



# Controlling critical technology in an age of geoeconomics:

## Actors, tools, and scenarios

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## Executive summary

The world is witnessing an escalating great power rivalry surrounding critical technologies – such as quantum computing, semiconductors, and artificial intelligence. The pursuit of dominance in these technologies, which often hold both civilian and military applications, has led the US, China, the EU, and other global actors to employ various geoeconomic strategies to safeguard their interests.

This report analyzes how critical technology is protected in the Transatlantic region and assesses the resulting effects. The focus is placed on the US and the EU, examining three key geoeconomic instruments: export controls, investment screening, and domestic subsidies, all aimed at securing their critical technological base.

### US tech defence

The most recent developments in the US illustrate increased ambitions to protect critical technologies through increased use of export controls, FDI regulation and subventions. First, export control measures have become a crucial tool in US national security and foreign policy, as illustrated by the revised export control system with a strong focus on emerging and foundational technologies. Second, the regulation of FDI in the US has undergone significant changes in recent years, not least with the introduction of the Foreign Investment Risk Review Modernization Act. Third, the Biden administration has taken significant steps to increase funding for R&I, enhance national infrastructure and boost national competitiveness. These new ambitions seem to be driven by both internal and external forces. Both Trump's Make America Great Again and America First campaigns, as well as Biden's Build Back Better Framework, demonstrate growing bipartisan support for protectionist policies aimed at boosting the domestic economy, particularly in the context of the post-pandemic era. At the same time, concerns about supply chain dependencies have increased due to China's increasing militarization and aggressive rhetoric regarding Taiwan, as well as lessons learned from Russia's war against Ukraine. Overall, recent geoeconomic developments in the US indicate a shift in its technological strategy, moving from relative advantage to ensuring that China falls behind as far as possible.

### EU tech defence

Much like the US, the EU has started to place greater emphasis on the need to protect and develop critical and emerging technologies, while also stressing the importance of remaining an open economy. Its efforts have focused on mapping vulnerabilities, investing in European capabilities and laying the ground for common strategies. While the export control and FDI regimes remain mostly decentralized, the EU continues to identify new ways forward to increase harmonization, primarily through increased information-sharing. European lawmakers are also closely monitoring developments in the US regarding outbound FDI, which are also expected to materialize in the EU soon. The most significant developments, however, have been made in the area of funding and subvention, where the European Chips Act, the Critical Raw Materials Act and the planned



Sovereignty Fund serve as current examples of the EU aiming to boost its technological edge. These initiatives can be seen as the EU's response to the tech war between the US and China, as well as its own strategic reliance on China. In addition, there is an internal dimension to this development. The trend toward protection of critical technologies can be seen as driven by two factors: first, the French ambition to promote European technological autonomy; and, second, the desire to avoid internal fragmentation, which became a concern during the pandemic when national interests sometimes took priority over EU solidarity.

### The future of Euro-Atlantic tech defence

Following a comprehensive analysis of the existing policy frameworks, four future trajectories based on varying levels of EU integration and transatlantic coordination are provided. It is important to note that these dynamics are heavily influenced by ongoing geopolitical challenges, such as Russia's war in Ukraine and the evolving US-China relationship. By outlining various scenarios, a spectrum of possible outcomes is illuminated, highlighting the potential disruptions that may arise from further fragmentation within the realm of critical technologies.

- **EU tech autonomy.** In this scenario, Europe is deeply integrated through supranational cooperation between a core group of strong nations. Atlantic coordination is shallow and transactional. The Europeans, with the power of the EU, aims to innovate, own, use, and export critical technology according to their own interests.
- **EU-US partnership.** In this scenario Europeans increase the level of integration at the same time as Euro-Atlantic coordination is strengthened. This effectively creates a powerful bloc with aligned tech policies, capable of affecting other actors around the world. The UK aligns itself with the western front, while China and Russia strengthen cooperation in a balancing effort.
- **National tech sovereignty.** European states come under strong domestic pressure to reassert control over critical technology and infrastructure. Several European states follow the UK example in aiming to 'take back control' from the EU. Atlantic coordination is weak, both within NATO and in EU-US relations.
- **Pax Atlantica.** Pressed by domestic challenges as well as strong external pressures, key EU member states doubt the efficiency and value of European integration and reinvest strongly in the transatlantic link. The pivotal role played by the US in supporting the freedom and security of Ukraine adds to this momentum. Globally, the US is the linchpin of different forums for countering Chinese influence.

These scenarios underscore the potential consequences of different approaches and the risks associated with further fragmentation in the area of critical technologies. Tech protection involves a wide range of complex trade-offs. As both the US and the EU are ramping up their policies in this area, sketching out possible futures illustrates the stakes involved and the wider ramifications of emerging technologies in a geoeconomic era.



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## 1. Introduction: critical technology in a new geoeconomic era

The end of the cold war ushered in a new era of liberal globalization. Prior to this, a liberal order had already been established by the United States and its allies after World War II, but one which was limited in scope. It was far from a world order in geographical terms, prioritized economically liberal norms over domestic liberal democratic values, and upheld the notions of national sovereignty and non-interference in the domestic affairs of other states – features it had inherited from the earlier Westphalian order.

After the Cold War, however, a significant transformation occurred. The pendulum swung away from sovereign rights to individual freedoms, through regimes such as the Responsibility to Protect (R2P) and the establishment of the International Criminal Court (ICC). While the US-led order, ‘Pax Americana’, became more liberal in some respects, it did not receive support of the hegemon in all areas, such as with the ICC. International and, in some cases, supranational institutions challenged state prerogatives and other actors, such as regions, cities, companies and individuals, gained influence. Markets, which had previously been controlled through export controls and heavy regulatory burdens, were now liberalized – leading to a separation between the state and corporations.

Western political actors still saw a political role for the market. In fact, two overarching bets guided western thinking in the era of liberal globalization, and markets played a crucial role in both. The first was a belief in the benefits of interdependence, which had informed decades of research on how cooperation spurs further cooperation and increases levels of interconnectedness, thereby increasing the costs of military conflict.<sup>1</sup> The second was the assumption that actors involved in globalization would eventually adopt liberal democracy.<sup>2</sup>

This era of unfettered globalization is now over and western states have largely abandoned these beliefs. Instead, a geopolitical logic based on conflict and zero-sum rivalry has returned, leading to a focus on states as the main actors, with material factors such as borders, energy supply, natural resources and access to land and sea routes guiding their actions.

Key reasons for this are the end of the unilateral US order and the rise of China as a systemic rival. The fact that China’s rise in recent decades has not been accompanied by regime convergence towards liberal democracy, as was hoped, has had two effects. First, the emerging multipolar order and great power rivalry now have explicitly ideological characteristics and competing systems of governance and development. Second, following three decades of liberal globalization and engagement with China that did not result in any regime convergence, the West is less willing to accept provocations such as state-sponsored corporate espionage, forced technology transfer, market access restrictions, export control violations, human rights atrocities in Xinjiang, the undermining of democracy in Hong Kong, the deployment of AI-enabled surveillance megaprojects

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<sup>1</sup> See Haas, Keohane and Nye.

<sup>2</sup> See Fukuyama.



or the development of AI-enabled lethal autonomous weapons – and there is also increased concern about China's long-term trajectory.

Furthermore, China's increasing assertiveness and lack of cooperation in global governance has led to a recent shift in US policy from one of cooperative engagement to a more cautious approach. This new approach aims to mitigate the risks associated with China's military expansion and its assertive behaviour toward neighbouring countries. The policy shift reflects US recognition of major changes in the balance of power in the twenty-first century.

Pessimism about China's future trajectory has been increased not least by the Covid-19 pandemic, China's technological advances and Russia's war on Ukraine. First, the pandemic exposed the world's dependence on Taiwan and China for cutting-edge chips, which power devices from iPhones to high-tech weapons. Second, China's launch of a hypersonic missile in 2021 alarmed the Pentagon due to its growing capability in the development of AI-powered weapons. Third, Russia's invasion of Ukraine further heightened geopolitical uncertainty, putting more pressure on governments to bring manufacturing back home and reduce dependence on regions with potential conflict risks, such as Taiwan.

Russia's war in Ukraine has ruptured long-standing norms of international relations and revived the spectre of conventional warfare, heightening fears that China may be poised to pursue military action to reintegrate Taiwan. This is cause for concern as the Taiwan Semiconductor Manufacturing Company alone supplies 90 percent of the advanced chips used by major US tech firms, while major US defence systems are powered by semiconductors sourced from Taiwan. As a result, western governments are increasingly preparing strategies for the creation of resilient supply chains by diversifying component supply chains and increasing domestic production.

These disruptions have contributed to an emerging consensus among the United States, Europe and other like-minded countries on the need for more robust and resilient global supply chains – buzzwords of a new era that will be characterized by a 'rewiring' of global capitalism and the supply chains that undergird it. The paradigm appears to be shifting from 'just-in-time' to 'just-in-case'.

However, the return of geopolitical rivalry does not signal the end of globalization per se. Instead, two quite different logics of international relations – globalization and geopolitics – now coexist. While this coexistence is not a novelty, the way these logics overlap is unprecedented. During the Cold War, the dominant logic was geopolitical, with pockets of liberal globalization, while the post-Cold War era was characterized by a dominant logic of liberal globalization and a more contained geopolitical logic. Today, both logics are prevalent and increasingly overlap, and geopolitical rivalry between states plays out in areas, such as science, innovation, data transfers, economic transactions and technological development, previously seen as dominated by global market forces. States have also instrumentalized the institutions established to facilitate these flows freely and efficiently, such as the SWIFT system for transactions, World Trade Organization (WTO)-managed litigation and standards setting within the ISO, in pursuit of strategic objectives.



Why do we see this overlap of logics in this current global order? In other words, why are major powers like China and the US, as well as other actors, fighting it out in the economic, technical, digital and infrastructure fields? There are likely several factors at play, but a key one is the nature of China's rise. Rather than relying solely on hard power, China's rise has been driven by progress in these areas. It is therefore not surprising that China would challenge the US in these fields as a result. The 'Made in China 2025' strategy, which dates from 2015, and its successors have explicitly aimed to make China a dominant power in the areas of critical technologies and innovation. In addition, as mentioned above, western states have become less willing to accept Chinese practices such as forced technology transfers and currency manipulation, due to China's lack of movement toward liberal democracy. Furthermore, neither the US nor China – as well as their domestic audiences – is keen to see this rivalry play out in the military field, which is likely to lead to a prolonged conflict in the market sphere.

Second, the rapid technological development itself is influencing the nature of great power rivalry. Numerous transformative technologies are on the brink of maturation within a historically brief timeframe. Technologies such as AI and quantum computing possess an inherent dual-use characteristic, offering a strategic advantage to those who can first master and utilize them. By their very nature, these technologies exhibit exponential growth, as demonstrated by self-training AI systems, where one scientific advance immediately enables further advancements in the same field. Moreover, these emerging technologies are interconnected, resulting in unpredictable interaction effects, wherein progress in one area unlocks potential in others. The high stakes involved, and the advantages offered to the first actors to effectively innovate, scale, and deploy emerging technologies perpetuate intense competition among great powers.

Finally, a major characteristic of this conflict is that interdependence, rather than mitigating conflict as was expected during the era of liberal globalization, creates vulnerabilities that can be exploited to exert influence over other actors. By controlling and manipulating data flows, innovation and commerce, actors in a privileged position can retain information and exercise influence.<sup>3</sup> Recognizing these risks of interdependence or connectivity, the US, China and other actors have attempted to decouple, which involves breaking dependencies, particularly in areas that are critical to society or of strategic importance, such as semiconductors and access to rare earth minerals. Consequently, globalization prevails, albeit in a more fragmented form, characterized by dysfunctional institutions. Both global flows and international cooperation now increasingly operate within regional and ideological boundaries, rather than adhering to a unified, cohesive framework.

Collectively, China's rise, the rapid advancement of technology, and the fragmented nature of globalization and international cooperation herald an era of geoeconomics. In this new context, geopolitical logic increasingly manifests itself in areas such as trade, innovation, and tech policy.

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<sup>3</sup> See Farrell et al and Leonard et al.





When it comes to critical and emerging technologies,<sup>4</sup> states in the current geoeconomic era therefore have two related reasons for protecting and supporting their national capabilities in these fields. First, because these technologies are the driving force of technological development and a key element in current rivalries, access to them confers power. Second, dependency on others in these fields is riskier than in other sectors, so actors are increasingly seeking ways to reduce their reliance. These reasons are linked but states have different strategies, focused either on maximizing technological and digital power or minimizing technological and digital vulnerabilities, or a combination of both.

However, there is also reason for caution. The effect these technologies – which are increasingly being adopted by the defence sector from the commercial sector and are being broadly disseminated due to the globalization of research and development – will have on global security is difficult to foresee. They have the potential to either enhance or undermine security. They may even exacerbate arms races and security dilemmas, rather than contribute to their resolution.<sup>5</sup>

Nonetheless, technological leadership – how a country invents, innovates and deploys technologies to compete economically and to secure its interests – will shape the coming years to a remarkable degree. States are now increasingly imposing measures to protect and support their critical technological base. These measures can be broadly divided into three types: (a) screening of foreign direct investment (FDI) to prevent external actors from accessing or transferring know-how and products; (b) implementing export controls to prevent domestic actors from transferring critical technologies to external markets; and (c) providing financial support and national subsidies, which can also have the effect of blocking foreign partners or dissuading them from collaboration on critical technologies.

This report first provides an overview of how the US and the EU define, protect and support their critical technological bases and examines the tools they use to control critical technologies. It then presents scenarios on how these policy regimes and the relationships between these actors might evolve in the future and how this could affect the field of critical technologies.

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<sup>4</sup> The concept of critical technologies is developed further below, but the term often encapsulates quantum computing, artificial intelligence, 5G-technology and nanotechnology.

<sup>5</sup> Cheung, T. M. (2021). A conceptual framework of defence innovation. *Journal of Strategic Studies*, p. 799.



## 2. Actors and control regimes

### 2.1 The United States

#### 2.1.1 Introduction

In the decades following the Cold War, there was a consensus in Washington, as noted by prominent diplomat Robert Zoellick, that trade with and investment in China would make it a 'responsible stakeholder' in the international system. Moreover, prevailing theories of globalization suggested that implementing strict controls would be nearly impossible. The consensus in Washington was that such controls would do more harm than good, negatively impacting US industry while failing to prevent China from purchasing goods from other countries. Japan and Europe were also eager to sell their products to China, and US leaders did not wish to provoke conflicts with allies over export controls, especially as they were focused on cultivating friendly relations with their Chinese counterparts as part of its engagement paradigm. Consequently, a new consensus emerged that the best course of action was to 'run faster' than US rivals. It was even thought highly unlikely that the United States would become overly reliant on any single country, let alone China, for any specific product, such as semiconductors. The problem, however, was that the US was not outpacing its rivals.<sup>6</sup>

For decades, the US has maintained technological leadership but gradually seen its position challenged, most notably in certain segments of the chipmaking process where the US has fallen behind and grown its dependence on Taiwan for building advanced logic chips. China, on the other hand, is investing billions of dollars into its chip industry and pressuring foreign countries to hand over sensitive technology.<sup>7</sup> Protecting critical and emerging technologies is now a key aspect of US efforts to address China's rapid rise to technological superiority and the rivalry that accompanies it. Technology serves as a critical enabler for economic, political and military power, so the ability of a country to invent, innovate and deploy technology to compete economically and safeguard its interests is pivotal in shaping the years ahead. The US has realized that its current policies are insufficient, disjointed and reactive, and failing to rise to the occasion. A new approach is thus in the making to regain the initiative.<sup>8</sup>

#### Crafting a national strategy for critical and emerging technologies

US legislators from diverse political backgrounds are increasingly suggesting actions to enhance US competitiveness and minimize foreign reliance in fields such as telecommunications, microelectronics and essential minerals, signalling a shift in attitude towards the benefits of a government-led technology strategy. However, strategies introduced by the Trump administration to protect critical technologies and support national capacity have been described as disparate and

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<sup>6</sup> Miller, C. (2022). *Chip War: The Fight for the World's Most Critical Technology*. London: Simon and Schuster. p. 201

<sup>7</sup> Miller, C. (2022). *Chip War: The Fight for the World's Most Critical Technology*. London: Simon and Schuster. p. 291.

<sup>8</sup> Rasser, M. and Lamberth, M. (2021, January 13). *Taking the Helm: A National Technology Strategy to Meet the China Challenge*. CNAS.



lacking coordination.<sup>9</sup> The Biden administration has introduced initiatives with similar pillars and strategic goals, in many ways building on previous initiatives.

Building on the 'Made in America' and 'America First' policies, President Donald J. Trump launched the first National Strategy for Critical and Emerging Technologies in October 2020. The goal was to enhance US innovation and the production of critical and emerging technologies (CETs) to maintain its competitive edge. The strategy outlined two pillars: promoting the National Security Innovation Base (NSIB); and protecting technological advantage. The Trump administration identified 20 priority technology areas, which included artificial intelligence (AI), advanced computing, autonomous systems, biotechnologies, communication and networking technologies, quantum information science, semiconductors and microelectronics. The NSIB aims to develop US capabilities to make it a competitive actor in the global arena through measures such as developing a science and technology (S&T) workforce, attracting foreign investment and increasing the R&D budget, while the latter involves protecting US technological advances to maintain its leadership in the field. This includes ensuring that competitors do not use 'illicit means' to acquire US property, protecting US R&D and ensuring supply chain security.<sup>10</sup>

Trump's National Strategy for CETs laid out a plan for the US, along with its allies and partners, to remain a world leader. The strategy emphasized that the US would take the lead in the highest-priority CET areas, collaborate as a contributing peer with key allies and partners in high-priority technology areas and manage risk in the remaining areas. It underscored the importance of working with allies and partners to advance CETs based on mutual benefit, teamwork, security and proportional investment. The strategy also acknowledged that the US would share its talents and capabilities with trusted allies and partners, and benefit from access to the full breadth of CETs available within this community. However, the Trump administration did not make any significant progress on this front. In fact, Trump's 'America First' policy caused frustration among some close allies and left the US isolated on important issues such as trade and climate change.

Building further on the strategy, the initial list of CETs deemed important to national security was updated by the Biden administration in February 2022. Several technologies were added, such as advanced gas turbine engine technologies, advanced nuclear energy technologies, directed energy, financial technology, hypersonics, networked sensors and sensing, and renewable energy generation and storage. While the list does not in itself constitute a strategy, it seeks to inform relevant fields and not least efforts to bolster national technological leadership and areas for cooperation with allies. In parallel, it will contribute to the development of a strategy on US technological competitiveness and national security.<sup>11</sup> The revised list of CETs serves as a guide for future US initiatives to prioritize across CETs and their component subfields, and could aid in the development of US national and multilateral export controls, while also informing domestic investment and research policies.

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<sup>9</sup> Costello, J., Rasser, M. and Lamberth, M. (2021, July 29). [From Plan to Action: Operationalizing a US National Technology Strategy](#). CNAS.

<sup>10</sup> Martin, C. 2020. [The 'tech' tonic plates begin to shift](#). *University of Oxford: Blavatnik School of Government*.

<sup>11</sup> National Science and Technology Council (2022). [Critical and Emerging Technologies List Update](#).





The significance of CETs to economic growth, technological competitiveness and national security has been emphasized in several Biden administration strategic documents, such as the Indo-Pacific Strategy 2022 (IPS-22), the 2022 National Security Strategy (NSS-22) and the 2022 National Defense Strategy (NDS-22). They too highlight the importance of strengthening cooperation with essential allies and partners in the field of CETs.

### **‘Protection will lead to great prosperity and strength’**

In recent years, the US has taken several unilateral measures to slow China’s technological advance in the West, building on the Trump protectionist agenda or ‘America First Policy’. In his inaugural address, Trump condemned ‘other countries making our products, stealing our companies and destroying our jobs’. Rather than embracing trade, Trump declared that ‘protection will lead to great prosperity and strength’. Trump levied tariffs on billions of dollars of Chinese goods, sparking a trade war that continued for most of his presidency.

However, it takes some time for what the Trump administration termed a ‘whole-of-government approach’ to be put in place. Until then, a range of unilateral measures were taken, such as blocking the Chinese telecommunications firm ZTE from April to July 2018, imposing sanctions on its larger peer Huawei in 2019, and imposing export controls to cut off the supply of high-end chips to Huawei and advanced chipmaking equipment to China since 2020.

