committees in Congress and state governments are involved in making policies. As a result, policies often take longer to be implemented, there may be inconsistencies between rules and the government's strategy is less cohesive (Hoffmann, Bradshaw and Taylor, 2019).

Moreover, because the private sector controls most of U.S. telecommunications, there is an extra level of complexity. The situation in America is different, as its companies are mostly self-

governing and focused on satisfying their shareholders. While it encourages new ideas, sometimes there is a gap between what the company sells and what it aims to accomplish.

3.7 Innovation and the Long-Term Strategic Horizon

The United States is now placing more attention on becoming the leader in 6G, quantum communications and artificial intelligence-driven networks. The focus is to address current issues and influence the upcoming technological changes before they occur.

Therefore, the U.S. is supporting research centers, forming partnerships with businesses and working with similar states on creating and sharing standards and applications. Among the agencies involved are the National Science Foundation, Department of Defense and Department of Commerce. Unlike at the start of 5G, the country is now trying to be ahead in developing cutting-edge technologies (Reilly, 2022).

The U.S. acknowledges that the next stage of digital leadership will rely on technology as well as public trust, compatibility and the dependability of institutions. The U.S. tries to strengthen its leadership in technology and cybersecurity by combining its strategy with global diplomatic and ethical norms.

The United States has responded to Chinese 5G by focusing on national security, remaining competitive with industry, managing alliances and clashing over ideas. Washington considers 5G to be an important area and it has focused on leading worldwide technology policies, limiting roles for China and restoring its own strengths. While some of these efforts have succeeded, they could end up dividing the internet.

The approach taken by the U.S. is complex because the 5G challenge involves several factors. The issue is broader than infrastructure and involves matters of power, rules and order among countries. With the rivalry between countries growing, the U.S. must secure its own systems and also provide tempting, ethical and flexible alternatives to China's models.

In chapter 4, we explore the reasons behind the clash between the U.S. and China over 5G technology. The reason the 5G conflict is crucial in the current battle for global power is that it

involves countries relying on each other economically, facing security issues and having different ideological views.

Chapter 4: The Bipolar Confrontation – Strategic, Ideological, and Economic Dimensions

Although this competition between the US and China over 5G is mainly about technology, it also reflects major shifts in the world's political landscape because of differing interests, opposing values and important changes in the international scene. In essence, the struggle is due to a shift from one superpower dominance to two superpowers competing in many areas such as strategy, beliefs and economics.

This chapter explores how the competition between China and the United States in 5G involves many different aspects. 5G is claimed to be important for both economic development and technology, but it also increases the spread of power and influence. The conflict in Ukraine reflects how much nations and their leaders are concerned about leadership in the world and the part technology plays in shaping the future.

4.1 Strategic Rivalry and the Balance of Power

The way countries are strategizing in the 5G conflict is based on realist theories of international relations. Offensive realism suggests that major states strive to increase their influence and security in the absence of authority (Golota, 2023). As China becomes more advanced and wealthier, the United States feels threatened and responds by taking certain actions.

The reason 5G is so important to the strategy is that it supports both national defense and commercial activities. Due to helping develop autonomous weapons, military communication and AI, 5G will play a key role in future battles. Because the infrastructure is the foundation, it must be secured at the national level. The U.S. has made it clear that 5G is key to future battles (Reilly,

2022). Beyond tactical deployment, 5G also symbolizes strategic digital terrain. As states race to secure network control, the geopolitical stakes shift from mere access to outright dominance over data flows and decision-making infrastructure.

Because of China's rising technological abilities, the United States has opted to block its access to vital supply lines and worldwide markets. Blocking exports, influencing allies through diplomacy and reorganizing global standards organizations are all ways to decrease China's power. At the same time, China is introducing its own indigenization efforts by speeding up localisation of semiconductors and telecom and software components to rely less on Western technology (Danilin, 2022).

The actions of the U.S. and China in this area are similar to those in the Cold War, yet they use different techniques and depend on one another. Because the US and China have strong economic ties, cutting their relations would be both complicated and risky. Still, the constant fear of one another leads them to establish their own ecosystems which strengthens the existing bipolarity. This technological bifurcation echoes Cold War logic, yet is it embedded in interdependence, making full decoupling both economically dangerous and politically destabilizing.

4.2 The Ideological Dimension: Competing Models of Governance

Along with the main concerns, the 5G conflict is also deeply rooted in ideology. It brings together two distinct forms of leadership and management of technology. The liberal-democratic model supported by the U.S. and its allies relies on open networks, defends personal rights and believes in sharing responsibilities. Each model also embeds assumptions about state-citizen relations: Liberal democracies prioritize autonomy and rights; China's model integrates technology into regime consolidation and national cohesion. China's side has a state-supported system targeted at centralization, strong surveillance and technology supporting the regime's stability (Seaman, 2020).

Through 5G, these models of thought are distributed around the globe. Most of the countries using Huawei equipment also adopt various Chinese regulatory models, including facial recognition, data localisation and social credit-like approaches. Likewise, nations that work with Western

companies typically implement transparency, protect personal data and ensure democratic supervision (Tang, 2020). The architectural design of these systems- centralized or federated, transparent or opaque- embeds ideological values even when framed as technical efficiency.

Such diffusion of ideology occurs by design, not by chance. China believes exporting its 5G networks will increase its influence and allow it to offer another approach to development. People in authoritarian or hybrid countries can use China's system to improve their digital technology, without having to become more democratic. In response to this risk, the U.S. presents its stance on Huawei as based on security as well as defending freedom and openness online (Hoffmann, Bradshaw and Taylor, 2019).

So, the fight for influence is happening not only in China and the United States, but also in Africa, Latin America, Southeast Asia and even some parts of Europe. Whenever a country decides to use a particular vendor, it is choosing the model of governance it is willing to support.

