CKN China Knowledge Network

Understanding China's Export Controls

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Executive Summary

Over the past decade, export controls have evolved from a specialised arms control and non-proliferation tool to a comprehensive mechanism for the maintenance of strategic economic advantages in the competition between great powers. China has played a central role in this process, first primarily as a target for export controls imposed by the United States, and more recently as an increasingly assertive user of these controls itself.

This report explores multiple dimensions of China's evolution in the global export control domain. It contains eight sections. First, Guangyu Qiao-Franco and Rogier Creemers map China's historical position in the international export control field and the overall strategic imperatives and objectives that inform the construction of its own export control regime. They trace the evolution of export controls from their origins in Cold War–era anti-Communism, including those targeting China, to their later role as an anti-proliferation instrument, and finally to their current use as a tool of economic warfare. Subsequently, they sketch how China gradually and incrementally developed their own export control framework in response to this perceived weaponisation of interdependencies by the United States. The primary objective of this framework is to enable deterrence and coercion in economic warfare, but it also serves collateral industrial policy goals.

In Chapter 2, Dechun Zhang and Ruoxin Su chronicle the legal and regulatory evolution of Chinese export controls. In a first stage, from the late 1990s onwards, China developed export control tools primarily to reflect the global trend towards non-proliferation in the military domain. However, the Export Control Law in 2020, they argue, signifies a shift towards an approach where Chinese policymakers can engage in economic statecraft and safeguard national security more effectively and coherently. This is particularly the case in the realm of dual-use goods, which can arguably cover the near-total gamut of cutting-edge technologies.

Chapter 3, by Haotian Qi, focuses on the non-proliferation side of export controls, particularly in the realm of weapons of mass destruction. Qi traces the institutional foundations of this regime by analysing China's track record under the Nuclear Non-Proliferation Treaty, the Biological Weapons Convention and the Chemical Weapons Convention. Chinese export controls have been increasingly refined in recent years to enable China to pursue its strategic interests. The war in Ukraine, for instance, has pushed China to impose export controls on certain drone

technologies, but China also remains critical of sanctions against Iran and North Korea, and has sought greater strategic leverage over critical technologies.

Ewan Smith, in Chapter 4, addresses the linkages between export controls and strategic emerging technologies. Using AI and advanced computing as a case study, the chapter distinguishes between broad policy principles (*fangzhen*) and the specific policy measures (*zhengce*) implemented to realise them. In terms of principles, the Chinese government has identified key technologies as essential to reaching its economic and social development programme, as well as national security interests. The specific policy measures, in turn, focus on specific, technology-driven concerns, such as semiconductor-related technologies, data export restrictions, rare earths and critical minerals.

In Chapter 5, Cong-rui Qiao explores the impact of Chinese export controls on collaborations in higher education and scientific research between Europe and China. The triad of export control rules, security-related regulations and sector-specific norms for science and technology has expanded significantly, but at the same time, do not affect higher education and research institutions in the same way as they do companies. In other words, the Chinese government does not impose blanket rules but has sought to develop flexible tools that enable it to maintain openness where desired, in line with the achievement of policy objectives.

Douglas Fuller examines Chinese private companies in Chapter 6. On the one hand, Fuller discusses the proactive export controls announced by drone manufacturer DJI in the context of the Ukraine war, as moving ahead of government action, potentially in an effort to avoid direct pushback in major Western markets. On the other hand, the chapter presents Huawei as a driver in building up a sanctions-proof semiconductor ecosystem in China, assisting domestic companies in the establishment of alternative supply chains. Ironically, these efforts may well defeat the original intent of U.S. export controls by resulting in a more capable Chinese technology sector which may support, rather than resist, further decoupling.

In Chapter 7, Qiaochu Zhang explores the impact of export controls on Chinese outbound technology transfers. Chinese technology is increasingly used around the world, for instance in telecommunications infrastructure, data centres and cloud services. Such exports are increasingly subject to a tension between the economic benefits arising from export income and national security interests, particularly under the broader definition of the latter term that China has come to adopt under Xi Jinping.

The final chapter, by Chenghao Sun and Chong Wang, discusses how Chinese export controls constitute a strategic response to U.S. export controls. Focusing particularly on the semiconductor sector and rare earths, the chapter describes the emergence of Chinese concerns about technological chokepoints used against it, and its instrumentalisation of such chokepoints for its own ends. These efforts have increasingly challenged the dominance of Western restrictions and intensify strategic competition but also stimulate the proliferation of global export controls and may erode technological globalisation.

General Recommendations

For European governments, responding to the challenges arising from China's emergence as an export controller and, more broadly, as a major factor in strategic dependencies, is a complex and comprehensive task that will demand engagement with a broad range of social, economic and political stakeholders. There are no simple diplomatic policy options or easy solutions, and any choice will demand tough trade-offs and have costly consequences. Each of the chapters in this report contains specific policy recommendations arising from their respective focus areas. Several overarching recommendations can also be made:

1. **Enhancing situational awareness**

The proliferation of export controls by the U.S. and China are drastically changing the fundamental assumptions underlying economic globalisation and the digital industries it has fostered. A widely shared consensus in favour of free trade flows and technological openness has rapidly given way to strong power competition, in which major players deploy agile export control tools in pursuit of national advantage. In addition, the growing capabilities of digital technologies have rendered the traditional categories of military and civilian technologies, with a relatively narrow range of dual-use technologies in the middle, obsolete. Yet European governments are poorly prepared for a reality that requires a greater degree of insight into the complexity of supply chains and high technology sectors, as well as into Chinese strategic objectives, policy considerations and export control practices. In response, they should devote greater resources to better understanding the landscape of technology companies and supply chains, potential risks and mitigation options, but also how Chinese policymaking operates and how its interests rely on EU collaboration. This degree of situational awareness must be developed to the degree that European governments are never caught by surprise by a Chinese initiative or policy measure and can appropriately respond to events such as the Nexperia case in the Netherlands.