According to the publicly available data, the Trump administration carried out over 210 public actions related to China across at least 10 departments in 2020, including 13 actions by the Commerce Department, such as the imposition of export controls, additions to the entities list and advisories. This was supposed to showcase the whole-of-government approach, but overseeing the far-reaching consequences of such a vast number of actions in such a short time would later present a daunting challenge for the Biden administration that followed.<sup>12</sup>

The aim of these measures was to hamper China’s expansion into the West, rather than enhance US capacity for innovation and competitiveness. Nor did the goal seem to be to directly compete with China in the critical infrastructure field, but to prevent China from accessing the US market. The ‘trade war’ was less about fostering innovation and more about ‘protecting American workers’.<sup>13</sup>

### **Biden’s ‘protect’ and ‘promote’ agendas**

The Biden administration’s ‘protect agenda’ involved the implementation of a series of executive actions throughout the fall and winter months of 2022. The Commerce Department’s new regulations, introduced in October, aim to curtail Chinese companies’ capacity to manufacture advanced computer chips. Subsequently, an executive order will be issued to establish fresh

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<sup>12</sup> Allen-Ebrahimian, B. (2021, January 19). [How US policy toward China transformed under Trump](#). *Axios*.

<sup>13</sup> Lawder, D. (2020, November 2). [Analysis: Trump changed how the US trades – not necessarily as intended](#). *Reuters*.



federal authority for regulating US investments in China – in the first instance of the federal government exerting such control over US industry. Another executive order will be enacted to restrict the ability of Chinese apps such as TikTok to gather data from US users. Congress is also involved in the process, developing bipartisan proposals on Chinese investment screening, potential regulations on US capital flows into China and restrictions on TikTok and other apps, in the hope of passing them in the 118<sup>th</sup> Congress which convened on 3 January 2023.<sup>14</sup>

In contrast to the Trump administration, the Biden administration has adopted significant measures as part of its ‘promote agenda’, which is centred on enhancing US capacity for innovation and competitiveness. Born out of the Build Back Better Framework presented by President Biden in October 2021, the Inflation Reduction Act (IRA), signed in August 2022, aims to catalyse investments in domestic manufacturing capacity, encourage procurement of critical supplies from domestic sources or free-trade partners and jump-start R&D and the commercialization of leading-edge technologies, such as carbon capture and storage and clean hydrogen. The IRA is the third piece of legislation passed since late 2021 that seeks to improve US economic competitiveness, innovation and industrial productivity. The other two are the Bipartisan Infrastructure Law (BIL) and the CHIPS & Science Act, which together with the IRA partially overlap in terms of priorities and introduce \$2 trillion in new federal spending over the next ten years.

Collectively, the ‘protect’ and ‘promote’ agendas signify a significant shift in the US strategy towards China’s technological progress and, ultimately, its economic expansion. Previously, US policymakers were content to oversee China’s technological development and ensure that it remained a few generations behind the United States. However, security officials now seek to impede China’s development, particularly in the domains of chips and computing – but soon in other sectors – with the objective of bringing it closer to a halt.

Finally, as a part of the wider modernization agenda, the US Department of State announced on 3 January 2023 the establishment of a new Office of the Special Envoy for Critical and Emerging Technology (S/TECH). S/TECH will ensure that the US implements an international strategy that furthers its competitive advantages across the constellation of CETs, ‘because the constellation of Critical and Emerging Technologies is reshaping the world’ and has now become ‘an integral part of the conduct of US foreign policy and diplomacy’.<sup>15</sup>

### **Building resilient supply chains**

New mapping of critical technologies has informed initiatives and investment in the US to advance domestic capacity building and reduce external dependencies (for more detail see Section 2.1.5). In February 2021, President Biden issued Executive Order 14017 on ‘America’s Supply Chains’, ordering 100-day and annual reviews of certain critical supply chains.

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<sup>14</sup> Bade, G. (2022, December 26). ‘A sea change’: Biden reverses decades of Chinese trade policy. *Politico*; and Bordelon, B. and Bade, G. (2023, March 7). *Senate, White House push new bipartisan bill that could ban TikTok. Politico*

<sup>15</sup> US Department of State. (2023). *Office of the Special Envoy for Critical and Emerging Technology - United States Department of State*.



In June the same year, a report thoroughly articulated US critical technology dependencies, supply chain processes, critical mineral, raw material and related reliance, cooperation with allies and domestic capacities, with accompanying action plans. It highlighted four critical products vital to national and economic security: semiconductors, batteries, critical minerals and pharmaceuticals, and active pharmaceutical ingredients (APIs).<sup>16</sup>

In addition, in October, the National Counterintelligence and Security Center (NCSC) announced the five tech sectors of greatest economic and security interest: quantum, semiconductors, autonomous systems, bioeconomy and AI. The aim is to safeguard, raise awareness of and support these sectors in order to protect their progress and development, having identified the key threats to and the benefits of these sectors to the US economy.<sup>17</sup>

A progress report published one year after EO 14017 contained new assessments of and strategies to strengthen supply chains in six key industrial sectors: the energy industrial base; the transportation industrial base; the production and distribution of agricultural commodities and food products; the public health and biological preparedness industrial base; the Information and Communications Technology (ICT) industrial base; and the defence industrial base. Some recent initiatives building on this mapping are the Biden administration's summits in October 2021 and 2022 to address the next steps in building better global supply chain resilience. Representatives from industry and academia were among the invitees, along with Secretary of State Antony Blinken's and Secretary of Commerce Gina Raimondo's foreign equivalents.<sup>18 19</sup>

With all the uncertainty swirling around the Covid-19 outbreak, it became clear that the methods needed to prevent or contain the epidemic had exposed the vulnerability and fragility of US supply chains. Quarantines, travel bans and factory shutdowns demonstrated the risks of achieving economies of scale through geographic concentration. Russia's ongoing war in Ukraine, leading to multi-state sanctions and bans on the import of Russian products, has further perpetuated the shocks to multiple economies. The US is critically vulnerable because of its highly concentrated logistics networks, therefore, key supply chains must be diversified and secured.

### **Cooperation with like-minded partners**

Despite the unilateral nature of these recent measures, the true US competitive advantage over China lies in its alliances and global partners, which allow it to collaborate with on initiatives such as the Five Eyes or the EU-US Trade and Technology Council (TTC), or possibly even the establishment of a D10 with the 10 largest democracies in the world. To overcome China's

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<sup>16</sup> The White House. (2021). [Building Resilient Supply Chains, Revitalizing American Manufacturing, And Fostering Broad-based Growth. 100-Day Reviews under Executive Order 14017.](#)

<sup>17</sup> The National Counterintelligence and Security Center [NCSC]. (2021). [Protecting Critical and Emerging US Technologies from Foreign Threats.](#)

<sup>18</sup> The White House (2021). [FACT SHEET: Summit on Global Supply Chain Resilience to Address Near-Term Bottlenecks and Tackle Long-Term Challenges.](#)

<sup>19</sup> US Department of Commerce. (2022). [ICT Supply Chain Assessment Fact Sheet.](#)





dominant technological advances in the long term, US national support measures would have to include greater collaboration with and involvement of its allies.

The establishment of the TTC in June 2021, following Biden's election as the US president, is a clear example of this ambition. The objectives of the TTC are to enhance transatlantic collaboration, promote bilateral trade and investment, and bolster the technological and industrial leadership of both parties while upholding shared values. There are several reasons why transatlantic collaboration in these areas is deemed important. It closes loopholes within defensive mechanisms, thus enhancing their effectiveness. It minimizes the risk of subsidies from both sides of the Atlantic cancelling each other out. It also reduces the burden imposed on companies as they no longer need to comply with two separate sets of regulations. Lastly, it reduces the potential for conflicts within the transatlantic relationship stemming from divergent or competing approaches. Ultimately, transatlantic coordination could make the US and EU approaches to protecting critical technologies less susceptible to reactive or excessive measures.

Thus far, the parties have conducted three high-level political meetings to oversee collaboration within the TTC and provide guidance to its 10 working groups, which cover areas such as technology standards, secure supply chains, tech regulation, global trade challenges, climate and green technologies, investment screening, and export controls. The first two meetings focused on the TTC's inauguration and setting its agenda, while the third meeting, held in December 2022, was described as a shift towards achieving concrete outcomes.<sup>20</sup> The fourth meeting is scheduled for 30–31 May 2023, and will be hosted by Sweden.<sup>21</sup>

Russia's war in Ukraine has given rise to a host of new challenges, to which the TTC has responded, particularly through the rapid and coordinated rollout of export controls. The agenda of the most recent TTC meeting was also influenced by the US Inflation Reduction Act (IRA). So far, however, the TTC has focused primarily on exchanging information, jointly mapping out priorities, defining best practices, identifying risks and examining options for closer cooperation. Ahead of the upcoming meeting in Sweden, scheduled for May 2023, there are high hopes that it will produce substantial, tangible outcomes, in order that the TTC remains relevant and does not lose momentum.

US willingness to work with like-minded partners across the world has been demonstrated by several initiatives in recent years. In this regard, the AUKUS pact and QUAD summit are examples of strengthened strategic collaboration in the Indo-Pacific region in an attempt to counter China.<sup>22</sup>

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<sup>20</sup> Szczepański, M. (2023, February 10). [EU-US Trade and Technology Council: Modest progress in a challenging context](#). *Epthinktank, European Parliament*.

<sup>21</sup> Swedish Presidency of the Council of the European Union. (2023). [European Union-United States Trade and Technology Council \(TTC\) meeting](#). *European Council*.

<sup>22</sup> Hakata, K. and Cannon, B. J. (2021, September 27). [Why the QUAD is crucial](#). *The Diplomat*; and McClure, T. (2021, September 16). [AUKUS submarines banned from New Zealand as pact exposes divide with western allies](#). *The Guardian*.



Thus, the US is not only focusing on building capacity in its techno-industrial base but also collaborating with partners to ensure they are also developing capacity and resilience. National Security Advisor Jake Sullivan emphasizes that to establish a secure and sustainable economy given the economic and geopolitical realities, all allies and partners must intensify their efforts.<sup>23</sup>

## 2.1.2 Export control measures

### A reformed export control system

Since 2018, the US Congress and the executive branch have significantly revised the US export control system that regulates dual-use exports. Much of the legislative reform has focused on controlling emerging and foundational technologies, as well as strengthening other technology controls and licensing practices. Many of these changes were efforts to address concerns about China's pursuit of civilian and military leadership in advanced technologies through the US commercial sector. Congress plays a key role in overseeing the reforms it enacted and shaping the US export control regime to address US national security and foreign policy concerns, including those posed by China.

### Bipartisan support for strengthened export controls

In response to China's 2015 industrial policy, known as 'Made in China 2025' (MIC2025),<sup>24</sup> the Export Control Reform Act (ECRA) was passed in the US in 2018. It re-establishes the president's non-emergency authority to control dual-use exports for national security and foreign policy reasons, and emphasizes the need to control the export of 'emerging and foundational' technologies to US adversaries. Both the Trump and Biden administrations have used the powers granted by the ECRA to restrict the flow of primarily commercial technologies to China, specifically targeting advanced semiconductors which are considered crucial for military power and important for US economic security.

Moreover, in February 2021, President Biden ordered a strategic assessment of vulnerabilities in, and a strengthening of the resilience of, critical supply chains. The key findings of the 100-day supply chain review were published in June 2021. The report concluded, among other things, that export control policies must be implemented to address concerns over the supply chain for semiconductor production and advanced packaging, and thereby to maintain US supremacy. Implementation of policies to address current supply chain vulnerabilities was recommended. Multilateral efforts will be made to limit semiconductor production capacity in 'countries of concern' while also facilitating sustained US leadership and production. This is part of a wider international effort to harmonize export controls and other policies with allies and partners, with

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<sup>23</sup> The White House. (2023, April 27). [Remarks by National Security Advisor Jake Sullivan on Renewing American Economic Leadership at the Brookings Institution.](#)

<sup>24</sup> European Parliamentary Research Service. (2019). [Briefing: United States: Export Control Reform Act \(ECRA\).](#) *European Parliament.*

a focus on all semiconductor-related production, in order to maintain US technological leadership.<sup>25</sup>

## An overview of the us export control system

The US State Department oversees the International Traffic in Arms Regulations (ITAR), which regulate the export of defence-related technologies, and includes the Munitions List (USML).<sup>26</sup> The Bureau of Industry and Security (BIS) in the US Department of Commerce administers export controls on dual-use technologies, which critical technologies are commonly categorized as, and the Export Administration Regulations (EAR) for less sensitive military items.

In March 2021, BIS introduced the Military Intelligence End-User Rule (MIEU Rule), which limits the activities of *US individuals* rather than those of foreign individuals in the US. Along with updated EAR licensing restrictions, there were two main changes. First, a licence is now required for the 'export, reexport, or transfer (in-country)' of an EAR item if the US individual knows that it 'is intended, entirely or in part' for an MIEU or to be received by an MIEU.<sup>27</sup> Second, the rule bans US individuals from participating in support activities,<sup>28</sup> even in cases where EAR-related items are not involved.<sup>29</sup>

While there are some similarities between the EAR and the ITAR, there are also major differences. The EAR and ITAR both focus on technology transfer, but the EAR covers a wider range of products and technologies with potential dual-use (not made to military specifications), and there is a more technical product classification process. The need for a licence under the EAR depends on the product, the people involved and the destination, whereas the ITAR primarily focuses on items with a military use or of strategic value to the US.

The EAR requires a licence for certain items listed on the Commerce Control List (CCL). Six technologies<sup>30</sup> were added to the CCL after the US successfully sought their adoption in 2019 by the international export control regime for (conventional arms and) dual-use goods and technologies, the Wassenaar Arrangement (WA).<sup>31</sup> Furthermore, a BIS Final rule later amended the EAR in accordance with a decision by the Australia Group (AG), the international export control regime for dual-use equipment related to the development of biological and chemical weapons.<sup>32</sup>

<sup>25</sup> The White House. (2021). [Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-Based Growth - 100-Day Reviews under Executive Order 14017](#).

<sup>26</sup> US Department of State. (2023). [Directorate of Defense Trade Controls - Overview](#).

<sup>27</sup> US Federal Register (2021). [Expansion of Certain End-Use and End-User Controls and Controls on Specific Activities of US Persons](#).

<sup>28</sup> 'Support' is defined in [EAR §744.6 \(b\)\(6\)](#).

<sup>29</sup> Froehlich, A. (2021, April 19). [An EAR-evolution? What Commerce's military intelligence end-user rule may foretell](#). *Atlantic Council*.

<sup>30</sup> Hybrid additive manufacturing (AM)/computer numerically controlled (CNC) tools; computational lithography software designed for the fabrication of extreme ultraviolet (EUV) masks; technology for finishing wafers for 5nm production; digital forensics tools that circumvent authentication or authorization controls on a computer (or communications device) and extract raw data; software for monitoring and analysis of communications and metadata acquired from a telecommunications service provider via a handover interface; and sub-orbital craft.

<sup>31</sup> US Federal Register (2020). [BIS Final rule: Implementation of Certain New Controls on Emerging Technologies Agreed at Wassenaar Arrangement 2019 Plenary](#).

<sup>32</sup> US Federal Register (2020). [BIS Final rule: Implementation of the February 2020 Australia Group Inter-Sessional Decisions: Addition of Certain Rigid-Walled, Single-Use Cultivation Chambers and Precursor Chemicals to the Commerce Control List](#).





Items not listed on the CCL but designated as EAR99 can generally be exported without a licence, unless the export is to an embargoed country or restricted party, or for a restricted end-use. In these cases it is included on the Entity List. The Entity List, created in 1997 to address risks related to the proliferation of weapons of mass destruction, has since been expanded to serve as a general tool for protecting US security interests. The End-User Review Committee (ERC), made up of representatives from relevant agencies in the departments of Commerce, Defense, Energy, State and Treasury, is responsible for administering the Entity List and deciding on any modifications, additions or removals. BIS, in turn, chairs and executes the decisions made by the ERC.<sup>33</sup>

Finally, so-called deemed exports, that is regulated information or technology that is released to a foreign national living in the US, are becoming an increasingly complex area, as the US (and other states) must meet the threat of Chinese nationals, among others, ‘taking home’ R&D and know-how acquired at US research institutions.<sup>34</sup> This has long been a strategy of China’s People’s Liberation Army (PLA) (see Figure 2.1) and has resulted in several expansions of the Entity List.<sup>35</sup> Research collaboration between the PLA and Western universities is strongest with the United States, United Kingdom, Australia and Canada – part of the so-called ‘Five Eyes’ countries that share intelligence data.

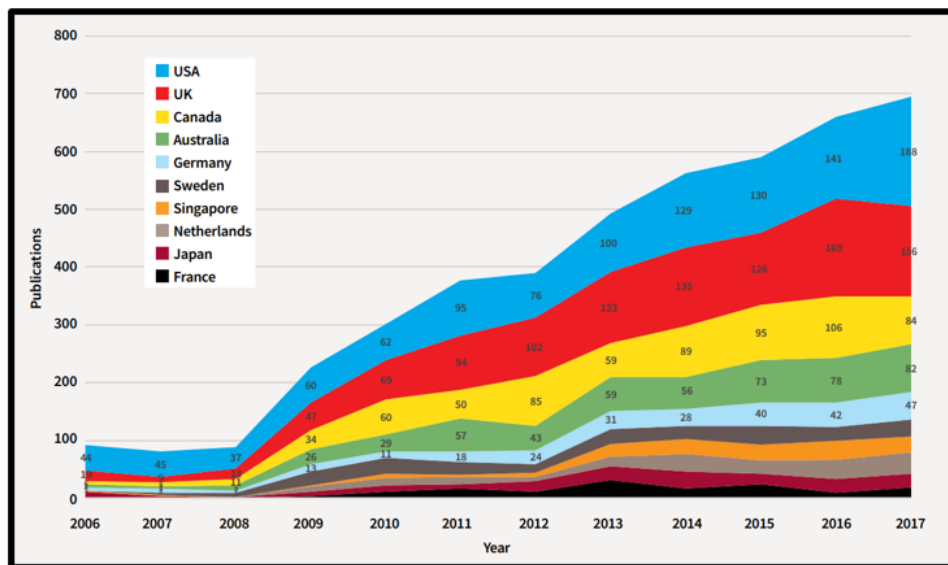


Figure 2.1.2.1.: "The top 10 countries for PLA collaboration, as measured by peer-reviewed literature co-authored by PLA scientists, 2006 to 2017". Source: Joske, A. (2018).

Figure 2.1 The top 10 countries for PLA collaboration.

<sup>33</sup> The American Chamber of Commerce in the People's Republic of China. (2022). 2022 American Business in China White Paper. P. 126.

<sup>34</sup> Joske, A. (2018). Picking flowers, making honey The Chinese military's collaboration with foreign universities. Australian Strategic Policy Institute (ASPI); Zhou, N. (2017, December 15). Calls for regulation of universities partnering with military-linked foreign companies. *The Guardian*.

<sup>35</sup> Joske, A. (2018). Picking flowers, making honey The Chinese military's collaboration with foreign universities. Australian Strategic Policy Institute (ASPI).



## Strengthening human rights with export controls

A shift in licensing policy was added in a Final Rule by BIS in 2020 to align it better with the Biden administration's foreign policy, adding more weight to human rights consideration. This applies to licence applications for items on the CCL and items subject to control for other reasons (with minor exceptions). The latter category concerns items such as telecommunications equipment and 'information security and sensors'.<sup>36</sup> If BIS identifies a risk that the exported item will be utilized for human rights violations or abuse, not least 'involving censorship, surveillance, detention, or excessive use of force',<sup>37</sup> or if civil disorder is ongoing in the potential end-user's country or region, it is likely that the application will not be granted.

Efforts to align international export control regulations with human rights objectives, and to promote democracy-affirming and privacy-enhancing technologies, were also made with like-minded partners at the Summit for Democracy in 2021, where 'the Export Controls and Human Rights Initiative' was launched. This is a non-binding and voluntary code of conduct for like-minded governments<sup>38</sup> that commit 'to use export control tools to prevent the proliferation of software and other technologies' that could seriously violate human rights.<sup>39</sup> In practice, the countries involved would exercise trade limitation on these technologies, such as those that can be used for the surveillance of citizens.<sup>40</sup>

## Enforcing national export controls

The US Entity List has grown since 2019, starting with the Trump administration's inclusion of Huawei and related entities for violating US sanctions against Iran.<sup>41</sup> The list continued to expand in 2020, when dozens of Chinese companies, including Semiconductor Manufacturing International Corporation (SMIC) and drone maker DJI, were added to cut them off from US suppliers and technology.

The export controls the US imposed in 2020 on supplying high-end chips to Huawei and advanced chipmaking equipment to China stopped the sale not only of US goods to Huawei, but also of any goods made with US produced technology. In an industry full of choke points,<sup>42</sup> this essentially meant restricting almost any chip.

During the Biden administration, new additions were made to the list with regard to human rights. In July 2021, entities located in China that have been enabling human rights abuses against Uyghurs, Kazakhs and other members of Muslim minority groups in Xinjiang, were added to

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<sup>36</sup>US Federal Register. (2020). [Amendment to Licensing Policy for Items Controlled for Crime Control Reasons](#).