4.3 Economic Competition and Technonationalism

The economies involved in 5G are closely connected to their countries' political and commercial interests. China counts dominance in 5G as a main part of its future economic plans. Telecommunications are regarded by the government as a sector that can promote economic growth in the country and influence in other nations. With more focus on relying on itself, China has increased its investments in research, chip making and software development (Prestes, 2022).

China's stance reflects the view that a nation's strength depends on its technological power. Following this, the state must treat innovation as its own undertaking and guard it against any risks coming from the outside world. For this reason, China uses subsidies, state support and diplomacy to help its top telecom companies (Panidis, 2023).

Even though the United States began as a liberal market economy, it has come to resemble this method more and more. Strategic industrial policy is becoming more popular with the approval of the CHIPS and Science Act, the support for Open RAN and the funding for new technology. Now, the idea of technological sovereignty that was once only spoken of in Europe and China is also included in discussions in the United States.

Because of this, global trade is affected by technonationalism. Before, global logistics systems worked smoothly, but now they are reviewed for security reasons, controlled in exports and influenced by world events. Efficiency in the economy is now being sacrificed for resilience in politics, even if it leads to less unity and organization (Rühlig and Björk, 2020).

4.4 Infrastructure as a Domain of Influence

Digital infrastructure is now regularly recognized as a means of influencing geopolitical matters. The battle for 5G reveals that ownership of key infrastructure can make one country depend on another for many years. Building their networks using Chinese or American technology, countries are joining a larger system that could influence their future developments. Infrastructure decisions effectively locks states into strategic and normative paths, where future compatibility, upgrades, and standards increasingly depend on the original vendor's ecosystem (Wong, 2021).

This type of influence is often very hard to notice. Services cover long-term maintenance, software updates, local engineer training and integrating with tools such as cloud services or cameras. When a country picks a supplier, it often finds it difficult and costly to use another. It results in what researchers term “path dependency” in the development of technological systems (Maxigas and ten Oever, 2023).

For China, sending infrastructure abroad is part of its Digital Silk Road diplomatic approach. The U.S. is focused on finding new ways to secure its markets and make sure rivals do not take advantage of global connectivity. Both situations see 5G being considered a major influence, just like ports, pipelines or military bases. As a strategic asset, telecom infrastructure is now treated like territory- subject to contestation, protection and diplomatic leverage.

This new situation in global infrastructure has pushed states to evaluate risks to their entire technology systems, not only to one project. So, countries become more divided, opting for partners based on if they agree on major issues, trust each other and fit into their political strategies.

4.5 Weaponized Interdependence and Systemic Vulnerabilities

To understand the 5G rivalry, analysts must think about “weaponized interdependence.” The theory was introduced by Farrell and Newman and explains how using global networks differently can give some states power over others. Regarding 5G, China and the U.S. are competitive to be seen as necessary suppliers, so they can restrict or influence others through digital control. Control over infrastructure enables coercive dependencies. Network chokepoints- such as base stations, software updates or cloud routing- become geopolitical levers (Wong, 2021).

Since China provides everything from the products to the software and maintenance, it has an advantage in various parts of the globe. If a government speaks out against China, it might lose access to new upgrades or parts for aircraft or be targeted with sanctions. The U.S. has also stopped Huawei from developing further by holding onto its lead in semiconductors and software, making it clear it can also use coercion.

Because of this, the world’s security becomes more at risk. What allows globalisation to happen can also introduce new risks for businesses. This situation is especially dangerous for smaller nations. They can find themselves pressured by everyone and unable to make independent judgments about risks which can result in penalties if they choose the “wrong” service provider (Bojic, Djukanovic and Nikolic, 2021). These asymmetric interdependencies pose risks to sovereignty, particularly for states lacking capacity to diversify suppliers or enforce national standards.

Overall, this situation makes it seem that the world is shifting towards bipolarity. Similar to the Cold War, technology partners are being formed through decisions about data, infrastructure and what tech to purchase.

4.6 Standard-Setting and Rules of the Game

Many people overlook the fact that the 5G confrontation is also about setting technical standards. The International Telecommunication Union (ITU) and the 3rd Generation Partnership Project (3GPP) decide on technology standards which patents are recognized and which companies are

allowed to sell their products first. Standards confer early mover advantages in intellectual property, licensing revenue, and platform compatibility. They also cement geopolitical influence over emerging markets. To support its companies and interests, China has become much more active in these forums (Seaman, 2020).

As a result, the U.S. and its allies have increased their efforts in standards diplomacy. They have created programs to support joining international groups, organize voting groups and support open technology like Open RAN. This is done because it is understood that governance means power, not only by law but also in the underlying framework of the international digital economy.

Standards help shape markets by outlining which products can be used together, how they are priced and which laws must be followed. They also help shape values by deciding on whether networks are see-through or obscure, open to everyone or closed and whether they can connect with other networks or not. Consequently, the debate around 5G standards is much more about politics than technical issues.

The group that sets the standards for 5G might also do the same for 6G and future generations. This means that standard-setting affects today's gadgets and determines the future form of digital capitalism. The race for standard dominance is thus a race to shape the DNA of future digital economies- determining not only how data moves, but whose values it reflects (Wong, 2021).

The 5G infrastructure issue between the U.S. and China signals that competition between nations is now expanding to include the design of today's global network. When the world's two leading states clash in this area, their rivalry is seen to be driven by strategy, ideology and economics.

Both countries try to gain control over key infrastructure so that they can support their civilian and military activities. From an ideological standpoint, they put forward incompatible ways to govern the internet which impacts privacy, transparency and control. Regarding the economy, they compete to invent new technologies and influence the global market by promoting their national companies, setting trade rules and making regulations.