2. **Developing a feasible strategic roadmap**

China's emergence as an export controller is, in many ways, a symptom of the broader trend that economic efficiency is no longer the prime organising principle of global flows of resources, capital and technology. Instead, major economic players have come to see the resulting interdependencies as a security risk, and the domestic impact of economic globalisation has destabilised national politics across the Western world. Adapting to these circumstances means

that European governments can no longer just focus on optimising regulatory and policy processes in the light of abstract ideals of global order. Rather, they must strategize towards desirable longer-term outcomes and then tailor agile and flexible policy tools to achieve them. This strategic roadmap must be feasible and realistic. Most importantly, this means understanding that there is no easy or cheap way to adapt to these new global trends. Any form of resilience to or mitigation of, for instance, dependencies on China will come at significant economic, political, social or diplomatic cost. Yet the cost of non-action will be higher, and European governments will not be able to exercise strategic initiative or maintain autonomy. In other words, incremental measures will not suffice. Chinese export controls are merely one manifestation of a broader challenge that requires a whole-of-society response.

3. Addressing strategic dependencies

In 2023, EU Commission president Von der Leyen announced the Union's intention to de-risk, primarily from China. Seen at the time as a softer alternative to U.S. efforts to "decouple", key questions surrounding how to derisk in relation to strategic dependencies, or how to build a greater degree of strategic autonomy, remain unanswered. Any form of derisking that results in the break-up of value chains and global trade flows will inevitably be costly in social, economic and political terms. This means European decision makers must understand it will be impossible to fully mitigate risk, including in relation to dependencies on or collaborations with China. Rather, they must assess which risks are worth taking in the light of related economic, social or security interests, and which ones are intolerable. The former must be embedded within broader diplomatic and policy frameworks that make risks manageable. Here, Europe should therefore not pursue strategic autonomy but strategic indispensability and should become better able to operationalise its ability to retaliate against foreign economic coercion to deter adversaries from taking actions that disadvantage Europe. The latter must be addressed through replacement, for instance by diversifying or reshoring sources of critical minerals and rare earth. Although this discussion originated around the relationship with China, transatlantic dimensions must be approached with greater caution, too, as the US under the second Trump administration has shown itself to be a capricious, unreliable and self-obsessed actor, rather than the natural ally that European policy makers had been accustomed to.

4. Industrial policy

Based on the diagnosis of the Draghi report, European governments should develop an industrial policy that combines economic prosperity and corporate success with resilience-oriented

factors such as strategic autonomy and indispensability in critical sectors, such as energy security and climate change mitigation. If successful, this industrial policy would, on the one hand, harden European societies against the impact of Chinese export control practices and thereby deter the Chinese government from their use. The Critical Raw Materials Act is a first possible cornerstone of such an approach, but effective industrial policy must go further, developing effective coordination mechanisms that integrate all major governmental and economic actors.

5. Diplomatic engagement with China

Without effective communication, European moves towards mitigating the impact of Chinese export controls risk creating possible misunderstandings and concerns among Chinese policy makers. To prevent this, it is essential to coordinate an effective diplomatic strategy at both the EU and the member state level. Such a strategy needs to clearly convey the scope and motivation of European measures, as well as European perceptions of the impact of Chinese export control practices. While it cannot be expected that China will applaud Europe taking steps that may erode Chinese economic or strategic advantages, such communication should at least aim to prevent escalation based on misperceptions and security dilemmas and to maintain transparency about motivations, means and objectives. This is particularly important in relation to incidents such as the recent Nexperia case in the Netherlands, where a lack of effective diplomatic preparation and follow-up likely exacerbated a conflict that could have been contained much more effectively. In these efforts, European policy should not be portrayed as an effort to foil China's development, but as a reasonable defence of Europe's own interests. Avenues for collaboration where European and Chinese interests align should continue to be explored.

6. Consolidating EU export control and economic coercion legislation

Although existing frameworks, including the Dual Use Regulation and the Anti-Coercion Instrument, provide statutory tools for responding to export controls and other forms of economic coercion, their effectiveness is hamstrung by bureaucratic fragmentation, tensions between the EU and member state levels, conflicts of interest between major stakeholders, and the slow pace of action. In the confrontation with the increasingly agile set of export control tools deployed by China, as well as other major actors such as the United States, European governments should streamline countersanctions policies. This will require integration both at the regulatory and at

the institutional levels, to ensure communication and decision-making chains are compact and effective.

7. Engaging with European firms' needs

European businesses need to adjust to an environment in which networks of commercial exchange are increasingly becoming vehicles for the exercise of state power, for whatever reason. This means, on the one hand, that governments should coordinate more closely to assess these businesses' needs, ranging from coherent information sharing and support in adapting to possibly rapidly changing operating environments, as well as in developing compliance processes necessary to operate legally as cross-border business flows grow more complex. On the other hand, businesses are often at the forefront of developments and can supply governments with useful information and updates.

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Chapter 1. China's Emergence as a Sanctioner in Export Controls: An Overview

Guangyu Qiao-Franco (Radboud University) & Rogier Creemers (Leiden University)

1. Introduction

In October 2025, China's Ministry of Commerce introduced new export control measures on a range of strategic materials – most notably gallium, germanium, graphite, and selected rare-earth processing technologies. These measures sent shockwaves through global markets and policy communities alike. They exposed vulnerabilities in global supply chains, prompted urgent reassessments of sourcing strategies, and underlined China's central position in global production networks, technology governance, and economic power. For governments and firms accustomed to viewing China primarily as the object of export controls, Beijing's actions marked a turning point. They demonstrated that China no longer responds symbolically to external sanctions but is increasingly willing and able to deploy export controls as an active instrument of economic security, industrial policy, and geopolitical leverage.

These recent actions are neither isolated nor ad hoc responses to short-term diplomatic pressure. Rather, they reflect the maturation of a comprehensive export control regime that has been quietly constructed over the past decade and formally consolidated with the enactment of China's Export Control Law (ECL) in 2020[1]. The ECL defines export controls broadly as "prohibitions or restrictions on the transfer of controlled items out of the territory of the People's Republic of China, including through export, re-export, transit, or the provision of related services to foreign entities and individuals" (Article 2). Subsequent policies – including the White Paper on China's Export Controls[2], the Guiding Opinions on Establishing Internal Compliance Mechanisms for Export Control by Exporters of Dual-Use Items[3], and the Regulation on the Export Control of

[1] For Chinese full text, see Export Control Law of People's Republic of China (中华人民共和国出口管制法), 2020, https://exportcontrol.mofcom.gov.cn/article/zcfg/gnzcfg/flfg/202111/226.html.