<sup>37</sup> US Federal Register. (2020). [Amendment to Licensing Policy for Items Controlled for Crime Control Reasons](#).

<sup>38</sup> The participating governments are at the initial stage the US, Australia, Denmark and Norway

<sup>39</sup> The White House. (2021). [Joint Statement on the Export Controls and Human Rights Initiative](#).

<sup>40</sup> Alper, A. (2021, December 2). [White House to unveil alliance to curb human rights abuse of tech](#). *Reuters*.

<sup>41</sup> US-China Economic and Security Review Commission. (2021). [2021 Annual Report to Congress](#), p. 144.

<sup>42</sup> There are more than 50 points across the value chain where one region holds more than 65% of the global market share. These are potential single points of failure that could be disrupted.



prevent them from gaining access to US technology. Similarly, following the coup in Burma earlier that year, companies and ministries controlled by the Burmese military were also added.<sup>43</sup>

Furthermore, in early November, four foreign companies were added to prevent the spread and misuse of tools used for repression. NSO Group and Candiru of Israel were designated for their development and supply of spyware to certain foreign governments, while Russia's Positive Technologies and Singapore's Computer Security Initiative Consultancy PTE (COSEINC) were designated for misusing and trafficking certain cyber tools.<sup>44</sup>

More recently, following reports in July 2022 that SMIC is developing advanced node semiconductors despite prior export controls in 2020, which raised concerns in the US, the Biden administration announced new controls on China on October 7th, 2022, cutting off all Chinese chipmakers from US exports of the equipment and services needed for high-end semiconductor production. The policy reflected the increasing bipartisan concern that China was using western technology to develop advanced weapons, such as missiles and drones. Lastly, despite being a narrow policy, it will echo in history because it reversed decades of US trade and technology policy toward China. Building on Trump's addition of Huawei to the Entity list in 2019, Biden announced in January 2023 the possibility of imposing a total ban that would eliminate the company's access to vital US supplies.<sup>45</sup>

### **Collaborating on export controls with like-minded partners**

One important forum for collaboration on export controls is the EU-US Trade and Technology Council (TTC). At the third ministerial meeting on 5 December 2022, the two parties agreed to further cooperate on export controls on advanced technologies against Russia, particularly with respect to information-sharing.<sup>46</sup> They also agreed to cooperate on export controls on sensitive and emerging technologies in a broader context.<sup>47</sup>

The Netherlands and Japan, two countries renowned for producing cutting-edge semiconductor manufacturing equipment, have recently agreed to collaborate with the United States on limiting the export of their most advanced chip-making machinery to China. This decision comes after a series of high-level meetings between these countries' national security officials in Washington, DC in January 2023. The new restrictions build on the sweeping semiconductor technology regulations already implemented by the Biden administration in October.<sup>48</sup>

Both the Netherlands and Japan announced new national export controls within months.<sup>49</sup> Dutch trade minister Liesje Schreinemacher announced on 8 March that the Netherlands would

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<sup>43</sup> The White House. (2021). [Fact Sheet: Export Controls and Human Rights Initiative Launched at the Summit for Democracy](#).

<sup>44</sup> Ibid.

<sup>45</sup> Baschuk, B. (2023, February 1). [Supply Chain Latest: US Chip War With China](#). *Bloomberg*.

<sup>46</sup> European Commission. (2023). [EU-US Trade and Technology Council](#).

<sup>47</sup> European Commission. (2022). [EU-US Joint Statement of the Trade and Technology Council](#).

<sup>48</sup> Swanson, A. (2023, January 28). [Netherlands and Japan Said to Join US in Curbing Chip Technology Sent to China](#). *New York Times*.

<sup>49</sup> Allen, G. C., Benson, E. and Putnam, M. (2023, April 10). [Japan and the Netherlands Announce Plans for New Export Controls on Semiconductor Equipment](#). *CSIS*.





implement new export controls on semiconductor technology. The controls would apply to Deep Ultraviolet (DUV) lithography systems and aim to achieve three strategic goals: prevent undesirable end-use, avoid long-term strategic dependencies and maintain Dutch technological leadership. The announcement did not mention the United States, Japan or China.<sup>50</sup> Similarly, on 31 March, Japan announced that it would introduce export controls on 23 types of advanced semiconductor manufacturing equipment from July 2023. The list includes advanced crystal epitaxial growth equipment, photomask coating equipment, deposition equipment, etching equipment, heat treatment equipment, cleaning equipment, photomask inspection equipment and lithography stepper and scanner equipment, which have to meet or exceed the Argon Fluoride (ArF) DUV performance level. The Japanese trade ministry did not explicitly mention China in its statement either, although trade minister Nishimura told a press conference that the restrictions were part of Japan's responsibility as a technological nation to contribute to international peace and stability.<sup>51</sup>

This trend for more international collaboration on export controls can be seen in wider networks too. In a statement issued on 4 April 2023, the trade ministers of the Group of Seven (G7) pledged to work more closely on export controls on critical and emerging technologies.<sup>52</sup> While there was no specific mention of China, the move is seen as aimed at Beijing amid escalating tensions with Washington. The statement emphasized the importance of export controls as a tool for preventing the misuse of technology and called for strong enforcement to counter the evasion of such controls. The trade ministers also highlighted the need for cooperation on export controls on critical and emerging technologies such as microelectronics and cyber-surveillance systems to address the misuse of such technologies by malicious actors. The ministers held the online meeting ahead of the 49th G7 Summit scheduled to take place in Hiroshima, Japan, on 19–21 May, with economic security high on the agenda.

### Policy shifts and implications

These recent US export controls 'mark the beginning of a new era for global technology trade', according to Tobias Gehrke and Julian Ringhof at the European Council on Foreign Relations.<sup>53</sup> To begin with, the new measures have redefined the parameters of national security. At the Special Competitive Studies Project Global Emerging Technologies Summit in September 2022, National Security Advisor Jake Sullivan gave an important speech that spelled out the Biden administration's national security objectives for export controls. Sullivan said that the US needs to 'revisit the longstanding premise of maintaining relative advantages over competitors in certain key technologies', noting that there is not the same strategic environment today. He added that the old approach, which was based on a 'sliding scale' and which only required the US to be a few steps

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<sup>50</sup> Government of the Netherlands. (2023). [Letter to Parliament on additional export control measures concerning advanced semiconductor manufacturing equipment](#).

<sup>51</sup> Lewis, L. and Inagaki, K. (2023, March 31). [Japan to restrict semiconductor equipment exports as China chip war intensifies](#). *Financial Times*.

<sup>52</sup> G7. (2023). [G7 Trade Ministers' Statement](#).

<sup>53</sup> Gehrke, T. and Ringhof, J. (2023, January 11). [Caught in the crossfire: Why EU states should discuss strategic export controls](#). *European Council on Foreign Relations*.



ahead, is no longer sufficient in the current strategic landscape, and that for crucial technologies, such as advanced logic and memory chips, the US must strive to ‘maintain as large a lead as possible’.<sup>54</sup> This is, however, not to be understood as an objective to any cost. In a speech delivered in April 2023, Sullivan clarified that the measures implemented to protect critical technologies are neither intended to be a ‘technology blockade’, as Beijing claims, nor targeted at emerging economies. Instead, they are specifically focused on certain technologies and a limited number of countries that pose military challenges to the US. This concept is often referred to as “small yard, high fence”. In addition, in the broader context of China, Sullivan aligned with President von der Leyen’s perspective of “de-risking” and diversifying rather than pursuing complete decoupling. In other words, seeking diversification to mitigate potential vulnerabilities, rather than seeking total disengagement.<sup>55</sup>

US export control policy can, in summary, be said to have undergone changes in three regards. First, its geographical focus. Export controls are becoming one of the main geoeconomic tools for the US to strategically decouple from China. In addition, even if the ultimate goal is not complete decoupling but political control, export controls provide governments with not just emergency breaks, but first-hand data on technology transfers.<sup>56</sup> Second, it is now mostly implemented unilaterally.<sup>57</sup> Restricting the export of US items to China when equivalent items can be freely or easily exported from another country does not benefit US national security. Instead, it results in a lost US export opportunity for US companies and, in turn, harms US job creation, economic growth and the stability of the US military industrial base. Despite Biden’s realization that unilateral controls risk losing their effectiveness over time, efforts to secure joint action are lagging. A breakthrough appeared to have taken place in late January 2023, when the Biden administration secured a deal with both the Netherlands and Japan to join new semiconductor export controls. Third, the policy is an offensive protectionist stance, in contrast to past administrations’ defensive protectionism. The Biden administration aims to maintain as large a lead as possible by degrading adversary advancements as opposed to slightly leading by delaying it. This is clearly demonstrated by US weaponization of dominant chokepoint positions in the global semiconductor value chain.

### 2.1.3 Control of foreign direct investment

#### The foreign direct investment infrastructure

The review of transactions involving foreign direct investment in the US and certain real estate transactions by foreign persons, in order to determine the effect of such transactions on national security, is primarily undertaken by the Committee on Foreign Investment in the United States

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<sup>54</sup> The White House. (2022). [Remarks by National Security Advisor Jake Sullivan at the Special Competitive Studies Project Global Emerging Technologies Summit.](#)

<sup>55</sup> The White House. (2023, April 27). [Remarks by National Security Advisor Jake Sullivan on Renewing Americal Economic Leadership at the Brookings Institution.](#)

<sup>56</sup> Baschuk, B. (2023, February 1). [Biden’s Chip Battle With China Picks Up Steam as Allies Buy In. Bloomberg.](#)

<sup>57</sup> Allen, G. C., Benson, E. and Reinsch, W. A. (2022, November 30). [Improved Export Controls Enforcement Technology Needed for US National Security. CSIS.](#)

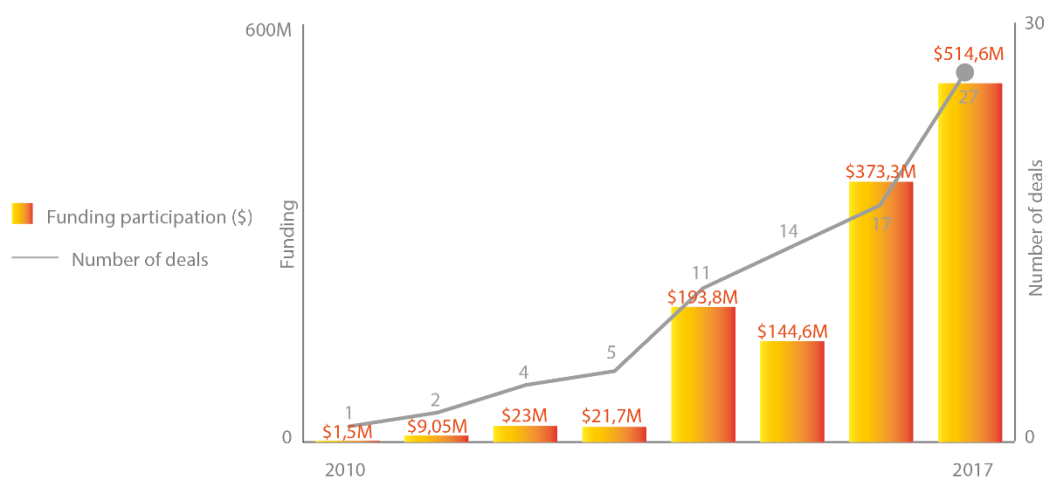


(CFIUS). The Secretary of the Treasury is the Chairperson of CFIUS. The other members include the heads of a number of departments and offices.<sup>58</sup>

### Expanded mandate to control foreign direct investment

The ability of the US to screen FDI improved following the introduction of the Foreign Investment Risk Review Modernization Act (FIRRMA) in 2018, which expanded the mandate of the CFIUS to address growing national security concerns over foreign exploitation of certain investment structures.<sup>59</sup> The act was a reaction to extensive Chinese investment in ‘venture-backed start-ups’ focused on technologies such as AI and robotics, which had hit record levels (see Figures 2.2 and 2.3). The previous mandate of the CFIUS permitted it to review foreign investment on a ‘case-by-case’ basis, but only where such investment would constitute a ‘controlling interest’.<sup>60</sup>

Chinese Investment in U.S. AI Companies: 2010-2017



Source: Brown, M., & Singh, P. (2018)

Figure 2.2 Chinese Investment in U.S. AI Companies: 2010-2017.

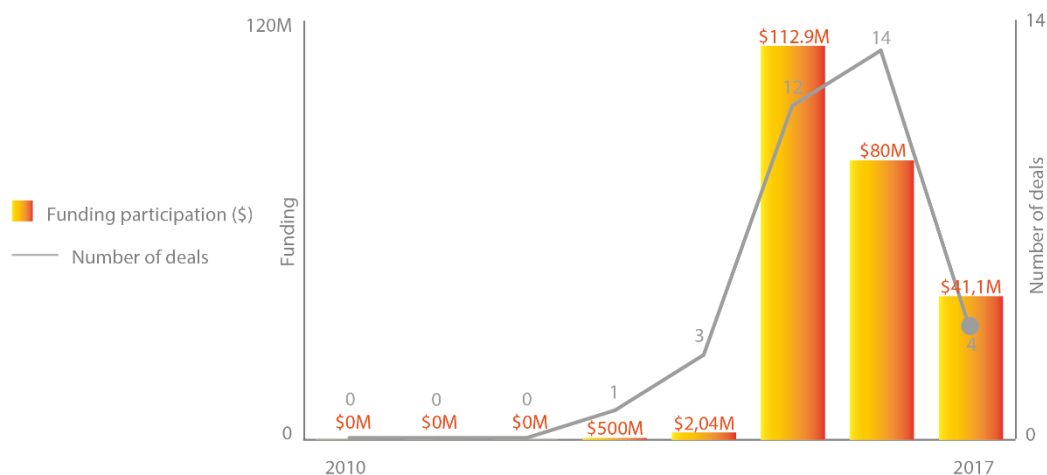
<sup>58</sup> US Department of Treasury. (2023). *The Committee on Foreign Investment in the United States (CFIUS)*.

<sup>59</sup> US Department of Treasury. (2018). *Summary of the Foreign Investment Risk Review Modernization Act of 2018*.

<sup>60</sup> Brown, M., & Singh, P. (2018). *China's Technology Transfer Strategy: How Chinese Investments in Emerging Technology Enable A Strategic Competitor To Access The Crown Jewels Of US Innovation*. *The Defense Innovation Unit*.



### Chinese Investment in U.S. Robotics Companies: 2010-2017



Source: Brown, M., & Singh, P. (2018)

*Figure 2.3 Chinese Investment in U.S. Robotics Companies: 2010-2017.*

The introduction of the FIRRMA led to three significant changes. First, the types of transactions the CFIUS was permitted to scrutinize were expanded to include smaller, non-controlling foreign investments in US companies directly or indirectly engaged in critical infrastructure or critical technologies, as well as sensitive personal data. These are together referred to as Technology, Infrastructure and Data (TID) businesses.<sup>61</sup> This covers companies involved in all parts of product development. Second, if an investment is successful, an additional transaction declaration is needed when a foreign government is assessed as holding a ‘substantial interest’ in the (foreign) entity that will gain a ‘substantial interest’ in a TID company.<sup>62</sup> Third, the CFIUS can now discriminate in its transaction examinations based on origin. The Five Eyes intelligence allies Australia, Canada, the UK and New Zealand are currently exempt from scrutiny of investments giving non-controlling interests.<sup>63</sup> Designation of these countries was largely anticipated as each operates pursuant to an intelligence-sharing arrangement with the US government.

Inbound CFIUS rules have their basis in legislation and have undergone years of revision, most recently an executive order (EO) by Biden in September 2022. The EO on Ensuring Robust Consideration of Evolving National Security Risks by the Committee on Foreign Investment in the United States marked the first time in the Committee’s history that a president has expressly directed CFIUS to prioritize certain national security risks when reviewing transactions. Although it does not change the Committee’s review process or legal jurisdiction, it elaborates on existing and

<sup>61</sup> Ankura Consulting Group. (2019, September 27). [Client Alert: New FIRRMA Regulations – Navigating a Changing FDI Review Environment.](#)

<sup>62</sup> US Department of the Treasury. (2020). [Fact Sheet: CFIUS Final Regulations Revising Declaration Requirement for Certain Critical Technology Transactions.](#)

<sup>63</sup> US Department of Treasury. (2022). [CFIUS Excepted Foreign States.](#)



adds new national security factors for CFIUS to examine when evaluating transactions. Specifically, it directs CFIUS to focus on supply chain resilience in critical sectors, such as AI, advanced clean energy, aspects of the agricultural industrial base that have implications for food security, biomanufacturing and biotechnology, climate adaptation technologies and quantum computing.<sup>64</sup>

### **Growing support for curbing outbound FDI**

While the US government has long monitored the investments that Chinese companies make in the US for potential security risks, it has little control over or insight into money moving from the US to China. Support has been building for the government to take more oversight of these kinds of deals. There is growing concern within the US government regarding the transfer of specific technology to China and the possibility of US businesses aiding the advancement of Chinese capabilities through their investments.<sup>65</sup> This stance has garnered bipartisan support on Capitol Hill and has gained attention from the White House. National Security Advisor Jake Sullivan expressed potential backing for an outbound review process in a speech in July 2021. As a result, it is becoming more evident that there is substantial support from both political parties for the implementation of some form of outbound investment review process.

Some proposals have prompted resistance from industry groups, which argue that overly broad restrictions could overwhelm government officials in charge of oversight, creating long delays, and rebound on the US economy, harming its competitiveness.<sup>66</sup> Nonetheless, a more significant bill in the direction of regulating outbound capital flows – the National Critical Capabilities Defense Act of 2021 (NCCDA) – was introduced to the Senate to ensure more resilient supply chains and prevent hostile entities from obtaining leverage over the US, thereby posing a potential threat to national security.

The bill, which did not pass in the previous Congress, proposed an ‘outbound CFIUS’, permitting review of and potentially restricting outbound investments. Had it been passed, it would have established a Committee on National Critical Capabilities (CNCC) with two primary capabilities. First, it would be able to review outbound transactions destined for ‘countries of concern’ due to their part in critical capability supply chains. Second, it would permit systematic gathering and review of national critical capability supply chain data to form recommendations for Congress with the aim of supporting the diversification and resilience of such chains. If, following a review, a risk would be found with a transaction, it could recommend the president to act.

The CNCC would only be able to review outbound investments related to national critical capabilities that are going to countries or entities of concern, making its scope narrower than that of the CFIUS. The first category for example includes certain medical and military items along with their supply chains, but the CNCC would be able to add other industries, such as semiconductors,

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<sup>64</sup> The White House. (2022). [FACT SHEET: President Biden Signs Executive Order to Ensure Robust Reviews of Evolving National Security Risks by the Committee on Foreign Investment in the United States](#).

<sup>65</sup> The US-China Economic and Security Review Commission. (2022). [Annual Report to Congress 2022](#). Washington: US Government Publishing Office. Pp. 200-201.

<sup>66</sup> Ibid.





in order to subject them to review as well. As geopolitics looks now, the latter category covers Russian or Chinese entities, or other investments in the two countries.

However, since the NCCDA did not pass in Congress, the Biden administration has reportedly prepared its own outbound investment screening mechanism and will soon present an Executive Order on establishing such a tool.<sup>67</sup> The proposed 'reverse CFIUS' is expected to be narrow in scope, with a focus on scrutinizing investments in specific countries of concern, particularly those involving military or dual-use technologies, as well as advanced technologies critical to the national security of the US.<sup>68</sup> The EO to implement this review mechanism is anticipated to be issued within the next few months.<sup>69</sup>

Some measures to curb US investments in China have already been taken by the president's office. Following the change in export control strategy signalled by the introduction of the MIEU rule, Biden announced a list of Chinese companies in the defence and surveillance technology sectors that will be barred from receiving US investment,<sup>70</sup> thereby preventing these investors from 'arming and funding' its 'leading competitor'.<sup>71</sup> The list includes companies such as the Semiconductor Manufacturing International Corp (SMIC), which is deemed vital to China's semiconductor production, and Huawei Technologies Ltd. More companies will be added to the list on a regular basis.<sup>72</sup>

## Evaluating the effects of the controls

The expansion CFIUS jurisdiction was notable in the Committee's 2020 annual report.<sup>73</sup> The decrease in Chinese investments is seen as a consequence of the increased scrutiny. FIRRMA should thus be deemed impactful in the desired direction.

Moreover, a November 2021 US-China Economic and Security Review Commission report observes flows of FDI between the two countries are at a lower level than previously, but augmented levels of venture capital and private equity along with a shift in the kind of targeted acquisitions.<sup>74</sup> The absence of transparency in these transactions makes it difficult to gain oversight or screening ability, which potentially poses a threat to national security. In addition, China's increasing military-civil fusion makes it a challenge to fully understand whether a Chinese entity that is seeking to invest or a transaction supports a military end-user, which would be a reason for denial.