Instead of a new Cold War, this bipolarity is both more complicated, more dependent and more involved in daily life. Every use of a smartphone, transferring data or accessing the cloud could have geopolitical importance now. In this situation, decisions by states, businesses and individuals become involved in a global conflict that is harder to sort out.

Later chapters will look at the impact of this competition between digital empires on countries in Europe and explore what options and challenges their leaders face.

Chapter 5: Third Parties and the Global Landscape of 5G

The growing bipolar conflict between the United States and China on the 5G infrastructure has not happened on a vacuum. Instead, it has been emanating outwards and has been pulling the third party states, whether developed or developing, into an intricate web of geopolitics. As strategic allies to non-aligned actors, these countries have been in the middle of the security interests, economic interests, and normative interests, all struggling to understand the cost and benefits of siding with either Beijing or Washington.

In this chapter, we look at the reaction of the third-party countries to the geopolitical tension that is provoked by 5G. It examines the pressurizing, enticement or coercion of states to take sides, or not be aligned at all. It further talks about how national strategies have been influenced by local factors, including the requirements of digital infrastructure, the form of governance, and the priorities of diplomacy. The case studies of the United Kingdom, Serbia, Indonesia, Peru, and the chosen EU member states present the worldwide impact of the US-China technological conflict.

5.1 The Dilemma of Digital Alignment

The 5G dilemma is a strategic paradox to many third-party states, in that the technology is a necessity of development and innovation, but the geopolitical baggage that accompanies it makes the procurement decision difficult. Partnering with Chinese suppliers such as Huawei can be an affordable and quick solution, particularly to nations that have a weak telecom network. Nevertheless, it can lose the United States, and the situation can draw attention to security issues (Healy, 2023). On the other hand, following U.S.-supported options might meet security requirements but are usually more expensive, take a longer duration and are less directly financed.

This tension is evidenced in the case of the United Kingdom. After initially allowing Huawei to participate in its 5G deployment on a limited basis, the UK government changed its mind in 2020 after several years of pressure by the United States, which threatened to cut off intelligence sharing as well as raised broader security concerns. Although the reversal was introduced as an independent policy change, it was strongly conditioned by geopolitical factors and alliance politics (Herzog, 2021). The UK example shows that even developed democracies could be bound by the greater power relations.

In the same way, Serbia demonstrates the opposite policy of digital non-alignment. Serbia is a non-EU or NATO country and has permitted Huawei to take a central role in its digital infrastructure, as well as the construction of surveillance networks under the name of Safe City. Serbia has positioned its ties with Huawei as technical and economically rational, despite pressure to break off ties with Huawei by Western countries. This is a developing trend whereby some states are pursuing a multi-vector policy, using great power competition to get some economic advantages without making any political commitments (Bojic, Djukanovic and Nikolic, 2021). This reflects a growing trend of instrumental alignment, where states treat 5G choices as tactical decisions shaped by short-term development needs and diplomatic flexibility (Wong, 2021).

5.2 Emerging Economies and Developmental Imperatives

In most of the developing nations, particularly in Asia, Africa, and Latin America, the calculus of 5G is more of developmental imperatives rather than ideology. To these countries, Huawei and other Chinese companies offer cheap, flexible, and packaged digital infrastructure solutions. These are frequently not only telecom gear, but also cloud, data centers, surveillance and AI platforms. In this way, they are turnkey solutions that are in line with the national digitalization plans (Goggin and Villanueva-Mansilla, 2024).

Instructive examples are Indonesia and Peru. The Chinese model has picked up in both countries not out of ideological attraction, but practical issues of cost, coverage, and schedule. Chinese traders have also been ready to commit to regions that are considered unprofitable by the Western firms and also to take higher political and regulatory risk, in order to get market access. Although critics fear that such relationships can result in long-term dependencies or loss of sovereignty, most

governments regard them as essential to modernization of their economies (Tekir, 2020). Rather than aligning ideologically, most emerging economies threaten digital infrastructure as a service-judged by functionality, cost, and roll out speed rather than geopolitical alignment (Wong, 2021).

However, the developmental imperative does not necessarily imply unconditional Chinese technologies support. In Indonesia, concerns about data localisation, regulatory transparency and dominance by Huawei have contributed to a more risk-averse trend, with the government trying to strike balance between Chinese and Western suppliers. This juggling act is part of the rising political consciousness of the political consequences of infrastructure decisions even in officially non-aligned nations.

5.3 Europe's Fragmented Front

The geopolitical geography of 5G is more complicated than it appears anywhere than in the European Union. The EU as a political bloc devoted to the concept of digital sovereignty, democratic governance, and rule-based international order has made hard choices on whether and how to incorporate Chinese technology into its networks. Member states have taken different directions, with some countries completely banning Huawei, others permitting a certain degree of involvement, and many implementing risk-mitigation policy instead of a blanket ban (Ruhlig and Bjork, 2020).

This division is based on the dissimilarity in the national economic connections with China, the internal political factors, and the different degrees of relying upon the U.S. intelligence cooperation and defense relations. States such as Sweden and Czech Republic have adopted a tough approach, stating national security and compliance with NATO priorities. Others such as Germany have been reluctant, trying to balance economic ties in China and alliance commitments to the U.S. (Sartori, 2020). This internal fragmentation reflects how digital sovereignty is interpreted differently across Europe- some see it as an autonomy from China, others from U.S control (Wong, 2021).

The EU has been trying to harmonize its member states by using guidelines like the so-called 5G Toolbox with little success in establishing common policy. Nevertheless, it has set a standard language that would be used to assess risk, enhance openness, and resilience. Although the EU is

not a geopolitical player in the classic sense, it has started to shape its own unique 5G approach that is based on strategic autonomy and digital resilience without taking sides between any of the two blocs (Liaropoulos, 2023).