[2] For Chinese full text, see State Council, White Paper on China's Export Controls (中国的出口管制》白皮书), 2021, http://www.scio.gov.cn/zfbps/ndhf/2021n_2242/202207/t20220704_130730.html.

[3] For Chinese full text, see MOFCOM, Guiding Opinions on Establishing Internal Compliance Mechanisms for Export Control by Exporters of Dual-Use Items (两用物项出口管制内部合规指南), 2021, https://www.mofcom.gov.cn/cms_files/filemanager/1077459795/attach/20239/2021070615181087.pdf.

Dual-Use Items[4] –have further expanded the scope, enforcement capacity, and extraterritorial reach of China's controls. In addition, Beijing introduced an "Unreliable Entity List" system to penalise foreign businesses and individuals deemed to harm Chinese national security (MOFCOM, 2020)[5], a "blocking statute" to prohibit Chinese actors from complying with the extraterritorial application of foreign sanctions and export controls (MOFCOM, 2021)[6], and the Anti-Foreign Sanctions Law (National People's Congress, 2021)[7]. Other new pieces of legislation, such as data protection laws, also contained clauses enabling government authorities to intervene in export processes[8]. Collectively, these measures have brought China's export control framework closer, both legally and functionally, to those of established export control powers, while retaining distinctive national characteristics.

It is very likely that China will further use this export control framework for deterrence and coercion of foreign governments. These governments should not underestimate both the strategic intent behind Beijing's approach and the broader transformation of export controls globally. Across major economies, export controls have evolved far beyond their post-Cold War focus on non-proliferation and arms control. Once primarily aimed at restricting the spread of military-oriented technologies, they now encompass a wide range of commercial and dual-use technologies that underpin global value chains. Rather than serving as passive instruments of collective or global security, export controls have become politically driven and strategically deployed as offensive tools to advance national economic and technological interests[9]. China's export control practices must be understood within this broader context of intensifying geopolitical rivalry, the securitisation of supply chains, and the gradual diminishment of unfettered economic globalisation[10].

For Chinese full text, see State Council, Regulation on the Export Control of Dual-Use Items (中华人民共和国两用物项出口管制条例), 2024, https://www.gov.cn/zhengce/zhengceku/202410/content_6981400.htm

[5] MOFCOM, Unreliable Entity List Regulation (不可靠实体清单规定), 2020, https://www.mofcom.gov.cn/dl/file/20211203230795.pdf

[6] MOFCOM, Measures on Blocking Improper Extraterritorial Application of Foreign Laws and Measures (阻断外国法律与措施不当域外适用办法), 2021, http://exportcontrol.mofcom.gov.cn/article/zcfg/gnzcfg/zcfggzqd/202111/447.html

[7] National People's Congress, Anti-Foreign Sanctions Law (中华人民共和国反外国制裁法), 2021, http://www.npc.gov.cn/npc/c2/c30834/202106/t20210610_311892.html

[8] Bird & Bird, "What you need to know about CAC's new data export rules," 15 April 2024, https://www.twobirds.com/en/insights/2024/china/what-you-need-to-know-about-chinas-new-data-export-rules

[9] For insightful analyses of the changing nature of contemporary export controls, see, for example, Hugo Meijer, *Trading with the Enemy: The Making of U.S. Export Control Policy toward the People's Republic of China* (Oxford: Oxford University Press, 2016), 3–7; John Krige and Mario Daniels, "Change and continuity in U.S. export control policy," *Issues in Science and Technology* 39, no. 2 (2023): 24–26; and Alexandr Svetlicinii and Xueji Su, "The unsettled governance of dual-use items under Article XXI(b)(ii) GATT: A new battleground for WTO Security Exceptions," *World Trade Review* 24, no. 1 (2025): 75–100.

[10] Daniel W. Drezner, Henry Farrell, and Abraham L. Newman, eds., *The Uses and Abuses of Weaponized Interdependence* (Washington, DC: Brookings Institution Press, 2021), http://www.jstor.org/stable/10.7864/j.ctv11sn64z

At the same time, China's approach to export controls exhibits several distinctive characteristics that set it apart from other states. These include:

- The rapid extension of control practices into non-traditional domains, with a focus not only on cutting-edge technologies but, critically, on minerals, materials, and processing technologies located at lower, often overlooked segments of global supply chains that nevertheless constitute chokepoints for wider industrial ecosystems.
- A relational logic, whereby measures are calibrated in response to actions by other states, particularly the United States.
- The strategic use of export controls as an "upselling" tool linked to industrial strategy and economic protection, rather than merely as instruments of denial.
- The operation of control mechanisms beyond formal export control regulations, intertwined with science and technology policy as well as industrial and trade policy.
- An iterative and gradual rollout of new control mechanisms, often taking years to fully mature.

These characteristics are rooted in China's long experience as a target of export controls, its state-directed economic structure, and its enduring self-identification as a developing country pursuing counter-hegemonic strategies. They are further shaped by China's techno-centric development model, its strategic positioning within global supply chains, its role as a major exporting economy, and its persistent need to reconcile export-driven development goals with the targeted restriction of specific technologies and materials for strategic and security purposes.

This report offers the first comprehensive analysis aimed at explaining how and why China's export controls are designed and applied. Unlike much existing work, it does not treat recent control measures as isolated shocks. Instead, it situates them within the long-term evolution of the international export control system and China's gradual strategic recalibration (Chapter 1) and traces the progressive development of legal foundations and institutional arrangements over time (Chapter 2). The report examines sectoral variation across WMD-related technologies (Chapter 3) and emerging technologies (Chapter 4), and moves beyond government-centric perspectives by analysing the role of non-state actors, including knowledge institutions involved in international R&D collaboration (Chapter 5) and firms such as DJI and Huawei (Chapter 6). Finally, it places China's export controls within the broader international environment, assessing technology transfer concerns in overseas infrastructure projects (Chapter 7) and China's

responses to U.S.-led restrictions (Chapter 8). A deeper understanding of these dynamics will help policymakers anticipate areas of regulatory convergence and divergence, identify potential chokepoints in global supply chains, and craft more informed strategies for engagement and risk management.