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<sup>67</sup> Benson, E. and Putnam, M. (2023, April 27). [The United States Prepares to Screen Outbound Investment](#). *Center for Strategic and International Studies*.

<sup>68</sup> Swanson, A. and Hirsch, L. (2023, February 9). [US Aims to Curtail Technology Investment in China](#). *Reuters*.

<sup>69</sup> Shepardson, D. (2023, March 2). [U.S. outbound investment measure should not be overly broad, Biden official says](#). *Reuters*.

<sup>70</sup> Martina, M. and Freifield, K. (2021, June 4). [Biden order bans investment in dozens of Chinese defense, tech firms](#). *Reuters*.

<sup>71</sup> Leonard, J., Jacobs, J. and Mohsin, S. (2021, June 2). [Biden to Amend Trump's China Blacklist, Target Key Industries](#). *Bloomberg*.

<sup>72</sup> Martina, M. and Freifield, K. (2021, June 4). [Biden order bans investment in dozens of Chinese defense, tech firms](#). *Reuters*.

<sup>73</sup> US Department of The Treasury. (2021). [Committee On Foreign Investment In The United States – Annual Report To Congress \(Report Period: CY 2020\)](#).

<sup>74</sup> US-China Economic and Security Review Commission (2021). [2021 Annual Report to Congress](#). Washington: US Government Publishing Office.



Establishing ownership or influence structures has become more difficult with regard to Chinese entities. The screening process scrutinizes the influence provided by equity ownership, but the Chinese government uses ‘legal, political, and economic [tools] to influence the corporate sector’.<sup>75</sup> In addition, government ownership regardless of its percentage provides ‘special controlling rights’, which grants disproportionate influence in comparison to its ownership. The US screening process is thus not fit for purpose, and may therefore have already allowed companies with such structures access.

A significant amount of the investment concerns the development of emerging and foundational technologies, where the US needs to counter Chinese advances in areas such as synthetic biology and cloud computing. While FIRRMA gave the CFIUS more authority to ensure the ability to address the evolving threats these pose, much in line with the ECRA, it can only act on ‘non-controlling foreign investments’ if the technologies concerned are pre-listed. However, CFIUS has the right to screen investments retroactively. The Secretary of Commerce was tasked by Congress with identifying the technologies, but there has been no action on emerging technologies and close to no action on foundational technologies. CFIUS argues that a ‘lack of clarity (...) on what constitutes’<sup>76</sup> these two categories of technologies from the Department of Commerce has hindered its work. The Department argues that this approach would be ineffective in meeting national security objectives. In lieu, the multilateral route was prioritized. The CFIUS’ updated authority has thus not been fully implemented. The recommended Technology Transfer Review Group (TTRG) would manage multilateral engagement on investment screening.

Finally, on multilateral cooperation, the inaugural TTC states the importance of openness to foreign investment, through practice based on factors such as non-discrimination and proportionality of measures.<sup>77</sup> Like the working group on export controls, the group on investment screening will seek to engage with other relevant parties, share information on relevant trends, such as the kind of transactions and sources of investments, and best practices for effective screening, such as risk analysis.<sup>78</sup> A degree of harmonization would seemingly be beneficial for both parties, but transatlantic cooperation on investment screening has thus far been scarce. Discussions continue on investment screening, with a focus on the security risks posed by certain investments in sensitive technologies.<sup>79</sup>

### 2.1.5 Funding and subvention

The US has a long history of supporting innovation in critical and emerging technologies, and applying these developments to military uses. The US also puts considerable funding into its R&D structures. In the mid-1960s, at the peak of the race to the moon, the US government invested 2%

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<sup>75</sup> Ibid., P. 216.

<sup>76</sup> Ibid., P. 266.

<sup>77</sup> based on the OECD the Guidelines for Recipient Country Investment Policies Relating to National Security adopted by the OECD Council May 2009.

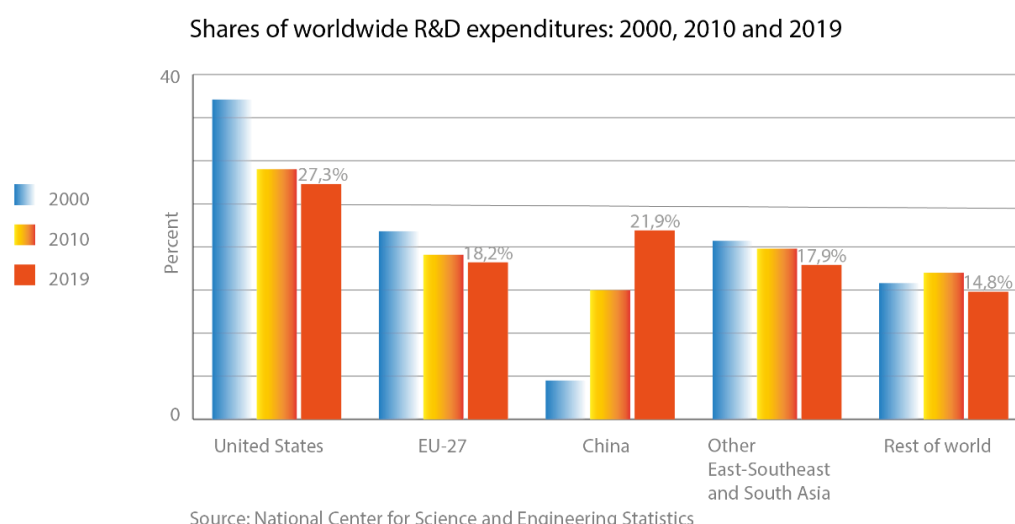
<sup>78</sup> European Commission. (2021). [EU-US Trade and Technology Council Inaugural Joint Statement](#).

<sup>79</sup> European Commission. (2023). [EU-US Trade and Technology Council](#).



of GDP in R&D. By 2020, that proportion had fallen to less than 1%. Despite spending more on R&D than any other country in 2019, 27% of global R&D or \$656 billion, the US has seen a decline in its global share, as several middle-income countries have experienced R&D growth that outpaces that of the US.<sup>80</sup>

At the same time, the policies implemented by Beijing have yielded remarkable results. Over the past two decades, China's investment in research and development has increased by an average of 15% annually to a global share of 22% in 2019 (see figure 2.4). The annual increase in China's R&D, which averaging 10.6% annually in 2010–2019, continues to greatly exceed that of the US, which averaged 5.4% in 2010–2019.<sup>81</sup> With this growth, China is projected to surpass US R&D spending by the mid-2020s. Furthermore, China has established itself as a leader in foundational technologies such as AI, 5G and quantum computing. Experts suggest that Congress should boost the US share of global R&D by 2030.<sup>82</sup>



*Figure 2.4 Shares of worldwide R&D expenditures: 2000, 2010 and 2019.*

### Strategies for enhanced R&D funding

Since 2014, the Third US Department of Defense (DoD) Offset Strategy has focused on three ways to approach technology innovation: defence R&D, integrating R&D from the non-defence-related private sector and repurposing existing DoD technologies. The strategy is an illustration of the aim to develop and ensure the nation's long-term technological superiority. This involves defence-related research and other areas such as disruptive technologies. The US Defense Innovation

<sup>80</sup> National Center for Science and Engineering Statistics. (2022). [US and Global Research and Development](#).

<sup>81</sup> Ibid.

<sup>82</sup> Lamberth, M. and Rasser, M. (2021, January 13). [Taking the Helm: A National Technology Strategy to Meet the China Challenge](#). CNAS.



Initiative (DII), launched in the Third Offset Strategy, inspired the UK to establish its own DII, which was allocated funding of £800 million over 10 years to support research in and beyond defence-related issues.<sup>83</sup>

The 100-day review published by the Biden Administration lists four critical technologies and the actions and investments to be implemented in order to protect the vulnerable supply chains for those technologies (see Section 2.1.1). Among the actions to be implemented that directly target the supply chain vulnerabilities of critical technologies are:<sup>84</sup>

- The Department of Health and Human Services (HHS) has made an initial commitment of approximately \$60 million to increase domestic production of active pharmaceutical ingredients (APIs).
- The Department of Energy (DOE) aims to support the domestic battery supply chain with an investment of \$17 billion along with a further \$260 million in project investments under the DOE's Federal Energy Management Program's Assisting Federal Facilities with Energy Conservation Technologies grants.
- Following the strategy of cooperating with allies and public-private partnerships, the US will partner with the private sector and build on its engagements with Japan and the Republic of Korea in addition to an investment of over \$17 billion in semiconductor production.
- The Department of Interior (DOI) aims to establish a working group to identify locations for critical mineral production and processing, while DOD R&D efforts will complement those with private sector involvement.

These bills represent a realization that there has been underinvestment and underdevelopment in federal support for technology, R&D and innovation. Greater federal support could help US companies develop and compete in biotechnology, AI and quantum computing as 'whoever defines the future of technology will determine the rest of the twenty-first century'.<sup>85</sup> The aim is to foster a drive to out-compete China that is reminiscent of the US drive during the Cold War and post-Sputnik. The drive is necessary for the US to enhance not just its national capacities, but also its foreign capabilities. As Biden's national security advisor, Jake Sullivan, has stated, '*foreign policy is domestic policy*'. In order to counter Chinese influence in setting global technological standards, the Biden Administration and US allies have reinstated the multilateral and mini-lateral agendas that had been cast aside by the Trump administration, which paved way for China to take advantage of various platforms, not least several UN agencies.<sup>86</sup>

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<sup>83</sup> Marino, T. (2017). Maintaining NATO's Technological Edge: Strategic Adaptation and Defence Research & Development. NATO Parliamentary Assembly: Science and Technology Committee.

<sup>84</sup> The White House. (2021). Building Resilient Supply Chains, Revitalizing American Manufacturing, And Fostering Broad-based Growth. 100-Day Reviews under Executive Order 14017.

<sup>85</sup> Bade, S. (2021, May 1). Is Washington prepared for a geopolitical 'tech race'?. TechCrunch.

<sup>86</sup> Ibid.



The 2021 Summit on Global Supply Chain Resilience<sup>87 88</sup> held by Biden with G20 leaders showcases Biden's priorities on building supply chain resilience focused on many of the technologies discussed above, such as semiconductors, lithium batteries and electronics. The supply chain disruptions and recent geopolitical tensions have only further emphasized the need for greater collaboration between G20 leaders to secure supply chain processes. This also shines light on the increase in public-private partnership possibilities, such as the Department of Energy hinting at a new public-private alliance for securing domestic supply chains of lithium batteries.

The 2021 Annual Report's<sup>89</sup> detailed account of China's advance towards self-sufficiency and global expansion informed the Commission's recommendations to Congress. These recommendations come in the form of possible actions that can be taken to respond to each of China's developments in areas ranging from biotechnology, AI, NEV batteries and smart cities to Chinese influence and expansion in Taiwan, Hong Kong and Latin America. The report offers a detailed articulation of Chinese developments in building national supply chains and the increase in Chinese public-private partnerships.

Greater support for the US private sector could help firms to compete with Chinese efforts. To remain competitive, the US would benefit from continued R&D investment strategies and involvement in international standard setting to enhance domestic alternatives and strengthen allied relationships, thereby reducing supply chain dependency in the event that China might '*cut off access to key inputs*'.

Among the new national support measures to protect and promote domestic technological advances are an EO on Ensuring the Future is Made in All of America by All of America's Workers, signed in January 2021; and a 'Buy American' initiative that encourages the domestic mining, acquisition, production and manufacture of goods. This this does not mean that all goods will be produced or manufactured domestically. The focus is on certain critical technologies and ensuring supply chain security.

An EO on US supply chains was signed on 24 February 2021 to ensure supply chain security for economic and national security reasons through the diversification of domestic production, much as the EU discusses in its 2021 Action Plan (see Section 2.2.1). A Memorandum on Revitalizing America's Foreign Policy and National Security Workforce, Institutions, and Partnerships, signed on 4 February 2021, contains plans for workforces promotion to attract scientific talent and expertise, and on recruitment and training in STEM-related fields.

Current policies hint at increased public-private partnerships due to the greater competitiveness and innovativeness of the private sector. This is understandable as private investment in R&D has

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<sup>87</sup> The White House. (2021). Fact Sheet: Summit on Global Supply Chain Resilience to Address Near-Term Bottlenecks and Tackle Long-Term Challenges.

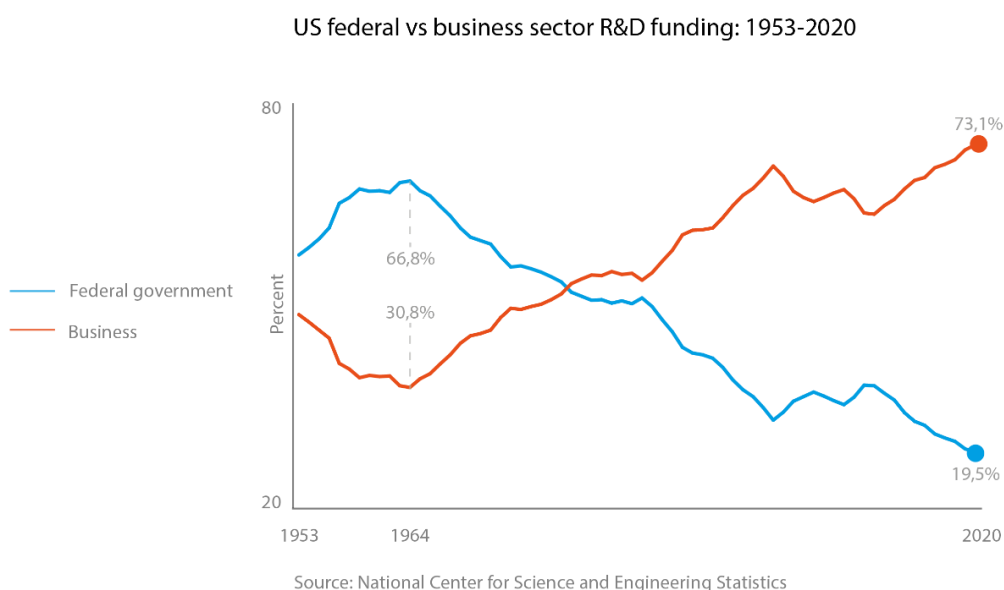
<sup>88</sup> News Wires. (2021, October 31). With G20 leaders, Biden unveils steps to ease global supply chain woes. *France24*.

<sup>89</sup> US-China Economic And Security Review Commission. (2021). 2021 Report To Congress. Washington: US Government Publishing Office.





surpassed public/federal funding in recent years (see Figure 2.5). The US saw a flood of initiatives, innovation and federal support post-Sputnik and would hope to see a similar flood following the wake-up call from China. Figure 2.5 shows that federal funding largely exceeded that of the business sector post-Sputnik in the late 1950s but has declined since the mid-1960s.



*Figure 2.5 US federal vs business sector R&D funding: 1953-2020.*

The Biden administration aims to enhance public-private partnerships, acquire talent in the technological sector and boost the nation's innovativeness and competitiveness. A recent example of a US public-private partnership is NASA's collaboration with Elon Musk's SpaceX, which was confirmed in April 2021. Using advanced SpaceX capacities, NASA aims to build a next-generation spacecraft to return people to the moon for the first time since the Apollo mission in 1972 and to step-up US efforts in outer space.<sup>90</sup>

### Historic investments in R&D

The Biden administration has introduced several bills to inject more funding into research and innovation (R&I), boost national infrastructure and enhance national competitiveness. The 117th Congress debated various proposals to enhance the technological competitiveness of the US against China and safeguard against the transfer of capital, goods and critical research to Chinese entities that may be predatory or part of China's military-industrial complex.

To begin with, the Infrastructure Investment and Jobs Act, dubbed historic legislation (or the American Jobs Plan, as Biden initially called it), signed into law in 2021,<sup>91</sup> is targeted at national

<sup>90</sup> Luscombe, R. (2021, April 17). [Nasa picks Elon Musk's SpaceX to build spacecraft to return humans to moon](#). *The Guardian*.

<sup>91</sup> US Congress. (2021). [H.R.3684 - Infrastructure Investment and Jobs Act](#).



infrastructure and training to improve economic competitiveness and create jobs.<sup>92</sup> This adds to the investments proposed in the Build Back Better bill, which was passed by Congress in the same year,<sup>93</sup> also with the aim of creating jobs and boosting competitiveness.<sup>94 95</sup>

According to officials,<sup>96</sup> the bill can help the nation reach its highest levels of federal investment in R&D after years of stagnation since the 1960s (see Figure 2.5). The bill also aims to pursue more long-lasting and climate-friendly investments in electric cars, for instance, or training labour for the 'greener' jobs of the future, which could indicate a possible twin transition as is envisaged in the EU whereby digitalization will be accompanied by greener investments. Although hailed as a victory by many, some financial experts have been quick to criticize the bill, arguing that it could lead to hyperinflation in an already growing economy.<sup>97</sup>

Other significant bills were also introduced in 2021 to increase S&T funding in the race to increase US competitiveness and innovation: the US Innovation and Competition Act of 2021, formerly known as the Endless Frontier Act, which passed by the Senate,<sup>98</sup> aimed to strengthen US competitiveness, increase investment and research in critical technologies such as semiconductors, and ensure US leadership.<sup>99</sup>

A modified version of the bill became law in August 2022, as the Creating Helpful Incentives to Produce Semiconductors (CHIPS) and Science Act.<sup>100</sup> This act aims to incentivize the production of semiconductors, and to support research and standards development in emerging technologies. The law allocates \$280 billion in spending over the next ten years, with the majority, \$200 billion, designated for scientific R&D and commercialization. Of the remaining funds, \$52.7 billion is allocated for semiconductor manufacturing, R&D and workforce development, while \$24 billion worth of tax credits are provided for chip production. An additional \$3 billion is set aside for programmes targeting leading-edge technology and wireless supply chains.

Of equal importance is the Inflation Reduction Act (IRA), passed by Congress in August 2022, which allocates nearly \$400 billion in federal funding to clean energy, with the goal of substantially reducing the nation's carbon emissions by the end of this decade. The funds will be disbursed through a combination of tax incentives, grants and loan guarantees. Clean electricity and transmission receive the largest share, followed by clean transportation, which includes incentives for electric vehicles.<sup>101</sup> While the IRA represents an ambitious climate effort and seeks to address

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<sup>92</sup> The White House. (2021). [Fact Sheet: The Bipartisan Infrastructure Deal](#).

<sup>93</sup> The White House. (2021). [President Biden Announces the Build Back Better Framework](#).

<sup>94</sup> The White House. 2021. [The Build Back Better Agenda](#).

<sup>95</sup> Long, H. (2021, November 7). [Biden's infrastructure bill will bring jobs. He wants the safety net bill to reduce inequities](#). *The Washington Post*.

<sup>96</sup> Tankersley, J. (2021, March 31). [Biden Details \\$2 Trillion Plan to Rebuild Infrastructure and Reshape the Economy](#). *The New York Times*.

<sup>97</sup> Ng, A. (2021, November 23). [Kevin O'Leary on US spending plan: 'The last thing we need is an inflation bill'](#). *CNBC*.

<sup>98</sup> US Congress. (2021). [S.1260 - United States Innovation and Competition Act of 2021](#).

<sup>99</sup> Cohon, J., Coleman, M. S. and Conn, R. (2021, September 7). [US Innovation and Competition Act will ensure continued US leadership](#). *The Hill*.

<sup>100</sup> US Congress. (2022). [H.R.4346 - Chips and Science Act](#).

<sup>101</sup> McKinsey & Company. (2022, October 24). [The Inflation Reduction Act: Here's what's in it](#).



the risks of clean-energy supply chains being weaponized, similar to the historical cases with oil in the 1970s and natural gas in Europe following Russia's full scale invasion of Ukraine in 2022, it also has direct implications for the EU. Since some IRA subsidies discriminate against foreign producers there are fears that investment will divert from the EU to the US and that this will lead to a distortion of transatlantic trade and investment. Given that these critical issues remain unresolved, it is likely that they will continue to be raised and discussed, in forums like the TTC.

## 2.1.6 Conclusion

The most recent developments in the US therefore show increased ambitions to protect critical technologies through increased use of export controls, FDI regulation and subventions. First, export control measures have become a crucial tool in US national security and foreign policy, as illustrated by the revised export control system with a strong focus on emerging and foundational technologies. While the track record mostly consists of unilateral measures such as expansions of the Entity list, the US is also working with like-minded partners to harmonize export controls and other policies, with a focus on all semiconductor-related production, in order to maintain its technological leadership. Multilateral efforts have already come to fruition when it comes to limiting semiconductor production capacity in countries of concern, particularly China.

Second, the regulation of FDI in the US has undergone significant changes in recent years, not least with the introduction of the Foreign Investment Risk Review Modernization Act. There is also growing bipartisan support for the government to take more oversight of outbound investments to ensure more resilient supply chains and stop hostile entities from obtaining leverage over the US, potentially posing a threat to national security.