5.4 Normative Diffusion and the “Silent Alignment”

In addition to formal alliances and procurement choices, the 5G global race has created a silent alignment phenomenon whereby countries are starting to use, copy, or internalize norms and technical architectures that come with the vendor of choice, usually without any political pronouncements. The most apparent examples of such normative diffusion are in the domains of surveillance technology and data governance and cybersecurity procedures (Maxigas and ten Oever, 2023).

Huawei systems have been implemented in nations as a part of public security or e-governance, and in such cases, a gradual transition to centralized data management, silent alignment happens not through explicit diplomacy, but through embedded technical defaults, procurement dependencies, and standards inherited from dominant vendors. Policing by face recognition and decreased transparency in information sharing can be observed. Although these practices are likely to be consistent with local forms of governance, they are also an expression of an ingrained logic of technological authoritarianism, even though they might not always be intentional. On the same note, U.S.-allied nations are adopting cybersecurity governance, regulatory scrutiny, and transparency practices, which are Western liberal norms.

Such soft power element of the 5G competition is highlighted by the fact that governance norms are diffused through infrastructure in subtle ways. It also shows that the geopolitical struggle is no longer only about dominating the markets but also about dominating the values. Infrastructure, which was once regarded as an ideologically neutral facilitator of development, has turned into a vehicle of ideology, one that determines the digital DNA of states.

5.5 Strategic Hedging and Middle Powers

The middle powers, those countries that are influential in the region but not globally, have implemented numerous hedging approaches to the US and China 5G standoff. Such states as India, Brazil and Turkey tend to have the abilities to create their own telecom ecosystems or to get more favorable conditions with external suppliers. This is informed by the need to retain strategic flexibility, economic competitiveness and diplomatic neutrality (Tang, 2020).

A good example is India which has moved to block Huawei in its 5G test, due to security reasons and also poor political relations with China. Meanwhile, it has spent a lot in domestic substitutes and collaboration with Western suppliers. Brazil originally thought about Huawei but changed its mind in favor of Nokia and Ericsson following the lobbying of the U.S. officials and the promise of financial incentives. These choices show the exploitation of the great power rivalry by the middle powers to advance their digital independence. These states use geopolitical ambiguity as leverage, extracting concessions or investments from both sides while avoiding binary alignment—a form of strategic digital hedging (Wong, 2021).

Turkey, however, has been in relationship with both camps. Although the telecom operators in the country operate on Huawei equipment, the government has also shown interests in the development of a national 5G strategy that does not depend on foreign domination. These mixed solutions indicate that there is an understanding that total compliance with one side or the other can result in a loss of sovereignty or restrictions in technological choice.

Middle powers therefore have a major role to play in determining the lines of the 5G world order. Their decisions do not only concern their networks, but also the power of regional blocs, standard-setting institutions, and digital diplomacy.

Chapter 6: The European Union's Position in the 5G Geopolitical Chessboard

Europe is at a strategic cross road in the global race to 5G. The European Union (EU) is not like the third-party states, which were either U.S or Chinese leaning, as it is a complex of relations between sovereignty aspirations, economic interdependence, defense alliances, and internal diversity. When the Sino-U.S. competition over 5G infrastructure turned into a full-scale battle, the EU wanted to find its niche of strategic autonomy of sorts digital sovereignty, in between security needs and market demands, alliance obligations and ambitions of international leadership.

This chapter discusses the changing approach of the EU to the 5G geopolitical environment. It analyses the internal disparity of member states, institutional work of the EU to harmonize policy, the external pressure on the EU by major powers and the normative framing of digital sovereignty as a normative objective. Through these dimensions, the chapter throws light on the potential and difficulties of a European way in the digital era.

6.1 Fragmented Approaches Across Member States

Although there are common institutions, EU is a collection of different national views that are informed by unique history, economic interests, and security relationships. This fragmentation is vivid through the contrasting positions on Huawei in the implementation of 5G.

Countries such as Sweden, Estonia and the UK (then still an EU member) took a hardline approach to Huawei equipment, placing severe restrictions or banning it outright, on the basis of national security. These choices were an expression of priorities in cybersecurity and defense collaboration in NATO (Ruhlig and Bjork, 2020). For some member states, rejecting Huawei became symbolic of transatlantic loyalty, rather than just a technical decision.

Other states, especially Germany, Italy, Hungary, and Greece were more reserved. Germany instead of banning outright prohibited strict vetting processes, which consider both the economic

and risk-reducing factors. The main reasons behind such policies were close industrial relations with China, high Chinese investments, and worries about the infrastructure cost and implementation schedule (Sartori, 2020).

The countries of Eastern Europe, where the digital infrastructure needed to be modernized and where there was a lack of a developed industrial base, were more likely to find a cost-effective solution in any case, even in the case of cooperation with Huawei. They made these decisions in the context of practical options to jumpstart the development of digitalization according to the EU connectivity objectives.

Overall, the lack of a single EU stance was indicative of the intricacies of reconciling interdependent economic, security and diplomatic interests within twenty-seven member states.

6.2 The EU's Institutional Response: The 5G Toolbox and Digital Compass

Considering internal differences, the EU tried to guide member states to a shared structure without bans. In early 2020, the European Commission proposed the so-called 5G Toolbox, a collection of 10 recommendations intended to standardize the risk assessment and security provisions, and vendor diversification among the member states.

Some of the measures that were included in the Toolbox were network sharing, penetration testing, audit requirements, and mandatory security plans. It was not legally binding, but it offered a shared language and structure through which nations could assess and limit the risks, although they still had the right to make procurement decisions sovereignly (Ruhlig, Seaman and Voelsen, 2019). This pragmatic approach aimed at maintaining unity while respecting national sovereignty, avoiding one-size-fits-all ban that could fracture internal cohesion.