The rest of this chapter proceeds as follows. It first situates China's export control regime within the broader history of international export control frameworks, tracing its shift from a passive target of restrictions to a conditional partner and, ultimately, a strategic actor navigating a complex global regime. It then outlines the evolution of China's domestic system and the strategic objectives underpinning recent policy choices. The final section provides an overview of the structure of the report.

2. China's position in the international export control landscape

Historically, global export controls emerged during the early Cold War as a means for Western powers, led by the United States, to prevent the transfer of strategic technologies and materials to the Soviet bloc. The Coordinating Committee for Multilateral Export Controls (CoCom), established in 1949, served as the cornerstone of this regime, setting collective restrictions on the export of dual-use goods and advanced technologies[11]. Following CoCom's dissolution in 1994, new arrangements such as the Wassenaar Arrangement, the Australia Group, the Missile Technology Control Regime (MTCR), and the Nuclear Suppliers Group (NSG) sought to institutionalise controls around non-proliferation, security, and dual-use technologies within a broader multilateral framework[12].

Over time, the purposes of export controls have evolved in line with broader geopolitical and economic shifts. Initially designed as tools of strategic denial to contain adversaries' access to critical technologies, export controls were reoriented in the post-Cold War period towards non-proliferation, counterterrorism, and regulatory compliance within an increasingly liberalised global trading system, where economic interdependence tempered traditional security imperatives. In the past decade, however, they have reemerged as instruments of techno-

[11] Cindy Whang, "Trade and emerging technologies: A comparative analysis of the United States and the European Union dual-use export control regulations," *Security and Human Rights* 31, no. 1–4 (2021): 11–34; Daniel H Joyner, "Restructuring the multilateral export control regime system," in *Non-Proliferation Export Controls: Origins, Challenges, and Proposals for Strengthening*, ed. Daniel H Joyner (Routledge, 2006), 213–244.

[12] For more detailed overview of the multilateral regime on export controls, see, for example, Bert Chapman, *Export controls: A Contemporary History* (University Press of America, 2013), 295–315.

geopolitical competition, increasingly deployed to manage technological dependencies, secure supply chains, and shape the contours of a fragmenting global economy[13].

As the global export control landscape has evolved, so too has China's position within it. Its engagement has been closely shaped by U.S. strategic imperatives during the Cold War and subsequent shifts in the global political and economic order. This historical trajectory can be broadly divided into four phases: the early Cold War and the "China differential" (1950s–1960s); rapprochement and conditional technology cooperation (1970s–1980s); post-Cold War ambivalence and selective integration (1990s–2000s); and strategic rivalry and targeted controls (2000s–present).

During the early Cold War, China, as a fellow communist state, was included as a target under the CoCom. The outbreak of the Korean War prompted the United States to advocate for even stricter measures. In 1952, the China Committee (CHINCOM) was established within CoCom to enforce these measures, introducing the so-called "China Differential" which added hundreds of items to embargo lists specifically against China[14]. These measures reflected Washington's determination to prevent the transfer of dual-use and military-related technologies to Beijing, while Britain and Japan, in particular, frequently clashed with the U.S. over the severity of restrictions[15]. By 1957, amid growing Western debates about exploiting rifts within the Socialist bloc, Britain unilaterally revoked the "China Differential", followed by other allies, leading to a relaxation of controls on China even before Sino-Soviet tensions became pronounced[16].

Although allied with Moscow in the 1950s, China's access to Soviet technology was selective and politically contingent, centred on large, capital-intensive "156" projects in heavy industry and limited military transfers, rather than a free flow of advanced know-how[17]. After the Sino-Soviet rupture (1959–early 1960s), Soviet specialists were withdrawn and many programmes were suspended, leaving China cut off from both Western and socialist technology networks.

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[13] Drezner, Farrell and Newman, *The Uses and Abuses of Weaponized Interdependence*; Edward Fishman, *Chokepoints: American Power in the Age of Economic Warfare* (New York: Penguin Group, 2025).

[14] Rajiv Nayan, "US policy on dual-use technology transfers to China," *Strategic Analysis* 31, no. 4 (2007): 554–5; Bingyi Gong, "Indispensable allied collaboration: The coordinating committee and US export control policies of China, 1966–80," *Journal of Contemporary History* 60, no. 4 (2025): 669–672.

[15] Gong, "Indispensable allied collaboration", 672; Jing-dong Yuan, "The politics of the strategic triangle: The US, COCOM, and export controls on China, 1979–1989," *Journal of Northeast Asian Studies* 14, no. 1 (1995): 47–79.

[16] Ibid.

[17] Baichun Zhang, Jiuchun Zhang, and Fang Yao, "Technology transfer from the Soviet Union to the People's Republic of China: 1949-1966," *Comparative Technology Transfer and Society* 4, no. 2 (2006): 105–167; Shu Guang Zhang, *Economic Cold War: America's Embargo against China and the Sino-Soviet Alliance, 1949-1963* (Stanford University Press, 2001).

The late 1960s and early 1970s saw the deepening of the Sino-Soviet split and a U.S. strategic shift towards engaging China as a counterweight to Moscow. This culminated in President Nixon's 1972 visit to China, which was accompanied by major changes in U.S. trade control policy. China was reclassified from the most restrictive category of the CoCom lists to a level comparable with the Soviet Union, effectively ending the "China Differential"[18]. The 1979 U.S.-China Science and Technology Agreement institutionalised bilateral cooperation across fields ranging from nuclear physics to high-energy research[19]. This framework facilitated large-scale exchanges of knowledge, joint projects, and networking between scientific communities, although it also raised concerns about the potential military applications of transferred technologies. Despite NASA's initial reluctance to cooperate, a 1992 bilateral agreement enabled limited scientific collaborations, although fears of diversion into China's missile programmes eventually constrained such efforts[20].

Within CoCom, China received preferential treatment under the "China Green Line" in 1985, which allowed advanced technology exports without requiring unanimous approval among members[21]. At the same time, the United States licensed hundreds of companies to export dual-use products to China, including semiconductors and high-performance computers[22]. This marked a striking reversal from the complete embargoes of the early Cold War and had important implications for U.S.-China relations and Chinese developmental policy. For the United States, it reflected a strategic shift toward engaging China as a counterweight to the Soviet Union, while for China, the influx of advanced technologies provided critical inputs for industrial modernisation and technological upgrading, helping to accelerate its developmental ambitions.