Third, the Biden administration has taken significant steps to increase funding for R&I, enhance national infrastructure and boost national competitiveness. A long-term commitment has emerged to promoting critical technologies, particularly during the second half of the Biden administration, as demonstrated by historic investments through the Infrastructure Investment and Jobs Act, the Build Back Better bill, the US Innovation and Competition Act, the CHIPS and Science Act and the Inflation Reduction Act. These bills represent a significant shift in the US approach to promoting R&I as the nation seeks to strengthen its global leadership in critical technologies.

These new ambitions seem to be driven by both internal and external forces. Both Trump's Make America Great Again and America First campaigns, as well as Biden's Build Back Better Framework, demonstrate growing bipartisan support for protectionist policies aimed at boosting the domestic economy, particularly in the context of the post-pandemic era. At the same time, concerns about supply chain dependencies have increased due to China's increasing militarization and aggressive rhetoric regarding Taiwan, as well as lessons learned from Russia's war against Ukraine. Overall, recent geoeconomic developments in the US indicate a shift in its technological strategy, moving from relative advantage to ensuring that China falls behind as far as possible.



## 2.2 The European Union

### 2.2.1 Introduction

Much like the US, the EU has started to place greater emphasis on the need to protect and develop critical and emerging technologies in order to reduce its dependencies on third parties and become more autonomous, albeit while remaining an open economy. Its efforts have focused on mapping vulnerabilities, investing in European capabilities and laying the ground for a common strategy with the Chips Act, the Critical Raw Materials Act and a planned Sovereignty fund as current examples.

The EU's unique structure means that it has several concerns that may not be shared by the US. Although it can act as a single actor, the member states' various policies, strategies and interests can conflict with the interests of the block as a whole, leaving the EU quite fragmented. Moreover, the two allies differ in their approach to regulation. While the US tends to be reactive toward regulation, the EU often takes a prescriptive approach, emphasizing the 'precautionary principle'. In practice this means only limited introduction of new innovations, the implications of which are not thoroughly understood. One such area where the EU and US remain divided concerns digital regulation and competition, which are discussed in the EU-US Trade and Technology Council in relation to AI governance.<sup>102</sup>

#### Tech control and strategic autonomy

The quest for European strategic autonomy has been an overarching feature of much of the EU's recent initiatives, and the protection of critical technologies has been at the heart of it. Russia's war in Ukraine has bolstered both supporters and critics of the concept. President of France Emmanuel Macron emphasized the concept of strategic autonomy during his recent visit to China. On his return to Europe, he received support from President of the European Council Charles Michel. Other EU member states have expressed caution. Sweden and seven others (Ireland, Finland, Denmark, Germany, the Czechia, Estonia and the Netherlands, known as the Stockholm Eight) have been pushing for a continuation of liberal free trade, insisting that certain EU supply chains are already highly resilient and arguing that Europe does not therefore require further resilience.

The European Commission speaks of 'open strategic autonomy', which means combining the EU's ability to make its own choices and shape the world around it through leadership and engagement, reflecting its strategic interests and values. As such, it builds on three pillars: resilience and competitiveness to strengthen the EU's economy; sustainability and fairness, reflecting the need for responsible and fair EU action; and assertiveness and rules-based cooperation to showcase the

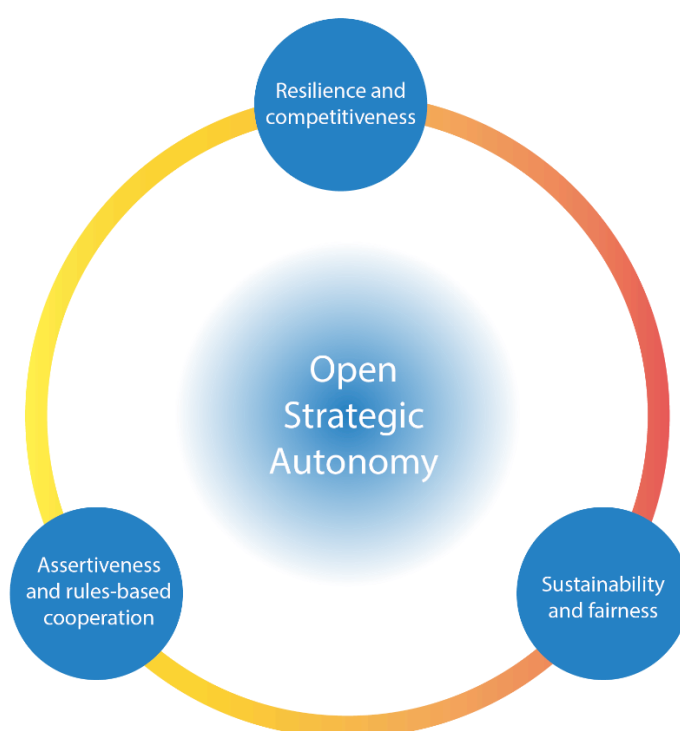
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<sup>102</sup> Benson, E. and Kapstein, E. B. (2023, February 1). [The Limits of 'Friend-Shoring'.](#) CSIS.



EU's preference for international cooperation and dialogue, but also its readiness to combat unfair practices and use autonomous tools to pursue its interests where needed.<sup>103</sup>

On technological sovereignty, Thierry Breton, the EU's Commissioner for Internal Market, stated in September 2020 that 'Europe must now lay the foundations of its sovereignty for the next 20 years'. He clarified that it is not a question of giving in to the temptation of isolation or withdrawal into itself but a question of making choices that will develop European technologies and alternatives, 'without which there can be neither autonomy nor sovereignty'. The time has come to take back the common initiative, he added, signalling the need for a new technological strategy.



*Figure 2.6 European Open Strategic Autonomy.*

Although the member states do not yet entirely agree on what the term 'sovereignty' should entail, the French presidency in 2022 in the post-Merkel era aimed to define how Europe articulates strategic autonomy,<sup>104</sup> as Macron hinting at solidifying EU democratic values and addressing security and defence concerns involving borders, cybersecurity, illegal immigration and so on to strengthen the EU as a strategic leader. Much as in the US, EU leaders have increasingly come to agree that European value chains are vulnerable, as was highlighted by the Covid-19 crisis and Russia's war in Ukraine.

<sup>103</sup> Sandby, M. (2021, February 9). Sweden flies the flag for the free-trade cause in the EU. *Financial Times*.

<sup>104</sup> France24. (2022, December 19). France's EU presidency: Macron calls for European 'collective security' pact, dialogue with Russia. *France24*.





In response to these challenges, the EU has begun strengthening European strategic autonomy, which can be seen particularly in the defence arena with the emergence of a European defence technological and industrial complex (EDTIC), where the European Defence Fund (EDF) plays a crucial role.<sup>105</sup> Other examples are the reviews and coordination of its industrial policy and its trade policy over the past three years.

Finally, the EU plans to protect its economic sovereignty by implementing a new trade defence tool to retaliate against countries that use punitive measures, such as China's recent block on Lithuanian imports due to Lithuania's relationship with Taiwan. The anti-coercion instrument (ACI) aims to deter third countries from targeting the EU and its member states with measures that affect trade or investment. Such countermeasures would include increased customs duties, withdrawal of import or export licences, and restrictions in the fields of services and public procurement. The ACI is designed to de-escalate and prevent coercive measures through dialogue. Any countermeasures would therefore only be taken as a last resort. The legislation is expected to enter into force in the summer of 2023, after a final approval in the spring.<sup>106</sup>

### **New strategies for technologic leadership**

In March 2020, the European Commission adopted the EU Industrial Strategy to lead the twin transitions towards climate neutrality and digital leadership. It outlines three drivers for industrial transformation: global competition, climate neutrality and a digital future. An updated New Industrial Strategy,<sup>107</sup> published in May 2021, highlights the significance of an open approach to European strategic autonomy. Additions to the existing 2020 strategy include lessons learned from Covid-19 and how to strengthen the resilience and autonomy of the EU. The New Strategy reiterates concerns about a fragmented EU and raises the issues this posed for the Single Market at the beginning of the pandemic when EU member states prioritized national interests, with the potential to tear the EU apart. It also emphasizes the need to reduce industrial and technological dependencies, which became even more apparent during the pandemic, and the need to push for and ensure a level playing field to protect and advance EU interests.

Similarly, the EU's New Innovation Agenda,<sup>108</sup> adopted in July 2022, aims to position the continent as a leader in deep tech innovation and start-ups. It focuses on five key areas: mobilizing investors to fund deep-tech start-ups; facilitating innovation through experimentation spaces and public procurement; supporting innovation in regional hubs; fostering talent development and retention; and improving policymaking tools through the development of data sets and shared definitions to inform policies across the EU.<sup>109</sup>

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<sup>105</sup> Csernatoni, R. (2021, December 6). The EU's Defense Ambitions: Understanding the Emergence of a European Defense Technological and Industrial Complex. *Carnegie Europe*.

<sup>106</sup> Bounds, A. (2023, March 28). EU agrees trade defence tool against China. *Financial Times*.

<sup>107</sup> European Commission. (2021). Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery.

<sup>108</sup> European Commission. (2023). The New European Innovation Agenda.

<sup>109</sup> European Commission (2022). A new European innovation agenda. *Publications Office of the European Union*.



In February 2021, having been announced in the New Industrial Plan for Europe, the European Commission presented an Action Plan on Synergies between civil, defence and space industries,<sup>110</sup> to further enhance Europe's technological edge and support its industrial base. This strategic Action Plan, adopted in July 2021, is designed to reinforce European innovation by exploring and exploiting the disruptive potential of technologies at the interface between defence, space and civil uses, such as cloud, processors, cyber, quantum and artificial intelligence.

The so-called Three-Point Belt Plan outlines specific policy measures to achieve three main objectives: improving the effectiveness of investments and outcomes by enhancing complementarity between relevant EU programmes and instruments (referred to as 'synergies'); ensuring that EU funding for R&D, including defence and space, generates economic and technological benefits for European citizens (referred to as 'spin-offs'); and promoting the integration of civil industry research accomplishments and innovation driven by the civil sector into European defence cooperation projects (referred to as 'spin-ins').

Finally, the European Commission announced in March that it plans to unveil an Economic Security Strategy later this year. The strategy will aim to identify areas where the EU needs to enhance its economic security and explore opportunities for improving the utilization of trade and technology security tools.<sup>111</sup>

### Mapping critical technologies

The EU has published several documents highlighting its projects and initiatives targeted at critical technologies, as well as a detailed and clear list of the technologies that need to be protected and possibly developed internally. The EU has clearly identified and published lists of these critical technologies (see figure 2.7). The protection of critical technologies and the ambition to secure access to them form part of the EU's increasingly broad ambition for strategic autonomy. Critical technologies have been defined by the European Commission as: *'technologies that are relevant across the defence, space and related civil industries and contribute to Europe's technological sovereignty by reducing risks of overdependence on others for things we need the most'*.<sup>112</sup>

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<sup>110</sup> European Commission (2021). [Action Plan on synergies between civil, defence and space industries](#).

<sup>111</sup> European Commission (2023, March 30). [Speech by President von der Leyen on EU-China relations to the Mercator Institute for China Studies and the European Policy Centre](#).

<sup>112</sup> Ibid.



Sector	Technologies
<b>ELECTRONICS &amp; DIGITAL</b>	<ul style="list-style-type: none"><li>• Artificial Intelligence, advanced analytics and big data</li><li>• Cybersecurity and cyber defence technologies</li><li>• Digital forensic technologies</li><li>• High-performance computing, cloud and data spaces</li><li>• Photonics</li><li>• Ultra-low power microprocessors, lightweight printed or flexible electronics</li><li>• Quantum technologies</li><li>• Secure communications and networking</li><li>• Sensors (including electro-optical, radar, chemical, biological, radiation, etc.)</li></ul>
<b>MANUFACTURING</b>	<ul style="list-style-type: none"><li>• Advanced and additive manufacturing</li><li>• Advanced materials technologies and sustainable materials by design</li><li>• Nanotechnologies</li><li>• Robotics</li><li>• Semiconductors and microelectronics</li><li>• Space technologies (including design and manufacturing of launchers and satellites)</li></ul>
<b>SPACE &amp; AERONAUTICS</b>	<ul style="list-style-type: none"><li>• Biotechnologies</li><li>• Chemical, biological, radiological and nuclear technologies</li></ul>
<b>ENERGY</b>	<ul style="list-style-type: none"><li>• Energy technologies (including energy storage, energy resilience, renewables, hydrogen and nuclear)</li></ul>
<b>MOBILITY</b>	<ul style="list-style-type: none"><li>• Autonomous systems</li></ul>

Figure 2.7 List of examples of critical technologies across the relevant sectors.<sup>110</sup>

Building on this list, the Action Plan on Synergies between civil, defence and space industries of February 2021 presents a methodology, which starts by identifying critical technologies and then develops roadmaps for those technologies and finally applies them to real projects. An Observatory for Critical Technologies was set up to monitor and analyse CETs, the desired level of EU control over them, and existing gaps and dependencies across the civil, defence and space industries.

The Roadmap on critical technologies for security and defence,<sup>113</sup> adopted in February 2022, outlines a path for boosting research, technology development and innovation (RTD&I) and reducing the EU's strategic dependencies on critical technologies and value chains for security and defence, notably by identifying technologies critical for EU security and defence, and boosting

<sup>113</sup> European Commission. (2021). [Roadmap on security and defence technologies](#).



them through European RTD&I programmes; ensuring that defence considerations are better taken into account in civilian European RTD&I programmes, and industrial and trade policies; promoting from the outset an EU-wide strategic and coordinated approach for critical technologies for security and defence; and coordinating as far as possible with other like-minded partners, such as the US and NATO.

The significance the EU places on ensuring supply chain security arises from its reliance on the supply of raw materials from non-EU countries to enable it to produce and export manufactured goods. This, however, is not entirely sustainable. These supply chains could be threatened by political disputes, climate vulnerability and state fragility, as well as crises similar to the Covid-19 pandemic. This calls for greater attention to be paid to ensuring that the EU is able to develop 'core technologies' and integrate these within the EU internal market in order to reduce its dependency in the digital domain. In addition to greater internal integration, reduced dependency could be achieved through trade diversification. This, however, would pose a dilemma in terms of diversification versus building trading relationships. How can the EU become less dependent while maintaining an open economy? These concerns are reiterated in European Commission's Strategic Foresight Reports of 2021,<sup>114</sup> and 2022,<sup>115</sup> as well as the JRC's 2021 Policy Report,<sup>116</sup> which focuses on the EU's capacity to become a global leader and standard-setter in the current geopolitical landscape.

The current geopolitical landscape is said to increase the urgency of transitioning to more resilient, diversified and dependable supply chains, and could even lead to the emergence of 'friend-shoring'<sup>117</sup> practices. Such changes also have the potential to reduce carbon emissions and promote circular economy practices. As a response, partners of the EU, such as South Korea, the US and Japan, have implemented or are in the process of developing supply chain monitoring systems and enhancing domestic capabilities.

Any disagreement between member states on how to proceed and what kind of measures to adopt to reduce technological dependencies and increase domestic capacities could pose problems. The EU is competing against both China and the US. While its allies, particularly the US, initially seemed to be heading towards a collaborative approach to competition with China, the EU seemed to face being either left out or forced to collaborate. This trend was accentuated during the Trump administration but thought likely to change under a more benign Biden administration. However, this notion was initially challenged by the AUKUS pact in September 2021 when the US and the UK decided to join forces with Australia to counter geopolitical issues in the Indo-Pacific, excluding the EU.

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<sup>114</sup> European Commission. (2021). 2021 Strategic Foresight Report: The EU's capacity and freedom to act.

<sup>115</sup> European Commission. (2022). COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL 2022 Strategic Foresight Report Twinning the green and digital transitions in the new geopolitical context.

<sup>116</sup> Cagnin, C., Muench, S., Scapolo, F., Störmer, E., Vesnic-Alujevic, L. 2021. *Shaping and securing the EU's open strategic autonomy by 2040 and beyond.* Publications Office of the European Union: Luxembourg.

<sup>117</sup> Deliberately sourcing critical materials, goods or services with allies who share the same values



The nail in the coffin of the collaborative approach was when the US a year later announced new protectionist industrial policies, particularly the CHIPS and Science Act and the IRA, followed by unilateral export controls on China. China has not yet taken direct action against these October measures but has announced financial support for its semiconductor industry and is seeking deeper technology ties with Europe in response to US unilateralism. China has recently passed an Anti-Foreign Sanctions Law, and further countermeasures against US restrictions should be expected. The EU, however, is yet to take a clear stance on the issue.<sup>118</sup>

## 2.2.2 Export control measures

The EU has a role in export controls on both defence-related materials and dual-use products, which are products that can have both civilian and military applications. The export control of dual-use products is where most of the relevance for critical technologies can be found and is the focus below.

### Modernization of EU export controls

Following a 2014 communication that set out options to review the EU's export controls, the Commission adopted a proposal to modernize the EU export control system in September 2016. The European Parliament and the Council adopted a new regulation on 20 May 2021.<sup>119</sup> Since then, the EU's export of dual-use items has been governed by EU Regulation 2021/82.<sup>120</sup> All member states apart from Cyprus are part of the Wassenaar Arrangement (WA).<sup>121</sup> Commitment to this multilateral export control regime, and others such as the Australia Group (AG), is reflected in the regulation's Annex I, which is regularly updated to be in line with the regimes' decisions. The regulation takes the EU's obligations and those of its member states into account, such as to the Biological and Toxin Weapons Convention (BTWC) and the Chemical Weapons Convention (CWC).<sup>122</sup>

The newly updated version of the regulation entered into force in September 2021. The primary aims are to enhance cooperation with partners, promote global convergence of controls, reduce trade frictions and increase predictability for businesses. In addition, the EU seeks to uphold international peace and security while promoting its core values. This could mean more restrictive controls over time. Significant changes concern the introduction of new controls on cybersurveillance items for export, an expanded mechanism to control unlisted items, an

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<sup>118</sup> Gehrke, T. and Ringhof, J. (2023). *Caught in the crossfire: Why EU states should discuss strategic export controls*. *European Council on Foreign Relations*.

<sup>119</sup> European Commission. (2023). *Exporting dual-use items*.

<sup>120</sup> EU Publications Office. (2021). *Regulation (EU) 2021/821 of the European Parliament and of the Council of 20 May 2021 setting up a Union regime for the control of exports, brokering, technical assistance, transit and transfer of dual-use items (recast)*. *Official Journal of the European Union* (L206).

<sup>121</sup> The Wassenaar Arrangement (2020). *About Us*.

<sup>122</sup> EUR Lex. (2017). *Consolidated text: Council Regulation (EC) No 428/2009 of 5 May 2009 setting up a Community regime for the control of exports, transfer, brokering and transit of dual-use items (Recast)*.





‘enforcement coordination mechanism’, public reporting of the export of dual-use items, and the introduction of technical assistance controls.

Specifically, Article 5 requires licences for exports of non-listed cyber-surveillance items if they are likely to be used for internal repression or serious violations of human rights. National authorization requirements may also be imposed and exporters are expected to exercise due diligence to determine the intended use of these items. EU Member states that impose authorization requirements must provide relevant information to other member states and the Commission to prevent circumvention. However, the new regulation does not provide a list of controlled cyber-surveillance items as the Commission initially proposed.

During the trialogue negotiations,<sup>123</sup> which led up to the new legislation, it was agreed to further restrict the export of cyber-surveillance technologies. European exports of such technologies have previously been controversial and given wide attention due to their role in human rights abuses.<sup>124</sup> The suggestion was therefore made that the EU establish an autonomous control list of cyber-surveillance technologies as an addition to the Wassenaar Arrangement’s lists. Creating such a list would have served to restrict EU exports still further.

The negotiations on whether to establish this list led to the creation of two groups with opposing stances: nine member states<sup>125</sup> rejected the proposal as it was argued that this addition would risk the European market’s competitiveness, but also deviate from the long-standing practice of basing export controls on the four international regimes (the AG, the Nuclear Suppliers Group, the WA and the Missile Technology Control Regime).<sup>126</sup> The opposing group<sup>127</sup> argued that an additional list was necessary as the EU must be a leader in the promotion of human rights, but the four regimes should remain at the core of the ‘identification and regulation’ of dual-use items.<sup>128</sup> While these groups may not be representative of all the critical dual-use technology export debates, they serve as an indication of the stances of individual member states and smaller groups on related issues.

It should be noted that Germany has already added certain items proposed for the additional list, such as data retention systems.<sup>129</sup> It now constitutes an outlier by extensively restricting technology exports in a way that is likely to continue. By contrast, France has traditionally argued for more relaxed regulation of the EU’s harmonization efforts, for example in the discussions on eligible recipients of European defence equipment. Germany has made concessions in discussions

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<sup>123</sup> Between the European Commission, the Council of the European Union and the European Parliament.