The Digital Compass strategy was the complement of the Toolbox, and it provided ambitious EU targets in the field of digital sovereignty: to master supply chains, increase investment and research and to ensure secure digital transitions by 2030. According to this approach, the future of Europe

was presented as the future of technological independence, where the single market and regulatory capability would define the digital standards around the world (Liaropoulos, 2023).

Yet, it was not evenly implemented. The Toolbox was adopted by some member states and its recommendations implemented into national law, others adopted minimal versions depending on domestic politics and external pressure, such as the intelligence-sharing requirements of the United States and the economic investment of China.

6.3 External Pressures and Diplomatic Tightrope

As it was trying to organize itself internally, the EU was facing a lot of pressure on the outside. The US was pushing hard to pressure EU nations to ban Huawei, labeling the move as a challenge to the unity of the alliance and common values. Such efforts involved intelligence-sharing threats, diplomatic persuasion, and the Clean Network initiative (Herzog, 2021).

In response, China offered economic incentives, such as loans, technology investments and market access, especially to those nations that share its Belt and Road expansionist agenda. This left individual EU states with a choice of a trade-off, rejecting Huawei and risking the Chinese investment, or continuing access and risking the wrath of the U.S.

This foreign pressure compelled the EU to balance between diplomatic associations. Brussels was trying to exercise strategic autonomy, as it was an internal issue with respect to digital policy. Nonetheless, strategic reliance on EU-U.S. security constructs and Chinese-related economic relations implied that the EU was forced to continuously adjust its stance to the changing geopolitical cues. Europe's efforts to assert strategic autonomy were constantly balanced against economic interdependence with China and defense reliance on the U.S (Wong, 2021).

6.4 Digital Sovereignty as EU Norm

Digital sovereignty has emerged as a policy pillar in the EU. The vision of this paradigm is technological independence in strategic sectors such as data processing, network infrastructure, semiconductors, and AI through regulation, investment and international collaboration.

The same ambition can be heard in several EU initiatives:

- The European Chips Act is expected to increase the production capacity in the EU by 2 times in order to reinforce the supply chains of semiconductors.
- The Digital Services Act and Data Governance Act aim at providing transparency, portability, and fair competition.
- Such funding instruments as Horizon Europe and Digital Europe Programme are expected to contribute to the innovation ecosystem, including quantum and AI infrastructure.

In such endeavors, the EU hopes to avoid overdependence on a particular power, which resonates with an idea of a strong, safe, and values-driven digital economy.

However, critics state that digital sovereignty also results in techno-protectionism. Excessive regulation and subsidies, as well as the political bias toward local companies, may suppress innovation and disconnect the EU with the rest of the world in the tech sphere, which may decrease the competitive advantage of Europe unless addressed properly (Kalantzakos, 2019). Maintaining technological openness while defending sovereignty has become one of Europe's most difficult balancing acts in the 5G domain.

6.5 Institutional Learning and Policy Innovation

The EU 5G strategy represents institutional learning of previous digital policy issues. Contrary to the smartphone and social media era, when Europe was frequently reactive in terms of strategy, the officials became proactive, and the regulatory capacity allowed them to influence network security at its inception. This shift illustrates the EU's growing ability to intervene early in digital infrastructure governance- a sign of institutional maturation (Wong, 2021).

As an example, the 5G Toolbox made it possible to mitigate the risk in a targeted way without politicizing the procurement. With the support of legal instruments such as the Network and

Information Systems Directive (NIS2), the EU may incorporate cybersecurity into telecom regulation successfully.

Moreover, the Digital Compass was a transition to strategic ambition instead of sector-by-sector management. The EU took proactive rather than reactive regulation by establishing specific goals of sovereign capabilities. Such trends are the symptom of the maturity of the European capacity to operate at the nexus of digital policy, foreign economic policy, and military coordination.

6.6 Europe's Strategic Positioning in Standards and Alliances

EU has also become more active in the international technology standards and alliances. It collaborates with Japan, Korea, Canada, and the U.S. through its Team Europe initiative that promotes collaborations in 6G research, cybersecurity frameworks and the promotion of open architecture.

The EU also coordinates national delegations and pools resources so that they can be able to propose to the standards bodies, such as the ITU, in accordance with democratic values. By embedding democratic principles into standards setting coalitions, the EU seeks to shape global digital norms while avoiding entrenchment in U.S-China rivalry (Wong, 2021). Europe is widely influential in disputed votes or drafting of norms, although not comparable with China in terms of sectoral mobilization (Prestes, 2022).

In the meantime, EU-U.S. alignment has gone further through the Trade and Technology Council, establishing cross-atlantic routes to secure supply chains, promote Open RAN, and build collaboration on digital resilience. These activities are in addition to national foreign policy to minimize Huawei exposure and maintain economic openness.

The European reaction to the geopolitical 5G race is a subtle balancing act: the effort to become independent to the world and at the same time hooked up to international alliances and business dependencies. The EU has managed to develop strategic frameworks, 5G Toolbox, Digital Compass, investments, alliances, which are both ambitious and pragmatic. But the bottom line is that its success depends finally on unity, investment, and the capacity to turn structures into collective action.

Chapter 7: Implications and Future Projections

With the world market in 5G infrastructure narrowing to a bipolar market, the impact is much more than what is being implemented. They are indicators of more fundamental changes in the international order, economic systems and norms of governance. The chapter assesses the future implications of the Chinese and U.S. 5G competition and the role it may play in defining how new technologies emerge, digital sovereignty, and the organization of international coalitions.