The end of the Cold War transformed the export control regime from a tool of anti-communist containment to one centred on non-proliferation. In the United States, the 1990s were marked by a refocus of export controls away from strategic trade restrictions and towards preventing the spread of WMD to "rogue states"[23]. While "strategic" controls exceeding the non-proliferation objective were gradually phased out for most countries, China remained subject to targeted restrictions[24]. These restrictions were largely a consequence of the Tiananmen Square incident of 1989, which had a profound impact on U.S. policy and prompted the continuation, and in some cases a tightening, of export controls, particularly on military and dual-use technologies. During

[18]Mathilde Velliet, "From nonproliferation to strategic competition: US export controls and China," *International Politics*, online first (2025).
[19] Nayan, "US policy on dual-use technology transfers to China," 556–7.
[20] Ibid.
[21] Ibid, 555.
[22] Gong, "Indispensable Allied Collaboration," 687–690.
[23] Chapman, *Export controls,* 295–315.
[24] Meijer, *Trading with the enemy*, 118.

this period, the U.S. approach towards China combined deepening economic integration with selective restrictions: American firms were encouraged to engage in trade and technology exchanges that supported China's economic modernisation, while exports of sensitive military and dual-use items were tightly controlled and human rights concerns were explicitly highlighted in policy discourse[25].

China's position within the multilateral export control architecture was ambiguous. Beijing was admitted to the NSG in recognition of its growing role as a responsible nuclear supplier, but it was excluded from the MTCR, the Australia Group, and the Wassenaar Arrangement due to lingering concerns among member states about China's missile proliferation, chemical and biological capabilities, and the export of sensitive conventional and dual-use technologies[26]. These exclusions, which China interpreted as discriminatory, fuelled its suspicion that multilateral export control regimes were being weaponised as instruments of an anti-China technology control system[27]. In response, China, often with Russian backing, sought to advance its own "Peaceful Uses" agenda at the UN General Assembly while continuing to integrate selectively into global technology flows[28].

From the 2000s onwards, U.S. export control policy towards China increasingly blended strategic engagement with targeted restrictions. The George W. Bush administration introduced the 2007 "China Rule", which tightened controls on sensitive technologies through a Military End-Use List, while simultaneously creating a Validated End-User programme to facilitate trade with trusted Chinese firms[29]. The Obama administration largely continued this approach, seeking to build a "higher wall around fewer items", that is, to focus restrictions on a smaller set of strategically sensitive technologies while liberalising less critical sectors. During this period, for example, China could import commercially available semiconductors for civilian and industrial purposes, but access to dual-use, military-related, or cutting-edge semiconductor equipment remained tightly restricted.

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[25] Zachary S. Davis, "China's nonproliferation and export control policies: Boom or bust for the NPT regime?," *Asian Survey* 35, no. 6 (1995): 587–603.

[26] Jonathan E Davis, "Export controls in the People's Republic of China," *Report of the Center for International Trade and Security, University of Georgia* (2005).

[27] Hugo Meijer, "Actors, Coalitions, and the Making of Foreign Security Policy: US Strategic Trade with the People's Republic of China," *International Relations of the Asia-Pacific* 15, no. 3 (2015), 433–475.

[28] China MOFA, "China's views and recommendations on promoting international cooperation on peaceful uses in the context of international security," https://web.archive.org/web/20260211145211/https://www.fmprc.gov.cn/eng/wjb/zzjg_663340/jks_665232/kjfywj_665252/202406/t20240606_11405406.html.

[29] Velliet, "From nonproliferation to strategic competition."

The Export Control Reform Act (2018) and subsequent Foreign Direct Product Rule (2020) introduced during Donald Trump's first presidency represented legal innovations, extending controls extraterritorially and targeting "emerging" and "foundational" technologies critical to national security. These measures, most famously applied to Huawei, exemplify how export controls have become embedded in the broader dynamics of superpower competition, serving not only as instruments of economic policy but also as tools of technological rivalry and strategic containment. This conceptual shift marked the integration of export controls into a framework of long-term competition rather than short-term threat management[30]. The often erratic tactics of the first Trump administration made way for a more coherent approach under President Biden, sometimes known as the "Sullivan Doctrine". This held that the US should maintain as much of a lead as possible over China in key areas of technology, such as semiconductors and AI, to protect its national security interests. Although self-characterised as "small yard, high fence", subsequent export controls on semiconductors and related equipment as well as rules focusing on the diffusion of AI technologies essentially affected the near-entirety of the advanced technology sector[31]. Under the second Trump administration, this approach has morphed into a full-scale trade war and the imposition of very high across-the-board tariffs on Chinese imports. China's introduction of rare earth export controls, as mentioned above, was widely seen as a response to this U.S. move[32].

Controls on China thus increasingly aim to constrain its military modernisation and technological advancement, reflecting deeper concerns about the erosion of U.S. technological primacy. In parallel, China has sought to frame its rise in terms of a "new type of great power relations", calling for mutual respect and coexistence between major powers. The United States, however, has rebuffed this framing, insisting instead on the preservation of the rules-based international order and implicitly rejecting any accommodation of China's bid for strategic parity – although there is increasing recognition of China's centrality, reflected in recent U.S. elite discussions on the prospect of a "G2" configuration[33].

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[30] Svetlicinii and Su, "The unsettled governance of the dual-use items under Article XXI(b)(ii) GATT," 76.

[31] Paul Triolo, "A new era for the Chinese semiconductor industry: Beijing responds to export controls," *American Affairs* 8, no. 1 (2024), https://americanaffairsjournal.org/2024/02/a-new-era-for-the-chinese-semiconductor-industry-beijing-responds-to-export-controls/; International Institute for Strategic Studies (IISS), The US Pivot on Regulating AI Diffusion (2025), https://www.iiss.org/globalassets/media-library---content--migration/files/publications/strategic-comments-delta/2025/12/sc-31-38-the-us-pivot-on-regulating-ai-diffusion.pdf.

[32] CSIS, 9 October 2025, "China's new rare earth and magnet restrictions threaten U.S. defense supply chains," https://www.csis.org/analysis/chinas-new-rare-earth-and-magnet-restrictions-threaten-us-defense-supply-chains.