<sup>124</sup> Timm, T. and York, J. C. (2012, March 6). [Surveillance Inc: How Western Tech Firms Are Helping Arab Dictators](#). The Atlantic.

<sup>125</sup> Czech Republic, Cyprus, Estonia, Finland, Ireland, Italy, Poland, Sweden and the UK.

<sup>126</sup> Council of the European Union. (2018). [Working paper: Paper for discussion – For adoption of an improved EU Export Control Regulation 428/2008 and For Cyber Surveillance Controls Promoting Human Rights and International Humanitarian Law Globally](#).

<sup>127</sup> Croatia, Czech Republic (signed both), France, Germany, Italy, Poland (signed both), Portugal, Romania, Slovakia, Slovenia and Spain.

<sup>128</sup> Council of the European Union (2018). [Working Paper: EU Export Control – Recast of Regulation 428/2009](#).

<sup>129</sup> Bromley, M. & Gerharz, P. (2019, October 7). [Revising the EU Dual-use Regulation: Challenges and opportunities for the trilogue process](#). SIPRI.



on harmonizing the EU's exports, not least on participation in joint projects, beginning with a bilateral agreement with France.<sup>130</sup>

The idea of an autonomous list did not make it into the final regulation text and it is unlikely to be added in the near future. The expanded mechanism to control unlisted items (i.e. address emerging technologies) through Article 9, however, functions as a possibility for member states to list additional dual-use items (not only cyber surveillance items) in their national controls and introduces 'reasons of public security, including the prevention of acts of terrorism, or for human rights considerations'<sup>131</sup> as a motive for doing so. 'Transmissible' controls are applicable to the published items if the exporter has been 'informed' that the item is 'or may be intended (...) for uses of concern with respect to' the new reasons, which will further level the playing field between member states.<sup>132</sup>

Where the breadth of controls is likely to increase, the enforcement coordination mechanism seeks to gather together the member states' individual licensing and enforcement agencies to share information on 'detection and prosecution of unauthorized exports'<sup>133</sup> that violate either this EU regulation or national legislation. These actors have not previously been formally involved in an EU body. Previous work has focused on the licensing officers and lacked any focus on regular enforcement.<sup>134</sup>

Public reporting on the export of dual-use items tasks the Commission with publishing annual data on licence applications, such as an item description and its destination, and more expansive information on cyber-surveillance items.<sup>135</sup> This reporting is a demanding commitment as member states have varied experience of collecting this kind of information and making it public.<sup>136</sup> This regular reporting will increase transparency and help European industry keep up to date and react accordingly.<sup>137</sup>

However, despite years of negotiations and legislative work, the recast of the EU Dual-Use Regulation may not constitute the revolutionary change that some imagined. The framework remains largely the same and the new rules seem only to apply in a limited number of scenarios.

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<sup>130</sup> Knight, B. (2019, February 18). [Germany's Angela Merkel makes arms export pact with France](#). *Deutsche Welle*.

<sup>131</sup> EU Publications Office. (2021). [Regulation 2021/821 of the European Parliament and of the Council of 20 May 2021 setting up a Union regime for the control of exports, brokering, technical assistance, transit and transfer of dual-use items \(recast\)](#). *Official Journal of the European Union (L206)*, p. 12.

<sup>132</sup> EU Publications Office. (2021). [Regulation 2021/821 of the European Parliament and of the Council of 20 May 2021 setting up a Union regime for the control of exports, brokering, technical assistance, transit and transfer of dual-use items \(recast\)](#). *Official Journal of the European Union (L206)*, p. 13.

<sup>133</sup> EU Publications Office. (2021). [Regulation 2021/821 of the European Parliament and of the Council of 20 May 2021 setting up a Union regime for the control of exports, brokering, technical assistance, transit and transfer of dual-use items \(recast\)](#). *Official Journal of the European Union (L206)*, p. 21.

<sup>134</sup> Bromley, M. & Brockmann, K. (2021). [Implementing the 2021 Recast of the EU Dual-Use Regulation: Challenges and Opportunities](#). EU Non-Proliferation and Disarmament Consortium.

<sup>135</sup> EU Publications Office. (2021). [Regulation 2021/821 of the European Parliament and of the Council of 20 May 2021 setting up a Union regime for the control of exports, brokering, technical assistance, transit and transfer of dual-use items \(recast\)](#). *Official Journal of the European Union (L206)*, p. 21.

<sup>136</sup> Bromley, M. & Brockmann, K. (2021). [Implementing the 2021 Recast of the EU Dual-Use Regulation: Challenges and Opportunities](#). EU Non-Proliferation and Disarmament Consortium.

<sup>137</sup> European Commission. (2020). [Commission welcomes agreement on the modernisation of EU export controls](#).



The option for member states to adopt national measures instead of EU-wide rules could lead to increased fragmentation, making compliance by companies more difficult.

## 2.2.3 Control of foreign direct investment

Of the 27 EU member states, 18 have screening regimes, but these differ greatly in terms of whether filings are mandatory or voluntary, the type of trigger for filing requirements, the critical industries that are required to file, government intervention rights, suspensory nature, coverage of non-domestic investors and duration/structure of proceedings. Some regimes are hybrid and the answers to these questions depend on the target's activities and other factors.

### Legislative developments in the EU

The EU's FDI screening regulation has been in place since October 2020, and it could be argued that it must now prove its effectiveness as the EU emerges from the pandemic. It was Chinese investment, which increased dramatically following the financial crisis of 2008,<sup>138</sup> that became a primary cause for concern. In accordance with the regulation, a member state must share information with member states and the European Commission on any investment that is undergoing screening due to its assessed likelihood of impacting on 'security or public order'. The information sharing primarily concerns the identity of the investing company, where its funding comes from (its ownership structure) and the sector it is seeking to invest in. Member states can also request information on a specific investment not being scrutinized by the member state concerned if it is deemed likely to have an impact on security or public order. The receiving member state is obliged to provide this information.<sup>139</sup> Sectors of special concern, or those with the most potential to disrupt order and security, include critical infrastructure and critical technologies.<sup>140</sup> These markets, among others, are commonly interconnected across the Single Market, so an investment in one member state could pose a risk to several. The final decision on whether to permit an investment remains at the national level.<sup>141</sup> However, if the Commission concludes that a projected or already agreed investment in a member state might have an impact on 'projects or programmes of Union interest', it can provide an opinion. The member state should 'take utmost account' of this opinion and provide an explanation if it chooses not to align itself.<sup>142</sup>

### Enforcing FDI screening

The first annual report on the EU FDI screening regulation states that the Commission had screened 265 transactions as of 30 June 2021. The information requests concerned areas such as the

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<sup>138</sup> European Parliamentary Research Service. (2017). [Briefing: Foreign direct investment screening - A debate in light of China-EU FDI flows.](#)

<sup>139</sup> European Commission. (2019). [MEMO - Frequently asked questions on Regulation \(EU\) 2019/452 establishing a framework for the screening of foreign direct investments into the Union.](#)

<sup>140</sup> European Commission. (2019). [Foreign Direct Investment - EU Screening Framework.](#)

<sup>141</sup> European Commission. (2019). [MEMO - Frequently asked questions on Regulation \(EU\) 2019/452 establishing a framework for the screening of foreign direct investments into the Union.](#)

<sup>142</sup> European Parliament and the Council of the EU. (2019). [Regulation \(EU\) 2019/452 of the European Parliament and of the Council of 19 March 2019 establishing a framework for the screening of foreign direct investments into the Union, Article 8.](#)

potential dual-use classification of products, the targeted company's R&D operations and its intellectual property (IP) portfolio; 6% of requests were still undergoing screening 'on the cut-off date'.<sup>143</sup> The regulation's cooperation mechanism is thus perceived to be working well and overall the regulation is deemed valuable by member states.

The member states have reported on 1793 investments that were reviewed on request. Around 80% had 'an evident lack of impact on security or public order' or were not deemed eligible for screening for other reasons. Of the rest, 91% were granted after screening (79% of these without conditions), and only two percent were denied.<sup>144</sup> These included Chinese Shenzhen Investment Holdings' proposed purchase of the Italian semiconductor company, LPE.<sup>145</sup> Seven per cent of reviewed investments were withdrawn by the investing parties for unknown reasons.<sup>146</sup> In comparison to 2020, Member States have considered the requests received as more sensitive in 2021, as the proportion of formally screened cases has increased.

These numbers indicate swift screening processes. The EU's continued openness can be confirmed, as well as the fact that a minority of investments in the EU constitute a risk to security or public order.<sup>147</sup> In addition, only 8 per cent of the cases were identified as involving Chinese purchases (their share of FDI was only 2%).<sup>148</sup> However, referring back to the US-China Economic and Security Review Commission report, the Chinese companies' shifting strategy on the European market should also be noted. Instead of purchasing existing companies in the EU, the idea is to establish their own, seek 'smaller deals' and set up offshore structures to get past screenings. This was seen recently in Italy (again), where 75% of the drone producer, Alpi Aviation, was purchased via an offshore company by two state-owned Chinese enterprises.<sup>149 150</sup>

The second annual review also demonstrates that the EU's FDI screening mechanism is functioning well. In 2021, there were 414 cases notified, and the vast majority (86%) were closed in the initial screening phase that occurs within 15 calendar days (Phase 1). This represents an improvement on the previous report period, where only 72% of cases were closed in Phase 1. Only 11% of cases proceeded to Phase 2 and less than 3% of cases resulted in a Commission opinion. Moreover, there was a trend towards more diversified screening among member states. In 2021, four member states accounted for approximately 70% of all applications received, a decrease from 86.5% in the first annual report. While most cases were assessed rapidly in Phase 1, the duration of cases that entered Phase 2 varied significantly due to the time needed by member states to provide answers to a Commission request for additional information. These often depend on the investor providing

<sup>143</sup> European Commission. (2021). [REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL - First Annual Report on the screening of foreign direct investments into the Union \(COM\(2021\) 714 final\)](#), p. 13.

<sup>144</sup> European Commission. (2021). [REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL - First Annual Report on the screening of foreign direct investments into the Union \(COM\(2021\) 714 final\)](#), p. 10.

<sup>145</sup> Pop, V. (2021, November 24). [Concerns raised on tightness of EU FDI rules amid Chinese investments](#). *Financial Times*.

<sup>146</sup> European Commission. (2021). [REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL - First Annual Report on the screening of foreign direct investments into the Union \(COM\(2021\) 714 final\)](#).

<sup>147</sup> European Commission. (2021). [REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL - First Annual Report on the screening of foreign direct investments into the Union \(COM\(2021\) 714 final\)](#).

<sup>148</sup> Pop, V. (2021, November 24). [Concerns raised on tightness of EU FDI rules amid Chinese investments](#). *Financial Times* (2021).

<sup>149</sup> State-owned rail company China Railway Rolling Stock Corp and an investment group controlled by Wuxi municipal government

<sup>150</sup> Pop, V. (2021, November 24). [Concerns raised on tightness of EU FDI rules amid Chinese investments](#). *Financial Times* (2021).



the requested information. The main sectors involved in screening were ICT, manufacturing, financial services, and wholesale and retail, while the primary origin countries of the ultimate investor were the US, the UK, China, the Cayman Islands and Canada.<sup>151</sup> A significant number of cases notified by member states involved one or more of the factors for consideration listed in Article 4 of the Regulation, such as critical infrastructure, technology and dual-use items and access to sensitive information, as well as possible government ownership or control of, or influence over, the foreign investor.

The second annual report also shows that in 2021, 25 of the 27 EU member states were either in the process of creating a screening mechanism – or updating an old one or creating a new one – or had already done so.<sup>152</sup> The EU foresees augmented levels of inward FDI in the coming years, and is therefore expecting more screening notifications. The Commission expects all member states to have a national FDI mechanism in place soon. This is equally emphasized in the guiding Strategic Compass, as well as the importance of '[m]aking full use' of the mechanism, not least for investments in the defence sector.<sup>153</sup> Review of the regulation is planned for no later than October 2023, when the European Commission must present a report to the European Parliament on the regulation's effectiveness, and possibly a legislative amendment.<sup>154155</sup> It is argued that the report will also have to consider whether the decentralized screening regime can be improved to provide better economic security and address issues with internal transparency in order to operate an effective EU-wide investment screening framework. The framework cannot be applied efficiently and effectively without reliable monitoring.<sup>156</sup>

## Foreign subsidies regulation and outbound investments

The European Commission has proposed a new regulation to permit scrutiny of non-European public authorities' 'financial contributions' to companies in the EU. As these currently go largely uncontrolled, the Commission is seeking to address their 'potential distortive effects' on the Single Market. The Foreign Subsidies Regulation (FSR) was adopted by the Council of the European Union on 28 November 2022 to address the issue of foreign subsidies granted to companies operating in the EU. The FSR aims to close an enforcement gap by giving the European Commission powers to investigate and assess companies that have received foreign subsidies and the impact on competition in the internal market. The FSR will take effect on 12 July 2023, and the filing obligation for M&A transactions and public tenders takes effect on 12 October 2023. The FSR targets all companies in the EU that have received direct or indirect foreign financial contributions, particularly those engaging in M&A transactions or public tenders. Unlike the FDI rules, the European Commission will be the sole enforcer of the FSR with far-reaching investigative powers

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<sup>151</sup> European Commission. (2022, September 1). Annual Report on the screening of foreign direct investments into the Union.

<sup>152</sup> Ibid.

<sup>153</sup> Council of the European Union. (2021). A Strategic Compass for Security and Defence - For a European Union that protects its citizens, values and interests and contributes to international peace and security.

<sup>154</sup> European Commission. (2021). REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL - First Annual Report on the screening of foreign direct investments into the Union (COM(2021) 714 final).

<sup>155</sup> Pohl, J. H. (2023, January). Monitoring the impact of the EU's new foreign investment screening mechanism. *Institute for International Trade. The University of Adelaide*.

<sup>156</sup> Ibid.





under two regimes: the ex-ante mandatory filing regime and the ex officio investigation regime. The final implementing regulation and notification forms are expected to be adopted by the summer of 2023.

Three tools were introduced for scrutinizing purposes. First, a notification tool for non-EU government financial contributions if the turnover of the entity that is sought to be acquired or invested in exceeds €499 million and if the contribution exceeds €49 million. Second, a notification tool for public procurement bids involving government financial contributions in cases where the assessed value of the procurement exceeds €249 million. Third, a 'general market investigation tool' to examine other market situations, including smaller concentrations and procurement processes. In this case, the Commission is able to initiate investigations and demand specific notifications if considered necessary.

If a contribution is deemed more distortive than positive, the Commission is able to impose measures or seek the entity's commitment to correct the distortion.<sup>157</sup> Foreign subsidies are generally considered distortive if they can enhance a business's competitive position in the EU and subsequently harm competition in the internal market. Examples of potentially distortive subsidies include those given to failing businesses, unlimited guarantees, and those that facilitate concentration or participation in tendering procedures.

The Commission is considering a revision of the current EU Screening Regulation to improve its functionality and effectiveness based on the past two years of operation, actions taken during the Covid-19 crisis and Russia's aggression against Ukraine. Although the FSR complements the Screening Regulation as the primary FDI instrument, the Commission is also exploring the need for new tools to regulate outbound strategic investments. In a joint statement issued in March 2023, President Biden and European Commission President Ursula von der Leyen expressed a shared interest in preventing their respective companies' resources from contributing to technological advancements that could enhance the military and intelligence capabilities of strategic rivals.<sup>158</sup> President von der Leyen further emphasized this stance in her speech on China the same month, urging the EU to establish a specific mechanism for outbound investment.<sup>159</sup> This targeted instrument would focus on a select few sensitive technologies where investments could potentially lead to the development of military capabilities posing risks to national security.

## Implications of EU FDI

The adoption of the EU screening framework is part of Europe's response to the rise of geoeconomic competition for critical resources and strategic assets. Governments in Europe, the US and other countries are increasingly scrutinizing foreign investment in sensitive sectors, notably biotechnology, hi tech, AI and data-driven activities. This trend is reflected in the lower thresholds

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<sup>157</sup> European Commission (2023). [Foreign Subsidies Regulation](#).

<sup>158</sup> The White House. (2023, March 10). [Joint Statement by President Biden and President von der Leyen](#).

<sup>159</sup> European Commission. (2023, March 30). [Speech by President von der Leyen on EU-China relations to the Mercator Institute for China Studies and the European Policy Centre](#).



that trigger FDI reviews and expansion of what qualifies as sensitive. The Covid-19 pandemic accelerated this movement, leading governments to add the healthcare sector to sensitive industries and expand FDI screening to the area of food security. 5G technology has become a source of concern for certain member states, which have issued specific rules to ensure FDI screening in relation to 5G networks and equipment.<sup>160</sup> Despite converging views, however, the exact definition of critical activities can vary greatly between member states.

Furthermore, while the EU Screening Regulation harmonizes and coordinates the varying FDI review mechanisms in place at the member state level, it does not delegate any veto or enforcement rights to the EU, which means that member states are still responsible for FDI controls. The regulation introduced a coordination mechanism whereby the European Commission can issue non-binding opinions on inbound FDI reviews, and 'non-reviewing' member states can provide comments to the 'reviewing' member states. National FDI authorities take different approaches when implementing the regulation, and smaller member states might feel pressure to conform to opinions or comments issued by the European Commission or other member states. The regulation has prompted member states to consider establishing a new national security review regime, and most are expected to have one in place in the future. However, it is important to emphasize that the key effects of the regulation are largely procedural, and the reviewing member state has the final say.

Similarly, while the EU is following US lead on setting up a screening mechanism for outbound FDI, if and when such a regime materializes member states will still have the freedom to adopt their own outbound investment screening mechanisms outside of EU institutions. Currently, none of the member states have implemented such a tool, which could present challenges in its implementation. In contrast, when the inbound screening tool was institutionalized in 2019, 12 member states already had pre-existing regulations in place, making its establishment comparatively easier.

## 2.2.4 Funding and subvention

In contrast to the US, the EU has seen a greater decline in private sector R&D spending and the European Commissioner for Innovation, Research, Culture, Education and Youth, Maria Gabriel, has urged the private sector to step up its R&D expenditure.<sup>161</sup> The 2021 edition of the European Commission's industrial R&D scoreboard illustrates that EU companies' overall R&D investment has fallen for the first time in 10 years, by 2.2%, while that of the US and China has increased, despite the impact of Covid-19. In the scoreboard published before the pandemic, European companies' spending on R&D increased by just 4.7% while that of China and the US increased by

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<sup>160</sup> France has implemented a unique authorization process for the use of 5G technology within its borders, while Germany's Federal Network Agency has created a security catalogue emphasizing the crucial role of 5G networks in telecommunications and data processing. The German government is also considering introducing a political review process to supplement the current technical security check for 5G networks.

<sup>161</sup> Zubascu, F. (2019, December 19). [EU companies continue sluggish R&D growth trend](#). *ScienceBusiness*.



26.7% and 10.3% respectively.<sup>162</sup> However, several months after implementation of the New European Innovation Agenda in July 2022, the 2022 EU Industrial R&D Investment Scoreboard delivered positive news regarding innovation. EU companies experienced an 8.9% increase in research and development investment, rebounding from a 2.2% decline the previous year, which was attributed to the Covid-19 pandemic.

### **Strategies for enhanced R&D funding and reduced supply chains dependencies**

The New Innovation Agenda highlights the significance of deep tech innovation in discovering inventive solutions to various challenges, such as reducing greenhouse gas emissions and enhancing the competitiveness of economies, improving the quality of life for citizens, making consumption more convenient and cost-effective for consumers and businesses, enhancing Europe's technological independence and addressing food security issues, while simultaneously improving economic and environmental sustainability, and reducing energy dependence.<sup>163</sup> Therefore, the EU plans to 'improve access to finance for European startups and scale-ups, for example, by mobilising untapped sources of private capital and simplifying listing rules'.

The New Industrial Strategy also emphasizes the need for greater investment in the R&D sector and increased collaboration between the public and private sectors. These aspirations match those of the US and the UK, which also have initiatives and bills in place to foster greater investment and collaboration between business and the government in order to boost innovativeness and competitiveness.

In a wave of measures to strengthen technological autonomy and reduce supply chain dependencies for critical technologies, Von der Leyen announced an €11 billion initiative as part of the European Chips Act, which was passed in February 2022,<sup>164165</sup> to boost the development and manufacturing of microprocessors, as a key part of Europe's digital transformation in addition to semiconductors. Initiatives to develop microprocessors and semiconductors could not only help reduce dependencies and expand European market share but also '*support companies to bring offshored manufacturing back to Europe*'.<sup>166</sup> This will allow for amendments and progress to be made in several areas, including enhancing European innovation and leadership, greater support for small, innovative companies, and the relaxation of state aid rules, reducing supply chain dependencies and encouraging more balanced dependencies.<sup>167</sup>

The European Commission's 2021 Action Plan<sup>168</sup> outlines various measures for reducing the EU's dependency on foreign actors for critical technologies, several of which are discussed above, such as cybersecurity and digital infrastructure initiatives, and the EDF initiative (discussed below), as

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<sup>162</sup> Zubascu, F. (2021, December 21). *Commission reports first fall in industry R&D investment in ten years*. *ScienceBusiness*.