7.1 Toward a Fragmented or Multipolar Tech Landscape

Among the most imminent consequences of the 5G standoff is the danger of a fragmented world digital structure, commonly known as the splinternet. In case export controls, vendor exclusion, and national regulatory frameworks remain divergent, the world may be divided into competing tech ecosystems (Nocetti, 2022).

In this case, the U.S.-friendly group would find itself in a trusted, safe-infrastructure environment that is controlled by open standards, democracies, and friendly collaboration. In contrast, the ecosystem led by China might be converging on centralized control, surveillance-enhanced governance, and proprietary standards that would strengthen the model of Beijing. Emerging economies can have difficult decisions to make, and choosing either ecosystem can result in technological comfort, whereas trying a middle ground can be resource- and innovation-starved (Panidis, 2023).

But there is also another way the future can occur: managed fragmentation. Fractured tech spaces could interoperate provided that the alliances like NATO, the Quad, and the EU-U.S. Trade and Technology Council manage to align standards and coordinate technological integration. This would entail strong cross-bloc communications, security procedures being mutually understood and interoperability systems. The question arises, is there any political will and institutional capacity to ensure such coordination when competition becomes tougher?

7.2 Impacts on Technological Sovereignty and Innovation

The geopolitical race to 5G is speeding up global movements toward technological sovereignty in which states deliberately develop resilience in their critical infrastructure ecosystems. The same can be seen in the Digital Compass of Europe and the European Chips Act, as well as significant investments in research on semiconductors and telecom in the U.S. (Kalantzakos, 2019).

However, sovereignty comes with responsibility: the development of secure, self-sustainable systems is costly and requires a coherent policy. The richer powers can afford these expenses; the developing nations might not, and they can be left behind as technologically dependent or second-tier participants. Without the appearance of global multilateral mechanisms that would promote inclusive digital development, the world may become two-speed: in one scenario, advanced democracies may be secure and innovative, whereas the rest may remain behind.

7.3 The Next Battlefield: Beyond 5G

Although 5G is a key point in the existing technological competition, 6G, AI-based networks, quantum communications are already being developed. The next generation of the 5G standards, talent pipelines, and regulatory norms will be defined by whoever has the first-mover advantage (Reilly, 2022).

The next generation systems can be even more entangled by military, civilian, and governance uses further erasing boundaries between business and state. Bets on Open RAN and ecosystem fragmentation will define not just the next connectivity speed, but also enshrine political logics into the practice of intelligence sharing, privacy standards, and international coordination itself.

7.4 Geopolitical Meaning of Infrastructure

The idea of infrastructure as geopolitical leverage is not going anywhere. The weaponized interdependence paradigm emphasizes the power of world relations to empower and limit

geopolitical activity (Healy, 2023). Infrastructure control has economic power as well as tactical power whether it is provided by cables, satellites, chip supply, or mobile networks.

The geopolitical alignment will also be considered in countries with proposed infrastructure projects, and will be assessed more and more. There is a possibility of multilateral development banks to bring formal geopolitical risk reviews; countries can be reluctant to collaborate with others unless they are promised to be open and to have a common strategy. Strategic diplomacy will be parallel to infrastructure finance.

7.5 The Challenge of Normative Coherence

A fundamental issue with the 5G conflict is also the ability to sustain coherent and usable norms in a multipolar world. Is it possible to establish shared standards, technical, ethical and regulatory, among actors that have fundamentally different political systems and strategic preferences?

The collaboration between the U.S. and the EU on such initiatives as the Clean Network and the Trade and Technology Council indicates the possibility to pursue the values-based standards. In the meantime, the investments in Digital Silk Road by China promote other models. It is not clear whether such convergent international standards can be embraced never mind being imposed without worsening competition.

New institutions such as the G7, WTO or new tech-driven coalitions can contribute to the creation of baseline norms but will succeed only when they are able to reconcile significant underlying divergences in the system and maintain the ability to advance the world technologically.

7.6 Policy Recommendations for Multilateral Stability

As the means of enhancing a more stable and cooperative digital order, a number of policy directions are possible to pursue at the international level. First, it is necessary to establish the diplomacy of cross-bloc standards. This would be done by involving China and the United States together with their respective allies in some form of structured dialogue to produce some form of

baseline agreements on security and interoperability. These discussions may take place within the framework of the United Nations or result in the formation of a new international convention devoted specifically to the governance of digital infrastructure (Seaman, 2020; Maxigas and ten Oever, 2023). Such initiatives are essential, especially in the context of the technical standard-setting battle that is becoming characteristic of the global 5G environment (Friis and Lysne, 2021).

Second, the world requires co-funded global infrastructure projects in an urgent manner. Multilateral financial tools must be developed to help nations, especially those located in the Global South, purchase safe and reliable 5G systems. These mechanisms would be alternative options to bilateral infrastructure loans and digital Silk Road proposals by China, hence, offering states with more diversified opportunities and less risk of dependency (Prestes, 2022; Tekir, 2020). Lack of such options has exposed most developing countries to geopolitical manipulation through technological and infrastructural debt (Goggin and Villanueva-Mansilla, 2024).

Third, there must be a world body of technology certification and security audit. Confidence in 5G vendors may be created through independent third party evaluations without making any procurement process politicized. This would resemble international cybersecurity labeling regimes and would help depoliticize the highly controversial debate on the selection of vendors that have dogged Europe and the rest of the world (Ruhlig and Bjork, 2020; Hoffmann, Bradshaw and Taylor, 2019). The common certification standard may even strike a balance between national security and access to the global market as it will meet the concerns of actors on both sides of the US-China divide (Kitchen, 2019).