[33] Bureau of Industry and Security, "Implementation of additional export controls: Certain advanced computing items; supercomputer and semiconductor end Use; updates and corrections; and export controls on semiconductor manufacturing items; corrections and clarifications," *Federal Register* 89, no. 66 (2024), https://www.govinfo.gov/content/pkg/FR-2024-04-04/pdf/2024-07004.pdf; David R. Hanke, "Testimony before the U.S.-China Economic and Security Review Commission. Hearing on U.S.-China

Across these phases, China's trajectory moved from a passive target of restrictions to a conditional partner of necessity and, eventually, to a strategic actor navigating a complex global regime. Tracing this evolution illuminates the contemporary context in which China's export control system operates and underscores how historical experiences of dependence and exclusion have informed its current policy orientation. Building on this historical foundation, the next section examines China's long-term objectives and the gradual evolution of its export control framework.

3. China's long-term objectives for its export controls and their evolution

The objectives guiding the evolution of Chinese export controls have shifted alongside its changing perceptions of the strategic environment. In the 1990s, it primarily followed the rest of the global system in establishing an export control system intended towards non-proliferation of military capabilities. Subsequently, as relationships with the United States deteriorated, Beijing adopted a reactive, mirroring response, in which it increasingly assertively reciprocated U.S. sanctions, aiming towards sovereignty and strategic autonomy.

The institutionalisation of China's export system took place from the mid-1990s onwards, when Beijing adopted laws and regulations designed to control the export of military and dual-use items, including certain chemicals, biological agents, missiles and related items, as well as nuclear materials and technologies (See Chapters 2 & 3 for more detail). These moves were largely in line with a relatively narrow reading of export control that served to limit the proliferation of chemical, biological and nuclear weapons as the country sought to present itself as a responsible global stakeholder, and shared concerns with other global governments about the misuse of particular technologies, particularly in the context of the War on Terror of the early 2000s. Still, public policy concerns also mattered. The temporary suspension of rare earth exports to Japan in 2010[34], often depicted as retaliation for a naval incident over the disputed Senkaku/Diaoyu islands, may have also been due to a decision to cut outflows in order to better regulate labour and environmental standards in the industry[35].

relations in 2021: Emerging Risks Panel III: Assessing export controls and foreign investment review," 2021, https://www.uscc.gov/sites/default/files/2021-08/David_Hanke_Testimony.pdf.

[34] It is still debated whether such a reduction actually took place. See for instance: Simon Evenett and Johannes Fritz, "Revisiting the China-Japan rare earths dispute of 2010," *VoxEU*, 19 July 2023, https://cepr.org/voxeu/columns/revisiting-china-japan-rare-earths-dispute-2010.

[35] Amy King and Shiro Armstrong, "Did China really ban rare earth metals exports to Japan?," *East Asia Forum*, 18 August 2013, https://eastasiaforum.org/2013/08/18/did-china-really-ban-rare-earth-metals-exports-to-japan/.

The rapid development of export control legislation and regulation over the past decade, however, is almost entirely a symptom of the growing tensions between China and its prime strategic adversary, the United States, and to a lesser degree, countries it perceives as U.S. allies such as Australia and European states. These tensions have a strong technological and economic component. By the mid-2010s, the Chinese government had determined that future economic growth should come from gaining a leading position in the income distribution of emerging and strategic sectors, mostly in manufacturing industries. In this view, exemplified in plans such as "Made in China 2025", China should move away from low-value added, export-oriented manufacturing and towards higher end capabilities, indigenous innovation and domestic brand-building. On the security side, such plans also intended for China to reduce its dependence on foreign high-end technologies. In addition, a new campaign of "civil-military fusion" sought to ensure that the fruits of Chinese technological innovation would also benefit its armed forces. In Western capitals, however, China's bid was read as a rejection of the liberal international order as they saw it, primarily driven by a search for economic efficiency, and as the dawn of a new era of superpower competition. China's rise and declared aspirations thus triggered a revival of economic statecraft and the weaponisation of economic interdependencies.

Within the context of these rising tensions, the United States used the export control tool first as a geopolitical tool. The Department of Commerce's Entity List system, previously mostly used to target military-affiliated organisations in China, was repurposed to deny Chinese access to key US technologies. At first, these interventions targeted specific companies and were justified on specific grounds. The first Trump administration imposed export controls against Huawei and ZTE for alleged breaches of US sanctions against Iran[36], and requested Canada to arrest Huawei CFO Meng Wanzhou. In addition, it demanded that TikTok's Chinese owner ByteDance sell the app to US investors over concerns about potential Chinese espionage and influence operations. The Biden Administration, recognising the crucial role of semiconductors in Chinese techno-industrial development, introduced and subsequently strengthened export controls against the entire country[37], and persuaded partners including Japan and the Netherlands to emulate those restrictions to a considerable degree[38].

[36] James Andrew Lewis, "ZTE, the telecom wars, and cyber spies," *CSIS Briefs*, June 2018, https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/180625_Lewis_ZTETelecomWars.pdf.

[37] Sujai Shuvakumar, Charles Wessner and Thomas Howell, "The limits of chip export controls in meeting the China challenge," *CSIS,* 14 April 2025, https://www.csis.org/analysis/limits-chip-export-controls-meeting-china-challenge.

[38] Gregory C. Allen, Emily Benson and Margot Putnam, "Japan and the Netherlands announce plans for new export controls on semiconductor equipment," *CSIS,* 10 April 2023, https://www.csis.org/analysis/japan-and-netherlands-announce-plans-new-export-controls-semiconductor-equipment.

Chinese authorities would have been alarmed, though not surprised, by these moves. The notion that "foreign hostile forces" were on a mission to curb China's resurgence and would resort to any means to retain their economic and political hegemony was well-established in top Party circles by the early 2010s[39]. Self-sufficiency and resilience were already prominent industrial policy goals, and the existing export control framework already permitted some ad-hoc measures to be taken. In August 2020, for instance, MOFCOM and the Ministry of Science and Technology updated the catalogue of export-controlled technologies for the first time in twelve years, to add 23 new restricted technology categories, including artificial intelligence[40]. This effectively meant that the sale of TikTok's algorithm to a U.S. party, as demanded by the Trump administration at the time, could only proceed with Chinese governmental approval. Tripwire clauses permitting Chinese retaliation against foreign sanctions were introduced in, amongst others, the Data Security Law and the Personal Information Protection Law of 2021. Cross-border data flow regulations-imposed security reviews for the export of large quantities of personal information, as well as for a vaguely defined category of "important data"[41]. Beijing also started building a broader countersanctions framework. In 2021, it passed a "blocking statute", enabling responses to perceived unjustified extraterritorial application of foreign legislation[42], as well as the Anti-Foreign Sanctions Law, which created countermeasures to sanction individuals and organisations involved in the formulation and/or application of foreign sanctions[43]. It also restructured legal frameworks for export control. 2019 saw the introduction of the "Unreliable Entity List" system, which permitted sanctions against foreign organisations and individuals whose activities harmed Chinese interests and national security.