<sup>163</sup> European Commission. (2022). *The New European Innovation Agenda*.

<sup>164</sup> Cerulus, L. (2022, February 8). *EU Launches Chips Act Industrial Plan*. *Politico*.

<sup>165</sup> Zubascu, F. (2022, February 8). *EU to launch €11B joint undertaking on advanced semiconductors*. *ScienceBusiness*.

<sup>166</sup> Zubascu, F. (2021, September 16). *Chips Act on the way to help EU boost semiconductor R&D and manufacturing*. *ScienceBusiness*.

<sup>167</sup> World Economic Forum. (2021). *Special Address by Ursula von der Leyen, President of the European Commission*.

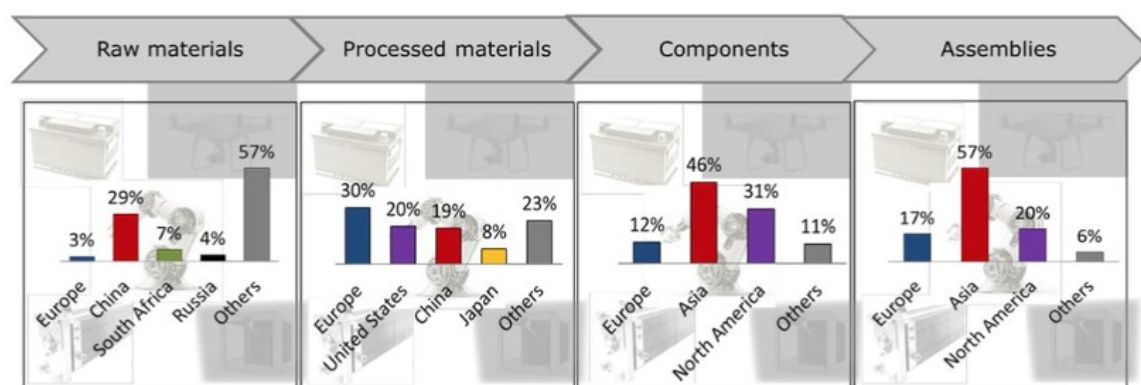
<sup>168</sup> European Commission. (2021). *Action Plan on synergies between civil, defence and space industries*.



well as the European Innovation Council's (EIC) funds and initiatives, which were finalized and published in February 2022. EIC funds will mobilize over € 1.7 billion<sup>169</sup> for projects and initiatives supporting the development and innovation of technologies of strategic interest to the EU (including both green and digital initiatives) through three programmes: EIC Pathfinder, EIC Transition and EIC Accelerator. Additional novel initiatives such as EIC Scale-Up 100 will aim to support EU deep tech companies that have the potential to become 'unicorns', or start-ups with a value of over \$1 billion.

Other measures discussed in the Action Plan, such as technology roadmaps and flagship projects, have been articulated in the European Commission's communication on EU security and defence,<sup>170</sup> or the separate document on the Roadmap on Critical Technologies for Security and Defence,<sup>171</sup> both published in 2022 as part of the Strategic Compass, to identify and highlight supply chain dependencies and map future initiatives and investments in the light of the current geopolitical and technological context.<sup>172</sup>

The 2019 JRC Report (see Section 2.2.1) found that the EU is dependent on certain actors to different extents for different parts of the supply chain. Supply chain dependencies can entail and refer to different parts of the processes. For example, the EU is *fully* dependent on the supply of 11 raw materials for Li-ion batteries whereas for robotics the EU is *fully* dependent on the supply of several processed materials but only *strongly* dependent on certain components.<sup>173</sup>



*Figure 2.8 Key suppliers of raw materials, processed materials, components and assemblies for Li-ion batteries, fuel cells, robotics, UAVs and additive manufacturing (3DP) technologies.*

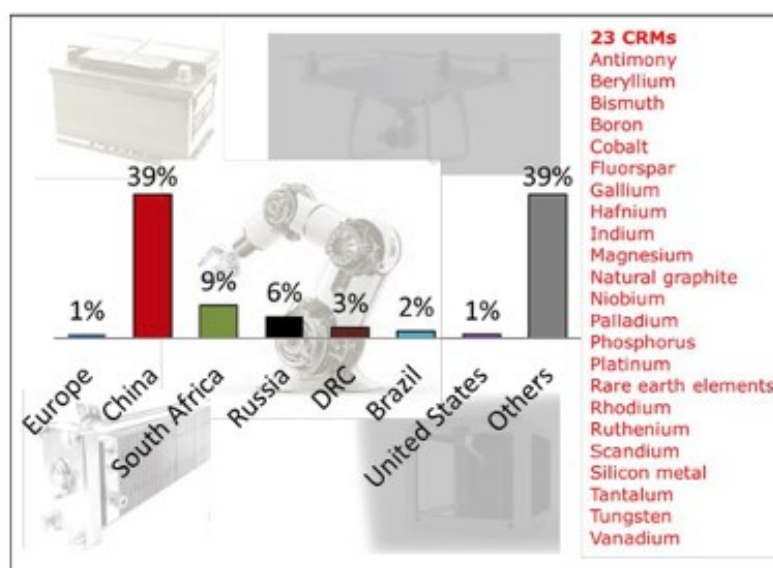
<sup>169</sup> European Innovation Council. (2022). *EIC Work Programme 2022*.

<sup>170</sup> European Commission. (2022). *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Commission Contribution to European defence*. Strasbourg.

<sup>171</sup> European Commission. (2022). *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Roadmap on Critical Technologies for Security and Defence*. Strasbourg.

<sup>172</sup> European Commission. (2022). *Commission unveils significant actions to contribute to European Defence, boost innovation and address strategic dependencies*.

<sup>173</sup> JRC. (2019). *Materials dependencies for dual-use technologies relevant for Europe's defence sector*.



Source: JRC, European Commission, 2017.

Figure 2.9 Key suppliers of CRMs for Li-ion batteries, fuel cells, robotics, UAVs and additive manufacturing (3DP).

Although, as the 2021 JRC Report highlights, the EU takes a lead in robotics and automation, and has a competitive advantage in the field owing to public-private partnership investments, there are still several sectors where the EU is falling behind.<sup>174</sup> Raw materials such as the semiconductors used in 5G infrastructure, cloud computing, military equipment, Li-ion batteries, robotics and driverless vehicles illustrate the EU's high dependency on third parties – not only China, but also the US and India, among others. Concern about of strategic dependencies on critical technologies is also discussed in the roadmap published by the Commission.<sup>175</sup> The 'Observatory of Critical Technologies' which was recently established, will identify, monitor and assess critical technologies in key sectors of strategic significance with the aim of reducing supply chain dependencies and harmonizing EU efforts between member states.

### Doubling the global market share in semiconductors by 2023

The EU has initiated measures to increase domestic production capacity so by launching a European Initiative on Processors and Semiconductor Technologies. It is interesting to note that the declaration has not been signed by all 27 member states, however, indicating a somewhat fragmented approach to the initiative. Among other matters, the signatories to the declaration have agreed to co-invest in all the processes of semiconductor technology. The aim is to reduce

<sup>174</sup> Cagnin, C. et al. (2021). *Shaping and securing the EU's Open Strategic Autonomy by 2040 and beyond*. Publications Office of the European Union: Luxembourg.

<sup>175</sup> European Commission. (2022). *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Roadmap on Critical Technologies for Security and Defence*.





dependencies on these materials and to become more economically and technologically competitive. The semiconductor industry is a €440 billion market, of which Europe currently only has a 10% share. The investment is to be taken from the EU budget, national budgets, the private sector and, if possible, from national Recovery and Resilience Plans. The declaration document suggests that 20% of the European Recovery and Resilience Plans should be spent on digital transition. This is 'up to €145 billion over the next 2 to 3 years'.<sup>176</sup>

More significantly, von der Leyen announced a European Chips Act in her State of the Union speech of September 2021, pointing out the need to harmonize Europe's research capacities and national investments along the value chain. The European Commission proposed the European Chips Act to help address semiconductor shortages and enhance Europe's technological leadership by mobilizing over €43 billion in public and private sector investments. The Act will establish measures to prepare and respond swiftly to any future supply chain disruptions, together with EU member states and international partners. These include strengthening Europe's research and technology leadership, increasing production capacity to 20% of global market share by 2030, innovation in the design, manufacturing and packaging of advanced chips, understanding global semiconductor supply chains, and addressing the skills shortage by attracting new talent and supporting the emergence of a skilled workforce.<sup>177</sup> The EU has pushed the Chips Act to reduce the EU's reliance on US and Asian semiconductors after supply chain issues affected various European businesses.

EU countries and lawmakers met on 18 April to negotiate funding for the Act.<sup>178</sup> The European Parliament and the Council were able to reach a political agreement on the European Chips Act, which is currently pending formal approval by the two co-legislators. The Act comprises three main pillars. The first pillar aims to enhance Europe's technological leadership by facilitating the transfer of knowledge from lab to industry, promoting the industrialization of innovative technologies, and encouraging investments from the private sector and EU and member state funds. This includes €6.2 billion in public funds, €3.3 billion of which will come from the EU budget until 2027. The second pillar will incentivize public and private sector investments in manufacturing facilities for chipmakers and their suppliers. This will contribute to the overall estimated €43 billion. The third pillar will establish a coordination mechanism between member states and the Commission to strengthen collaboration and monitor semiconductor supply, demand and potential shortages, triggering a crisis response if necessary.<sup>179</sup>

### **Funding European defence**

A broader funding initiative in the EU, the European Defence Fund (EDF), serves as a dedicated fund to aid the development of cooperative research on defence products and technologies, including critical technologies. Several EU member states are pushing their individual agendas and priorities, which means that the EU's defence strategy as a whole can be quite fragmented, leading

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<sup>176</sup> European Commission. (2021). [A European Initiative on Processors and semiconductor technologies](#).

<sup>177</sup> European Commission. (2023). [European Chips Act](#).

<sup>178</sup> Foo, Y. C. (2023, April 5). [Exclusive: EU Chips Act likely to get green light on April 18 -sources. Reuters](#).

<sup>179</sup> European Commission. (2023). [Commission welcomes agreement on the European Chips Act](#).



to duplication of efforts, capabilities and funds. The launch of the EDF illustrates the EU's ability to act as a supranational actor with the capacity and authority to protect critical technologies, signifying strategic autonomy and technological independence. It is also said to be a game changer for the EU defence cooperation, as the first step towards overcoming the taboo of distributing money to defence capability development and related R&D.<sup>180</sup>

The EDF seeks to generate projects that would otherwise not have been funded. The budget of almost €8 billion (at current prices) is for projects in the years 2021–2027. The EDF has two strands: one for defence research and one for capability development. The latter will provide incentives for EU entities and member states to cooperate on the development of defence technologies by providing partial funding for such projects.<sup>181</sup> The EDF had two precursor programmes: the Preparatory Action on Defence Research (PADR) and European Defence Industrial Development Programme (EDIDP), one for each strand.<sup>182</sup>

The EDF is now open to third party participation. Negotiations on such participation largely began with Brexit, as British entities were found to be important to the European defence industry and research. In 2019, the first call for the EDIDP announced a number of projects with EU-based entities owned by entities in third countries – Canada, Japan and the US.<sup>183</sup> Norway has also participated as an 'associate' country since 2021.<sup>184</sup> A crucial difference between European and third-party entities is the issue of Intellectual Property Rights. These can only be held by European entities and not transferred to a parent company,<sup>185</sup> thereby ensuring that EDF projects benefit the EU. The UK currently has no formal relation with the EDF as British industry and policymakers disagree over its advantages.<sup>186</sup> This might affect the ability of British entities and British-owned European entities to participate.

A recent initiative in the defence field is the establishment of the European defence industry reinforcement through common procurement act (EDIRPA). Russia's invasion of Ukraine has had a significant impact on the geopolitical situation in Europe, prompting EU member states to increase talks on defence investment and capabilities. In March 2022, the European Council committed to boost European defence capabilities, increase defence budgets, enhance innovation and strengthen the European defence industrial and technological base (EDTIB). As part of these efforts, the Commission and the European Defence Agency were tasked with analysing defence investment gaps and proposing initiatives to reinforce the EDTIB. In May 2022, the Commission presented its defence investment gap analysis, which identified investment, capability and industrial gaps. One proposed solution was the creation of a short-term joint defence procurement

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<sup>180</sup> Csernaton, R. (2021, December 6). The EU's Defense Ambitions: Understanding the Emergence of a European Defense Technological and Industrial Complex. *Carnegie Europe Working Paper*. Carnegie Europe: Brussels.

<sup>181</sup> European Commission. (2021). European defence fund.

<sup>182</sup> European Defence Agency. (2021). European Defence Fund (EDF).

<sup>183</sup> European Commission. (2020). European Defence Fund: €205 million to boost the EU's strategic autonomy and industrial competitiveness.

<sup>184</sup> The Norwegian Government. (2021). Det europeiske forsvarsfondet (EDF).

<sup>185</sup> Engberg, K. (2021). A European Defence Union by 2025? Work in progress. *SIEPS*.

<sup>186</sup> Gen. Abrial, S. et al. (2021, February). Toward a Future EU-UK Relationship in Foreign Policy and Defense.



instrument worth €500 million. In July 2022, the Commission put forward its proposal for a regulation establishing the EDIRPA.<sup>187</sup>

The Commission had originally intended to propose a regulation for a European defence investment programme (EDIP) in the autumn of 2022 based on the EDIRPA proposal. This programme aimed to create a framework for European defence capability consortia (EDCC), enabling member states to jointly procure defence capabilities developed collaboratively for mutual benefit. However, the proposal has been postponed until 2023, and is expected to be launched on 21 June.<sup>188</sup>

Lastly, the Important Projects of Common European Interest (IPCEI) initiative is more of an indirect funding initiative. IPCEI project status must be granted by the European Commission under state aid law. If granted, for the first time, it permits a member state to 'promote innovation up to the first industrial deployment' in an area that is deemed a shared European interest. The member states are the funders rather than the EU. The Communication on state aid rules for IPCEI was updated in November 2021 to make necessary clarifications on rules as a result of lessons learned from application of the current rules, and to align the rules with current EU priorities. The revised Communication on IPCEI aims to make the state aid rules more European and open by requiring the involvement of at least four member states, and ensuring transparent and inclusive design. It also facilitates small and medium-sized enterprise (SME) participation by allowing for a more limited own contribution and encouraging collaborations between larger companies and SMEs. The revised Communication clarifies criteria for the combination of EU and national funds, maintains safeguards to prevent undue competition distortion and requires positive spillover effects across the EU.<sup>189</sup>

## 2.2.5 Conclusion

Much like the US, the EU has started to place greater emphasis on the need to protect and develop critical and emerging technologies, while also stressing the importance of remaining an open economy. Its efforts have focused on mapping vulnerabilities, investing in European capabilities and laying the ground for common strategies. While the EU Industrial Strategy and New Innovation Agenda aim to drive the transition towards climate neutrality and digital leadership, the Action Plan on Synergies between civil, defence and space industries and the roadmap on critical technologies for security and defence seek to reinforce European innovation through critical technologies. By implementing these plans, the EU is positioning itself to remain competitive in the face of global challenges and to advance its strategic interests in the years ahead.

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<sup>187</sup> European Parliament. (2023). [European defence industry reinforcement through common procurement act \(EDIRPA\)](#).

<sup>188</sup> Ibid.

<sup>189</sup> IPCEI. (2021). [What is IPCEI](#); European Commission (2021). [Press release State aid: Commission adopts revised State aid rules on Important Projects of Common European Interest](#).



While the export control and FDI regimes remain mostly decentralized, the EU continues to identify new ways forward to increase harmonization, primarily through increased information-sharing. European lawmakers are also closely monitoring developments in the US regarding outbound FDI, which are also expected to materialize in the EU soon. The most significant developments, however, have been made in the area of funding and subvention, where the European Chips Act, the Critical Raw Materials Act and the planned Sovereignty Fund serve as current examples of the EU aiming to boost its technological edge.

These initiatives can be seen as the EU's response to the tech war between the US and China, as well as its own strategic reliance on China. In addition, there is an internal dimension to this development. The trend towards protection of critical technologies can be seen as driven by two factors: first, the French ambition to promote European technological autonomy; and, second, the desire to avoid internal fragmentation, which became a concern during the pandemic when national interests sometimes took priority over EU solidarity. As the EU increasingly stresses the need to safeguard and develop critical and emerging technologies, while also remaining an open economy as well as taking a fragmented overall approach to China, it finds itself caught in the crossfire between two superpowers and at a strategic crossroads internally.



### 3. Controlling critical technology in the future: scenarios and implications

Chapter 2 outlined the policies and instruments used in the US and the EU to control, protect and nurture critical technology. This chapter provides insight concerning possible futures in the realm of critical technologies and relations among key actors.

#### 3.1 Defence, security and critical technologies: future pathways

The baseline when considering the future is that some factors will stay the same while others will develop in line with current trends. As the scenarios in this report relate to the near future – in five to ten years from now – quite a few factors can be placed in these baseline categories. Great power rivalry, as discussed in the introduction, will predominantly take place in the geoeconomic field, the US and China will be the dominant powers in most areas, and demographic shifts will follow established patterns – as will overarching trends such as climate change.

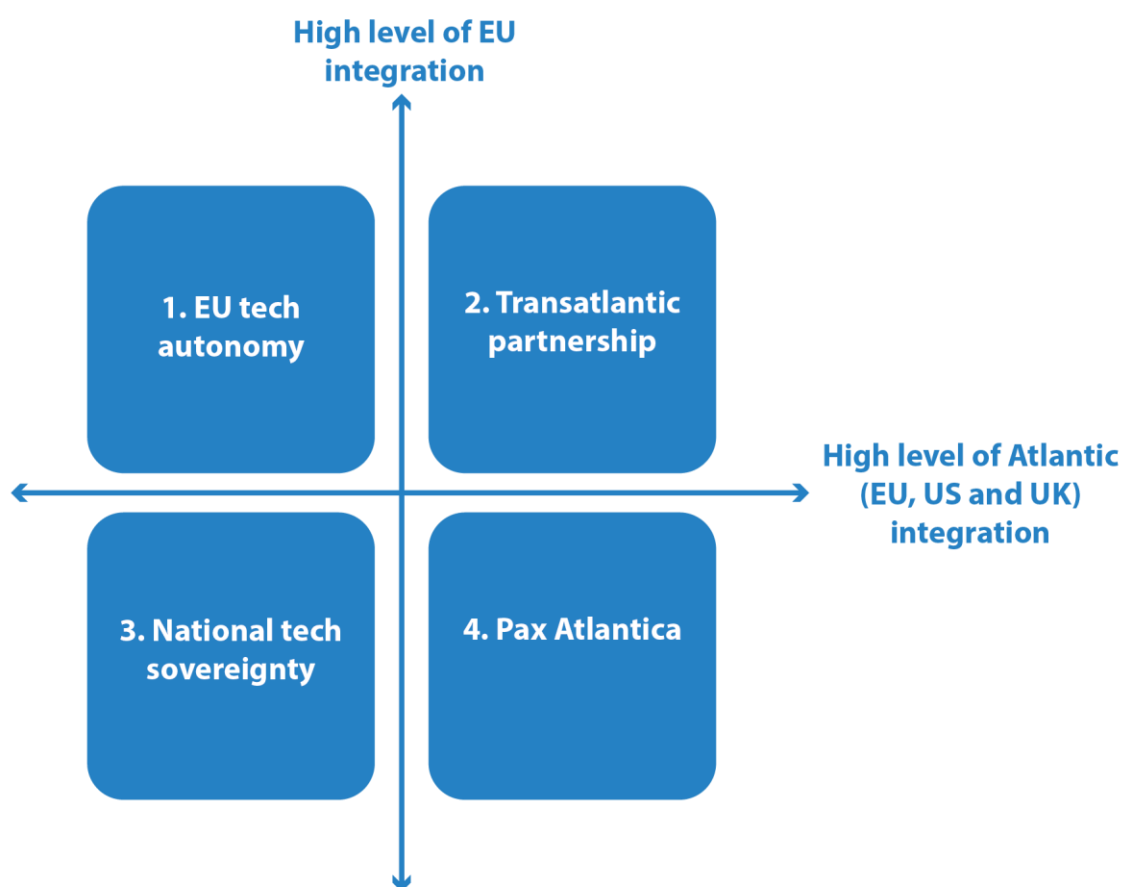


Figure 3.1 Matrix of outcomes.