Fourth, it is important to promote hybrid technological ecosystems. The adoption of open-architecture solutions like Open RAN (Radio Access Network) allows integrating parts of different suppliers, creating the opportunity to compete as well as flexibility in operations (Danilin, 2022; Gonzales et al., 2022). These systems will also lessen single-vendor reliance, especially on Chinese companies such as Huawei, and enable governments to stop facing the decision of either utilizing American or Chinese technology (Tang, 2020). Hybrid ecosystems are gradually becoming a solution to the future of reducing security risks, and encouraging digital sovereignty (Golota, 2023).

Last but not least, the global development assistance programs should be enlarged to embrace capacity building on digital security. Such initiatives ought to assist developing countries to build

strong, safe digital infrastructure in accordance with ethical principles and international best practices but not at the expense of technological inclusivity and accessibility (Healy, 2023; Panidis, 2023). Such initiatives may follow the trend of larger European Union projects on a secure digital transformation without the techno-authoritarianism that is inherent to state-led surveillance systems (Bartholomew, 2020; Reilly, 2022). Besides, this kind of support will be necessary to address digital marginalization and support a globally interoperable and safe digital economy (Sartori, 2020).

Overall, these suggestions provide a basis to alleviate tensions, enhance inclusivity, and raise resilience in the world where 5G technology ceases to be a mere connectivity tool and becomes a key factor of strategic global influence.

7.7 Broader Impacts on International Order

The 5G competition has revealed a wider weakness of post-Cold War order. Interdependence, which used to be a pillar of peace, has become a force of tension and a strategic weakness (Nocetti, 2022). The danger lies in the possibility of digital fragmentation to follow political polarization—causing a lack of trust, making international collaboration more difficult, and raising the chances of cyber war, or digital coercion.

But the reaction to this challenge is encouraging. Security and cohesion could be maintained through a multilateral approach to digital governance, which is based on transparency, interoperability and inclusive standards. International community can learn to live with dual-use pressures, by controlling, and not yielding to, fragmentation, maintaining the advantages of international collaboration in the digital age.

Conclusion

The competition to lead in the fifth-generation (5G) telecommunications technology is not merely a battle of technological supremacy, but it is the characteristic of 21st century geopolitics. As we have seen in this thesis, 5G has evolved into a complex of international strategic rivalry, in which the nature of diplomatic alliances, economic systems, and governance systems, and even the structure of the global order, are being determined. This conclusion synthesizes the most essential points of the above chapters and provides the general implications, further questions, and possible ways to a more balanced and secure global digital ecosystem.

The core of the 5G competition is a paradigm change in the perception and deployment of infrastructure. Telecommunications infrastructure including 5G, which was once viewed as a neutral instrument to promote globalization and integration, has turned into a strategic asset, which has a direct impact on national security, economic growth, and international influence. The ideological gap between the competing systems of governance, China state-led model and liberal democratic models that are advocated by the United States and its allies, further complicates the geopolitical aspect of 5G. 5G is not just a technology, but a source of political values, regulatory philosophies and digital sovereignty.

This ideological aspect provides the rationale why 5G has sparked such intense competition in the national politics as well as international relations. The choice of vendors, standards and protocols are no longer technical decisions but a symbol of larger alignments. In that regard, the attempts of the United States to exclude Chinese companies like Huawei in its and the networks of its allies may be seen not just as an act of national security but as an effort to uphold the principles of the liberal international order.

The rise of China in 5G has been carefully thought and strongly executed. China has deployed its firms in the lead in 5G hardware and patents with huge state investment, policy coherence, and a fast-growing domestic market. Its Digital Silk Road strategy has spread this influence to developing economies, not just infrastructure but also strategic alliances in the digital development.

Conversely, the U.S. was slow to roll out and have vendors domestically. But Washington has since staged a coordinated counter-attack, with a mix of diplomacy, spending on Open RAN technologies and legislative efforts to build up domestic capacity and guarantee allied support. What comes out is a strategic competition that involves not just access to the market but normative control, standards, and the moralization of digital development.

Competition between the United States and China in the 5G technology has solidified a new kind of bipolarity in the global system. The bifurcation of today is less monolithic and one-dimensional compared to Cold War ideological blocs, and includes economic interdependence, digital infrastructure, data flows and cyber capabilities. Nevertheless, the dangers of decoupling are still present. Unless there are systems of mutual recognition of standards and safe interoperability, the international digital environment can become fragmented, which would have severe implications on innovation, economic inclusion, and cyber stability.

The third-party states are also redefining their roles due to this emerging bipolarity. Nations like the United Kingdom, Serbia, India, and Indonesia are in the process of managing this confrontation with different strategies some of which are strongly aligned with one camp and others are hedging or hybrid in nature. These decisions will have a great impact on how the final shape of the global 5G environment and the form of the next digital order will look like.

The European Union is a rather complicated example on the 5G geopolitical chessboard. On the one hand, Europe is dedicated to the digital sovereignty and open market values. Conversely, it relies on outside suppliers, has no coherent strategy to security, and is disjointed internally in its geopolitical disposition. As observed in the discussions on whether to include Huawei and the adoption of the EU 5G Toolbox, Europe is finding it hard to balance economic interests and strategic autonomy.

However, the EU has a great potential to influence the future of the global digital governance. The power of its regulation, its standard-setting and normative influence may provide a third way to a more open and rule-based approach to 5G and emerging technologies.

The final question that arises on the basis of this thesis is whether the world can unite on common standards of digital infrastructure or whether the 5G race will be the start of permanent

technological balkanization. It is a high risk game. A divided digital world can support geopolitical rifts, decrease innovation spillovers and increase the risks of digital blackmail and cyber war.