This process culminated in the Export Control Law (ECL), which took effect in 2020. As the first comprehensive framework governing export controls, it regulates goods and technologies with military and dual-use applications, while also extending to broader national security and public policy concerns. Articles 3 and 12 of the ECL explicitly frame export controls as instruments to safeguard the "holistic view of national security" (总体国家安全观), "national interests" (国家利

[39] Hu Jintao's Article in Qiushi Magazine – translated, 4 January 2012, China Copyright and Media, https://chinacopyrightandmedia.wordpress.com/2012/01/04/hu-jintaos-article-in-qiushi-magazine-translated/

[40] Reid Witten and Julien Blanquart, "China expands technology export controls: Fighting back on TikTok and putting your R&D at risk," *Sheppard Mullin,* 2 September 2020, https://www.globaltradelawblog.com/2020/09/02/china-technology-export-controls-tiktok/.

[41] Rogier Creemers, "China's emerging data protection framework," *Journal of Cybersecurity* 8, no.1 (2022), tyac011: https://doi.org/10.1093/cybsec/tyac011.

[42] Ministry of Commerce of the People's Republic of China, Measures to Block the Improper Extraterritorial Application of Foreign Laws and Measures, promulgated 9 January 2021, translated by China Law Translate, https://www.chinalawtranslate.com/en/blocking-law/.

[43] Standing Committee of the National People's Congress of the People's Republic of China, Law of the People's Republic of China on Countering Foreign Sanctions (中华人民共和国反外国制裁法), promulgated 10 June 2021, translated by China Law Translate, https://www.chinalawtranslate.com/counteringforeignsanctions/.

益), “integrated security and development” (统筹安全和发展), “international peace” (国际和平), and “counterterrorism” (反对恐怖主义). Terms such as “national security”, “national interests”, or “development” were not explicitly defined, suggesting a significant expansion of the potential applicability of the law. The ECL also included a requirement that exporters themselves should assess whether a particular export might need to be controlled, even in cases where it was not listed in an export control catalogue. In addition, the ECL contained an extraterritorial dimension, as its scope of application included companies or individuals violating its terms outside of Chinese territory.

In October 2024, an export control system explicitly aimed at dual-use items came into being, as the State Council published regulations consolidating previous scattered lists into one whole, under the responsibility of MOFCOM[44]. This dual-use control system took clear inspiration from its U.S. counterpart in two significant ways. First, the functioning of an envisaged “control list” strongly resembled the U.S. Entity List, where Chinese exporters are required to obtain government approval to export dual-use items to listed organisations. Second, the rules also echo the U.S. deployment of “long-arm jurisdiction”, authorising MOFCOM to sanction foreign entities providing products with Chinese-origin dual-use content to third parties. MOFCOM duly issued an accompanying export catalogue[45] that, according to a Ministry spokesperson, only consolidated the content of several previous export control lists[46]. However, as part of its response against Washington’s “Liberation Day” tariffs, MOFCOM added 7 rare earth elements to the list in April 2025[47].

Implementing regulations have since followed. The “Control List” system was unveiled in January 2025, with an initial 28 entries, all of them U.S. defence vendors with few or no significant business activities in China. Dozens of further U.S. firms were added in April as part of retaliatory

[44] State Council of the People’s Republic of China, Regulations of the People’s Republic of China on Export Control of Dual-Use Items (中华人民共和国两用物项出口管制条例), promulgated 30 September 2024, effective 1 December 2024, https://www.gov.cn/zhengce/content/202410/content_6981399.htm.

[45] MOFCOM 2024, Export Control List of Dual-Use Items of the People’s Republic of China (中华人民共和国 两用物项出口管制清单), https://picpolicy.mofcom.gov.cn/file/20241120/56691732080580306.pdf

[46] Ministry of Commerce of the People’s Republic of China, MOFCOM Spokesperson Answers Questions on the Publication of the Export Control List of Dual-Use Items of the People’s Republic of China (商务部新闻发言人就公布〈中华人民共和国两用物项出口管制清单〉应询答记者问), 15 November 2024, https://www.mofcom.gov.cn/xwfb/xwfyrth/art/2024/art_e1930a8010fe4ef8a2a2c89df1a7b812.html

[47] Ministry of Commerce of the People’s Republic of China and General Administration of Customs, Notice No. 18 (2025) on the Decision to Impose Export Controls on Certain Medium and Heavy Rare Earth-Related Items (商务部 海关总署公告2025年第18号 公布对部分中重稀土相关物项实施出口管制的决定), 4 April 2025, https://www.mofcom.gov.cn/zwgk/zcfb/art/2025/art_9c2108ccaf754f22a34abab2fedaa944.html.

measures against US tariff escalation[48]. Eight Taiwanese firms were added to the list in July, in the wake of rising cross-strait tensions. The listed firms included three shipbuilders, two aerospace entities, two drone producers and a vendor of tactical equipment[49]. In October, China announced its own version of the U.S.'s "foreign direct product rules"[50], establishing licensing requirements for third-country businesses selling products that contain more than 0.1% of China-sourced rare earths, or are produced using Chinese mining, processing or magnet-production technologies. The rules impose a blanket ban on applications for export to overseas military users, to entities on the Control List, or for military purposes. China also announced increased scrutiny on export applications related to advanced chip research, development and production. Lastly, the rules echo a recent US provision under which any entity of which 50% or more is owned by an organisation on the Entity List or the Military End-User List is automatically added to those lists[51].