Another class of factors is those that can be considered crucial for the development under scrutiny, but where the outcome could shift either way within the chosen time frame. Two such critical uncertainties are used to structure the scenarios in this report. The first is the level of EU integration in defence, security and critical technology. Will we see a shallowing out of cooperation as more states aim to ‘tack back control’? Or will integration move forward towards deeper cooperation and even federal solutions? This factor will reflect both external pressure on the EU as well as internal cohesion. The second is the level of Euro-Atlantic coordination in defence, security and critical technology. Will the EU and the US align, pursue common policies and employ tools in tandem? Or will we witness divergence in policies, strategies and behaviour? Clearly, Euro-Atlantic coordination will rest on both constructive relations and the ability to view the challenges posed by China’s rise through similar lenses. Combining these factors arrives at the matrix in Figure 3.1, where all four outcomes also relate to the baseline established above.

### **3.2 Scenario 1: EU tech autonomy**

In this scenario, Europe is deeply integrated through supranational cooperation between a core group of strong nations. Atlantic coordination is shallow and transactional. The Europeans, with the power of the EU, aims to innovate, own, use, and export critical technology according to their own interests.

#### **Strategic context**

European nation states have held on to key instruments of power and successfully managed to anticipate and regulate new areas of critical technology and innovation. The willingness to cooperate within Europe is high, largely due to the perceived need to act as a single unit in relation to an increasingly polarized external environment. The repeated US calls for loyalty in Washington’s global tech competition with China, which intensified during the substantial US support provided to European security amid Russia’s war in Ukraine, have convinced both large and small European nations of the need to build their strategic capacity. This newfound European coherence, also including influential eastern members, was cemented when the US declared that support would be scaled-down and efforts to manage the regional threat of Russia would not be allowed to dilute its primary effort to match China in the Indo-Pacific realm. These messages from the US were particularly ill-received as the US in previous years had doubled down on its America First and Buy American policies. In addition, the strengthening of EU competences followed a grand bargain whereby France and Germany eventually accepted Ukraine’s EU membership as long as the euro core were allowed to fast track integration. The global geopolitical showdown convinces many Europeans that it is time to develop the teeth required to act as a strategically autonomous actor vis-à-vis other great powers. The core group of EU countries therefore agrees on a defence, security and innovation spending target, of which a proportion is managed by the European Commission’s defence arm.





## Tech control attributes

### ➤ Export control

As a result of a combination of joint procurement projects and heavily protectionist US actions, the achievement of European self-reliance creates momentum to strengthen the common export control regime. The common criteria from the Common Position, which previously had to be 'taken into consideration' by member state export licensing authorities, are made more stringent with a reference back to the EU's enforcement of its fundamental values. An ITAR-free common defence market is progressively being established.

At the same time, the EU – primarily driven by France and Germany – takes steps to reciprocate US protectionist policies. It customizes its export controls to target the US at technology choke points and limits the transfer of know-how. Member states' national legislation must transpose these regulations and non-EU partners fear becoming subject to them. European industries are forced to replace previous non-European partners and supply chains.

In addition, academic and expert exchanges are put under scrutiny, seeking to prevent the export (or theft) of intellectual property and know-how. Individuals from non-EU countries can no longer work within European research institutions for this reason.

### ➤ FDI

The list of industries concerned is expanded and the bar for non-European investments to be put under scrutiny is lowered. The European Commission is given a veto power. With much more weight being put on the EU's fundamental values, such as strategic autonomy (along with a certain scepticism), more restrictive practice is established. Many European companies working in the critical technology sphere move outside the EU to be able to receive investments. There is a loss of know-how and technological development comparative advantage. Companies less dependent on such investment remain in the EU, however, and form successful joint ventures partially funded by the new sovereignty fund. British investments are generally allowed but relations with the EU remain asymmetrical. The EU's outbound investment screening reduces European funding of competitors and adversaries, including of previously EU-based companies.

### ➤ Funding

As inflation subsides and geoeconomic competitive pressures increase in Europe, significant funds are directed towards technology protection and support. This is primarily achieved by the tech fund, the sovereignty fund and the European defence fund being bolstered in the 2027 budget, and the ongoing enhancement of IPCEI projects. A key compromise in Ukraine's EU membership negotiations involves reallocating funds from agriculture and rural development to technology sovereignty, preventing the eastward flow of resources.



Member states that possess competences and resources that were previously imported from outside the EU gain a competitive advantage. A new European Fund for Critical Technologies (EFCT) offers unprecedented funding for the new projects needed to compensate for the loss of imports.

### **What took us here?**

The path to this scenario was characterized by a series of successful cooperative ventures in combination with mounting external geopolitical pressure, which had a unifying rather than divisive effect on European cohesion. Franco-German reform of the eurozone proved resilient in the face of later economic turbulence, which unlocked the potential of the Franco-German engine. The continuing Russian threat boosted the power of eastern EU member states and Poland in particular. Seeing that the US was unwilling to sustain support for European security, Poland joined the French-German efforts in a rejuvenated Weimar Triangle. Germany's focus on defence policy aspects to support security measures in Eastern Europe, as part of its 'Zeitenwende' initiative, helped facilitate this process. Subsequent attempts at regulation and joint innovation projects also boosted societal support for a shared European project and established the necessary levels of trust and cohesion. Meanwhile, tensions increased between the US and China, and each increasingly protected its economic and technical base. In the case of the US, a new administration in 2024 felt the need to accommodate the increasingly strong support for national populist sentiments among voters, with negative effects on transatlantic cooperation. US national protectionist policies reached the point of placing the EU in a disadvantageous position, leading the EU to seek reciprocity and limit dependency on the US. The policies adopted by the EU as a consequence on a range of areas, not least export control and FDI, led US actors to limit their involvement, leading to a decrease in relations/dependency on both sides. A precondition for this scenario is that the increasing problems with 'Trojan horses' – EU member states obstructing EU positions and policies in compliance with external authoritarian regimes – can be reversed. This is achieved by a combination of public shaming of the use of such veto rights and targeted economic incentives to uphold EU cohesion.

### **Strategic implications**

- Mini-lateral attempts at security cooperation – gatherings of a select number of states such as the European Intervention Initiative (E2I) – are drawn back into the EU orbit in order to benefit from EU defence funding and procurement schemes. Regional cooperation such as Nordefco is increasingly related and adapted to EU processes.
- The EU embarks on an ambitious programme aimed at autonomy in critical technologies, considerably scales-up its IPCFI framework, develops a beefed-up investment screening mechanism with EU level veto powers and takes steps towards a common export control regime.
- The development of autonomy comes with costs, in terms of both investment and industrial policy, but also in terms of reduced influence through reduced positive interdependency. A negative autonomy spiral is triggered whereby protectionist policies



dilute the EU's leverage over others, leaving it feeling even less powerful, and in turn leading to more autonomy and, consequently, even less leverage over others.

- Symbolic and prestigious industrial projects such as sixth-generation fighter jets form the core of an EU push towards defence industrial autonomy. EU member states involved in projects with non-EU partners face an uphill battle in attracting support and finance for their work as the FCAS project is increasingly framed as a true EU project.
- Overall, the EU establishes a less restrictive economic relationship with China, which it portrays as the only way to compensate for the higher production costs and energy prices that are adversely affecting jobs and industry in Europe, both to its domestic audience and to the US.

### **3.3 Scenario 2: EU-US partnership**

In this scenario Europeans increase the level of integration at the same time as Euro-Atlantic coordination is strengthened. This effectively creates a powerful bloc with aligned tech policies, capable of affecting other actors around the world. The UK aligns itself with the western front, while China and Russia strengthen cooperation in a balancing effort.

#### **Strategic context**

EU-US cooperation is the main vector of transatlantic cooperation, especially in relation to China where the US needs European market and regulatory power. The EU-US Trade and Technology Council proves pivotal in this regard and is strengthened by way of institutionalization and law-making ability. Work within the TTC also lays the ground for a common technology threat analysis with China as the main adversary. This motivates the transatlantic allies to undertake joint efforts as they try to secure their own technological development, given that both sides want to significantly reduce their dependence on China and find themselves to be the two biggest (democratic) counter actors. NATO has a more limited role as a military deterrent to Russia in the European theatre. Joint EU-US standards are developed in a broad range of industrial sectors but the global level sees fragmentation on standards. The UK reinforces bilateral ties with EU member states to gain influence in the new transatlantic arrangement.

#### **Key tech control attributes**

##### ➤ **Export control**

With a shared geopolitical adversary and increasing fear that a less predictable and cooperative US president will be elected 2024, the EU and the US go beyond the initial talk of jointly regulating strategic goods. The US export control efforts of 2022 are deemed successful in hampering China's technological development and a joint EU-US front is established to bring these policies forward. The EU therefore adopts similar regulation in a harmonizing effort, which also increases member states' harmonization. These harmonized controls benefit the defence industry and cooperation



within the two but are less advantageous to those outside. Industries within the alliance adapt the majority of their supply chains for crucial technologies to re-shored options. Regulations on 'deemed exports' are eased, permitting a better flow of expertise, and allowing for further technological development within the Euro-Atlantic alliance (and increased competitiveness against those outside). The UK seeks closer ties with the EU in the hope of beneficial access to, and influence on, the alliance. Industry outside the alliance seeks more unifying technology collaboration to compensate.

➤ **FDI**

Harmonization of investment screening procedures follows similar lines: the EU adopts a similar system to the US. New joint investments focus on boosting production and development facilities of critical technology (components) previously imported from outside the alliance. The EU as a whole is designated as an excepted foreign state and is exempt from scrutiny in the US screening system. External investors face extensive scrutiny and limitations on investing in the alliance. However, a group of external 'trusted partners' with beneficial investment conditions is formed while investments from other external countries are limited.

➤ **Funding**

EU-US cooperation within the TTC effectively halts the cycle of industrial subsidies and countermeasures. Agreed standards and joint funding for shared priorities are established, with some funding also accessible to democratic actors from regions of key concern.

## **What took us here?**

Successful cooperation with first the US Biden and then the Europe-leaning 2024 administration is driven by shared geopolitical adversaries as well as the fear of a less predictable/cooperative US president in the future. Collaborative efforts to counter Russia's ambitions in Ukraine also initiate an era of cooperation among prominent politicians on both sides. Good relations with a benign US administration secure high intra-European support for integration, as it can be achieved in synergy with strong transatlantic cooperation. The European countries that had resisted more European integration in geopolitically charged areas to avoid scaring the US become less hesitant as the US itself increasingly calls for a more potent European Union to partner with.

The EU-US tech council proves to be a good ground for dialogue and collaboration across the Atlantic focused not only on the digital arena, but also on critical technologies such as semiconductors and microchips. It is also used as a platform for avoiding greater divergence and experiences a greater overlapping of ideas. Issues addressed include the question of how the two actors across the Atlantic could join efforts to manufacture and become more independent of key third-party actors in the critical technology supply chain, for instance, by addressing Taiwanese dominance in the production of high-end semiconductors.



## Strategic implications

There will be a clear yet narrow role for NATO while the core of transatlantic cooperation pivots around EU-US relations. In the military industrial field, however, the EU and NATO's work is fully integrated through back-to-back meetings among defence planners to set defence capability targets for European allies and NATO partners. Joint work on military mobility in the air and on land would be advanced.

The US and the UK would receive preferential treatment in the EU's defence industrial projects in the EU 2028–2034 multiannual budget.

The Atlantic area in practice becomes a single integrated digital sphere of innovation cooperation, joint regulation and an increasingly common market.

The EU and the US together influence global tech policy and regulation through concerted action in UN bodies and the G7.

With the EU and the US working as a more or less coherent western bloc, China and Russia form a counter bloc, which makes the Euro-Atlantic area and the Indo-Pacific region two communicating areas of strategic competition. In managing this challenge, the US and the EU establish a division of labour, which allows the US to focus increasingly on the Indo-Pacific region.

The close linkage between the EU and the US builds on a compromise where Europe can maintain trade with China only with a higher degree of decoupling (with more areas affected) than a fully autonomous EU line would have implied. While this comes with costs for parts of European industry, it is beneficial to other segments as demand for non-Chinese critical technology increases.

Strong intra-European industrial cooperation in combination with US support for EU defence market integration would incentivize the UK to re-engage in continental defence and security cooperation. The FCAS and the UK-led sixth generation fighter jet projects merge at the end of the 2020s to supply a unified solution for the European 27+2 (the UK and Norway). The US supports this development as a competitive European defence market and defence forces are central to simultaneously managing Russia and China.



### 3.4 Scenario 3: National tech sovereignty

European states come under strong domestic pressure to reassert control over critical technology and infrastructure. Several European states follow the UK example in aiming to 'take back control' from the EU. Atlantic coordination is weak, both within NATO and in EU-US relations.

#### Strategic context

In this scenario, European nations prioritize self-interest as external powers exploit divisions. A standstill in Ukraine erodes EU cohesion, exacerbated by waning US involvement. The continent grapples with rising nationalism and fatigue towards international cooperation. To address legitimacy concerns, some European states adopt direct democracy and popular votes, hindering international collaboration. With diminished enthusiasm for multilateral cooperation, France, the UK, and Germany reinforce their traditional areas of engagement (Françafrique, the Commonwealth, and exchange with China, respectively), developing distinct industrial policies and strategic cultures. Cooperation on foreign policy, industrial policy, and intelligence declines sharply. The EU becomes largely irrelevant in defence and related innovation due to fragmented policies and legal frameworks, and lack of political will.

The main US focus is on mini-laterals such as AUKUS and the Quad. There is limited interest in a fragmented Europe apart from the link to the UK and its regional hub. In security matters, many European states maintain (increasingly costly) bilateral links with the US for protection.

#### Key tech control attributes

##### ➤ Export control

The recently updated EU dual-use regulation grinds to a halt when member states refuse to implement it. It is deemed too restrictive and to hamper national economic growth. Instead, desperate to gain export revenues to recover from the economic downturn and the costs of war, member states make efforts to reverse regulations, further blocking developments in multilateral institutions such as the Wassenaar Arrangement, where decisions require consensus. Exports and regulation of critical technologies become national matters. Without coordination of joint funding, individual states must invest in R&D on the same technologies, which makes for huge increases in national debts and competition for limited markets. The European states with domestic access to critical technologies (components) and relevant competences gain strategic advantage by being





less dependent on other states, while also having the power to regulate other members' access to them through export regulations. States' niche markets therefore become more important. Smaller states without advantages and niche markets, which must acquire everything from other (non-European) states, suffer financially as importing these becomes more expensive and difficult.

## **FDI**

As decisions to allow investment are already a national matter, member states adopt a practice of granting essentially all investments as a way to fund their individual R&D efforts and recover economic growth. As a result, European states become the ground for proxy conflict between investors with significant competing shares in European critical technology industries. In addition, the investing entities commonly transfer know-how and technical development to their own operations, which makes European industry increasingly uncompetitive and thus unattractive for investors other than those seeking geoeconomically motivated takeovers.

### **➤ Funding**

As trust dissipates, joint funding declines as EU member states prefer to support their own industries. The resulting intra-European subsidy spiral undermines competitiveness, further diminishing Europe's influence over international politics, especially on tech policy.

## **What took us here?**

Failure to manage the economic downturn and the deadlock in Ukraine evaporated trust among European states. Concerted efforts to 'take back control' and repair national legitimacy – fuelled by surging nationalism – create a downward spiral where little effort is made to legitimize European integration and international cooperation.

Threatened by outside powers that increasingly use Europe as a playground for their geopolitical rivalries, individual European states turn inwards or focus on traditional national transactional foreign policy orientations.

As Russia's war in Ukraine reached a state of relatively stable frozen conflict, the US disengaged from Europe, as the region held few interests for it.

## **Strategic implications**

European states increasingly try to cater for their own needs in critical technologies. The failure to fund and develop capacity at the EU level or in close cooperation with the US



means that most states will lack sufficient access to key future technologies and become rule-takers in the standardization area. European regulatory power over foreign platforms and digital service providers will be marginal.

The limits of scale as the European market malfunctions and the US market is increasingly protected will limit the growth potential of the European tech industry. The willingness to invest in technologies that can only reach foreign markets with great difficulty will be limited.

The costs of acquiring critical technology abroad will increase substantially. For most European states, national tech sovereignty will prove to be an illusion as they will have to accept close transactional deals with major suppliers such as the US. They simply lack segments of critical technologies and will thus be unable to regulate flows and protect borders. Either way, their sovereignty will be substantially limited.

The supply of critical technologies, trust, raw materials and skills will suffer. European countries will have to stockpile more resources and find new suppliers and substitutes for critical components. In the absence of monitoring, analysis and coordination at the EU level, such nationalization of supply strategies will lead to new risks and cross-border tensions within Europe.



### 3.5 Scenario 4: Pax Atlantica

Pressed by domestic challenges as well as strong external pressures, key EU member states doubt the efficiency and value of European integration and reinvest strongly in the transatlantic link. The pivotal role played by the US in supporting the freedom and security of Ukraine adds to this momentum. Globally, the US is the linchpin of different forums for countering Chinese influence.

#### Strategic context

The US dominates the Atlantic sphere and uses NATO as well as other formats to streamline the western response to China's geoeconomic challenge. Both Russia and China exert pressure on Europe and its neighbourhood. The effect is that both eastern and western EU member states see the need for a strong link to the US. Meanwhile, growing illiberalism and value divergence prohibit further European integration. NATO, which exhibits greater resilience in the face of value divergence, becomes the main platform both for European defence cooperation and transatlantic cooperation in relation to Russia and China. The US, through NATO and more specific mini-lateral platforms oriented around critical technologies and minerals, ensures western cohesion – and US leadership.

#### Key tech control attributes

##### ➤ Export control

The US engages in a number of small initiatives that are customized in accordance with either the group's technical expertise, or its joint manner of excluding US rivals; for example, creating a group of semiconductor producers (that includes Taiwan, the Netherlands and Japan) or of those forwarding new telecommunications standards based on 5G technology. These smaller groups adopt targeted export controls, which limit China's access to critical technologies and influence. The US becomes the key actor in these efforts. The US manages to restrict China without damaging its own exports and manages to increase the gap between the two which was previously shrinking. Most of US industry manages to tailor its supply chains to partnership countries. A prerequisite for becoming a US partner is to not have any entities associated with US rivals (or rivals' associates) in the supply chain, which ultimately divides the globe into two spheres – US-aligned countries and non-US-aligned countries. The US prefers to manage wider issues tied to tech regulation within the Multilateral Action on Sensitive Technologies (MAST) framework. The EU and its joint (dual-use) export control regulations are weakened.

##### ➤ FDI



CFIUS tailors its investment screening regulations to individual countries or smaller groups. The more cooperation with the US, the better the conditions on and chances of investing in the US. The logic of the IRA is eventually applied to all new industrial policy tools. As the US develops its screening procedure for outbound investments, countries become eligible for US investments in accordance with their level of cooperation. Thus, the EU member states and the UK generally enjoy limited restrictions and scrutiny. A similarly tailored approach is adopted among US partnership countries, resulting in a network of several small groups of countries collaborating outside of traditional frameworks, which ultimately forms a similar global divide as mentioned above with possible implications for technical standard setting. EU-wide FDI screening remains at a minimal level, as member states prioritize their national interests in relation to the US when implementing policies.

### ➤ **Funding**

European funding in the tech domain is mainly channelled through NATO and its emerging innovation ecosystem. Bilateral cooperation between the US and selected European countries flourishes as the US seeks to leverage resource-rich allies in its rivalry with China.

### **What took us here?**

The unwillingness of Europeans to manage their geopolitical challenges through the EU. Continued Russian meddling in European affairs following the war in Ukraine strengthens the perspective that only the US can cater for European security.

The growth of illiberalism in Europe's south-east becomes too difficult to manage within a political union based on liberal democratic principles.

### **Strategic implications**

As US influence over Europe is considerable, Russia increasingly seeks closer relations with China. In the absence of a further integrated European market, however, the US finds it difficult to muster European leverage against China in its geoeconomic rivalry. NATO, which is a strong platform for transatlantic defence and tech cooperation through its growing Innovation Accelerator and Innovation Fund, also suffers from a lack of European integration both on defence industrial markets and in building the resilience of infrastructure. European states choose different ways to accommodate and adapt to US leadership, but this patchwork leaves the continent without coherent market structures and market power.



NATO also initiates work to counter China in technical standard setting, primarily targeting China's 2021 national standardization strategy. The UK has a strong voice in NATO but remains limited in terms of partnerships as it must start from scratch.

In retaliation for extensive US countermeasures and the instrumentalization of NATO, China ceases its exports of rare earth minerals to the US and several allies, including both the EU and the UK.

A smaller and less functional European home market and more direct ties to US industry leave Europe more exposed to critical dependencies in relation to US components, skills and materials.



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