International cooperation is the key to prevent such an outcome. The standardization, certification, cybersecurity, and digital development needs to be discussed on multilateral platforms, whether already established or newly formed. Countries that are not part of the developed world, in particular the Global South, must be enabled as co-producers of the global digital future rather than passive beneficiaries.

Technical solutions may be provided by open and secure architecture like Open RAN, transparent procurement processes and independent audits. However, political will to collaborate, particularly between large powers, is the most important. In its absence, the technological advancement that 5G promises can be overwhelmed by the worsening mistrust, strategic separation, and digital disparity.

The 5G geopolitical competition between China and the United States is an indicator of a wider change in the projection, contestation and institutionalization of power in the digital era. It unveils not only changes in material capabilities but also rival ideas of governance, sovereignty and international order. As this thesis has traced the outlines of this competition, in terms of strategic interests and ideological confrontations, diplomatic consequences, and technological prospects, it is clear that an equilibrium, inclusive, and long-term approach is urgently required.

The future of connectivity, not to mention international cooperation, does not lie only in the technological progress, but in the norms and institutions that regulate its use. The 5G race is not the race to connect the world as quickly as possible, but who sets the rules that will govern that connection.

References

- Bartholomew, C., 2020. China and 5G. *Issues in Science and Technology*, 36(2), pp.50-57.
- Bojic, L., Djukanovic, D. and Nikolic, N., 2021. 5G as geopolitical power struggle: The new neutral approach of balance and safety in technology controlled world explained through a case study of Serbia. *NBP. Nauka, bezbednost, policija*, 26, p.25.
- Danilin, I.V., 2022. The US-China tech war: A dawn of new geopolitics? In: *Technological innovation and security: The impact on the strategic environment in East Asia*, p.101.
- Friis, K. and Lysne, O., 2021. Huawei, 5G and security: Technological limitations and political responses. *Development and Change*, 52(5), pp.1174-1195.
- Goggin, G. and Villanueva-Mansilla, E., 2024. 5G common threads and challenges in emerging economies: the cases of Indonesia and Peru. *Media International Australia*, 190(1), pp.39-53.
- Golota, L., 2023. The Role of 5G Technology in Superpower Rivalry between the United States and China: An Offensive Realist Approach. *Polish Political Science Yearbook*, 52, p.173.
- Gonzales, D., Pfeifer, S., Bonds, T.M. and Brackup, J., 2022. *Securing 5G: A Way Forward in the US and China Security Competition*. [Report].
- Healy, N., 2023. "My way or the Huawei": Understanding the role of third-party states in weaponized interdependence via a study of the United Kingdom's response to the United States' treatment of Huawei. [online] Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4540582 [Accessed 29 Apr. 2025].
- Herzog, R., 2021. *Geopolitical Competition for 5G Technology between China and the United States: Former US President Trump's Ban on Huawei*. [Report].

Hoffmann, S., Bradshaw, S. and Taylor, E., 2019. Networks and Geopolitics: How great power rivalries infected 5G. Oxford Information Labs, 22, p.4.

Kalantzakos, S., 2019. The geopolitics of critical minerals. Rome: Istituto Affari Internazionali (IAI).

Kitchen, K., 2019. The US Must Treat China as a National Security Threat to 5G Networks. Heritage Foundation Issue Brief, (4952), p.1.

Liaropoulos, A.N., 2023. The Geopolitics of 5G and EU Digital Sovereignty. In: D. Soldatos and N. Moustakis, eds., Hybrid Threats, Cyberterrorism and Cyberwarfare. Boca Raton: CRC Press, pp.22-39.

Maxigas and ten Oever, N., 2023. Geopolitics in the infrastructural ideology of 5G. Global Media and China, 8(3), pp.271-288.

Nocetti, J., 2022. Europe and the Geopolitics of 5G: Walking a Technological Tightrope. [Report].

Panidis, A., 2023. The prospects of Renewable Energy Sources-RES-in view of the 2050 energy transition: a case study based on USA, Europe, Russia and China. Master's thesis. Πανεπιστήμιο Πειραιώς.

Prestes, E.G., 2022. The digital geopolitics of 5G: Elements to understand the Chinese technological development of the fifth generation of mobile telephony. GEOUSP: Espaço e Tempo (Online), 26(2), p.e194823.

Reilly, H., 2022. Connection and Competition: Navigating the US-China Race to 5G. [Report].

Rühlig, T. and Björk, M., 2020. What to make of the Huawei debate? 5G network security and technology dependency in Europe. UI Paper, 1, p.2020.

Rühlig, T., Seaman, J. and Voelsen, D., 2019. 5G and the US-China tech rivalry: A test for Europe's future in the digital age: How can Europe shift back from back foot to front foot? [Report].

Sartori, E., 2020. EU-China relations and 5G: A “threat”? [Report].

Seaman, J., 2020. China and the new geopolitics of technical standardization. Notes de l'Ifri, 34, pp.20-21.

Tang, M., 2020. Huawei versus the United States? The geopolitics of extraterritorial internet infrastructure. International Journal of Communication, 14, p.22.

Tekir, G., 2020. Huawei, 5G network and digital geopolitics. International Journal of Politics and Security, 2(4), pp.113-135.

Triolo, P., Allison, K. and Brown, C., 2018. Eurasia Group White Paper: The Geopolitics of 5G. New York: Eurasia Group, pp.1-19.

Vicioso Benítez, M., 2020. China and the Telecommunications War: The Threat of the Rising Power and its Impact on the International Order. [Report].

Wu, X., 2020. Technology, power, and uncontrolled great power strategic competition between China and the United States. China International Strategy Review, 2(1), pp.99-119.

Wong, P. N. (2022). *Techno-geopolitics: U.S.-China tech war and the practice of digital statecraft*. Routledge. <https://doi.org/10.4324/9781003047100>