China's export control framework, as it has evolved over the past few years, thus mirrors U.S. export control practices to a significant degree and is primarily a tool for geo-economic statecraft. This framework serves several goals. A first is deterrence, coercion and retaliation. The gradual build-up of export control structures served to make adversaries think twice about deploying sanctions against China, or to make doing so far more costly. For instance, the imposition of export control requirements on AI algorithms meant that Beijing retained a significant say over any solution to the domestic U.S. effort to divest the TikTok app from Chinese ownership. The final arrangement, concluded in September 2025, allowed ByteDance to both retain ownership of the algorithm, and charge handsome fees for its use to a new majority U.S.-owned TikTok entity[52]. The explicit mirroring of even detailed features of U.S. export control processes indicates that Beijing intends to escalate in a balanced manner, exploiting its dominance in rare earths just as it feels Washington does in relation to semiconductors. Even so, Chinese authorities present their

[48] Ministry of Commerce of the People's Republic of China, Notice No. 13 (2025) on Including 15 U.S. Entities on the Export Control List (商务部公告2025年第13号 公布将15家美国实体列入出口管制管控名单), 4 March 2025, https://www.mofcom.gov.cn/zcfb/dwmygl/art/2025/art_a022a79f394641d3b9d8e5859ba2de8a.html; Ministry of Commerce of the People's Republic of China, Notice No. 22 (2025) on Including 12 U.S. Entities on the Export Control List (商务部公告2025年第22号 公布将12家美国实体列入出口管制管控名单), 9 April 2025, https://www.mofcom.gov.cn/zwgk/zcfb/art/2025/art_c6b190344a154e6f831e0fdfc190e41e.html.

[49] Ministry of Commerce of the People's Republic of China, Notice No. 35 (2025) on Including 8 Entities from the Taiwan Region on the Export Control List (商务部公告2025年第35号 公布将8家台湾地区实体列入出口管制管控名单), 9 July 2025, https://www.mofcom.gov.cn/zwgk/zcfb/art/2025/art_53c6b5ab958841dfb90b77c00f8602cf.html.

[50] Ministry of Commerce of the People's Republic of China, Notice No. 35 (2025) on Including 8 Entities from the Taiwan Region on the Export Control List (商务部公告2025年第35号 公布将8家台湾地区实体列入出口管制管控名单), 9 July 2025, https://www.mofcom.gov.cn/zwgk/zcfb/art/2025/art_53c6b5ab958841dfb90b77c00f8602cf.html.

[51] Trivium China, "US closes export control subsidiary loophole for blacklisted firms," 30 September 2025, https://triviumchina.com/2025/09/30/us-closes-export-control-subsidiary-loophole-for-blacklisted-firms/

[52] Marina Yue Zhang and Wanning Sun, "The sovereignty tax: What the TikTok deal means for the digital order," *The Diplomat*, 11 October 2025, https://thediplomat.com/2025/10/the-sovereignty-tax-what-the-tiktok-deal-means-for-the-digital-order/

activities as “rational, prudent and moderate”. For instance, the dual-use export control list only contains about 700 entries, which a MOFCOM spokesperson touted as “significantly less than other major countries”[53], – a thinly veiled allusion to the U.S. The imposition of export controls in strategic sectors also allows Beijing to present itself as constructive and lenient: granting export licences or facilitating exports of critical raw materials can be cast as a diplomatic favour to countries Beijing hopes to court or cultivate.

There is also an element of economic protectionism to export controls. Thus far, the lion’s share of export controls has been imposed in the realm of rare earths, an area strongly dominated by China and one that is essential to a whole swathe of industrial applications. This not only inhibits foreign firms’ access to those elements but also facilitates vertical integration within Chinese industry chains: rather than exporting raw materials, a significant part of China’s techno-industrial strategy is to export the goods produced with them. It is, after all, far more profitable to export cutting-edge batteries, and more lucrative still to export electric vehicles powered by those batteries. In this sense, “upselling” can be seen as a collateral impact of export controls in strategic sectors. A similar phenomenon may emerge in the realm of data, where strict controls on large-volume exports of personal information, as well as the export of any data the government has designated to be “important”, may incentivise the development of domestic AI applications and models trained on those data and capable of generating added economic or social value. China also seeks to maintain control over Chinese tech companies’ international activities. One example is the Manus case. This AI agent developer was acquired by Meta at the end of 2025. Manus had not only focused on international markets, with negligible presence in China, but had also relocated to Singapore to avoid breaching “reverse CFIUS” rules that restricted U.S. investment into Chinese tech companies[54]. Nevertheless, the Ministry of Commerce announced an investigation of the comprehensive legality of the deal, ostensibly out of concerns that “young crops” end up in the hands of foreign businesses[55].

If the core goal of new export control rules is techno-nationalist in nature, aimed to establish Chinese strategic autonomy vis-à-vis the United States, “classical” export control concerns, such as the non-proliferation of military technologies and concerns about the abuse of

[53] Ministry of Commerce of the People’s Republic of China, Press Conference on the Publication of the “Export Control List of Dual-Use Items of the People’s Republic of China” (商务部新闻发言人就公布《中华人民共和国两用物项出口管制清单》应询答记者问), 15 November 2024, https://www.mofcom.gov.cn/xwfb/xwfyrth/art/2024/art_e1930a8010fe4ef8a2a2c89df1a7b812.html.

[54] Letian Cheng, 2026, “Identity engineering: Why a leading Chinese AI startup abandons its home market,” https://www.internetgovernance.org/2026/01/07/identity-engineering-why-a-leading-chinese-ai-startup-abandons-its-home-market/

[55] “China’s fear of ‘selling young crops’ spurred review of Meta’s Manus deal,” *Financial Times*, 2026, https://www.ft.com/content/9496e2bc-f67a-4db7-b5af-f760fedeb666

technologies, has not played a significant role. Most notably, although China has been careful in its sales of potentially dual-use goods and technologies to Russia to avoid breaching Western sanctions regime concerning Ukraine, it has also not significantly updated its export control framework in the light of this conflict. This suggests that China's contemporary export control policy is driven less by normative commitments to global non-proliferation norms than by strategic calculations designed to preserve flexibility and advance national technological interests in an era of intensifying great power competition.

4. Chapter overview

This report brings together eight studies that collectively trace China's evolution from a rule-taker to a rule-maker in the global export control system, examining multiple sectors, actors, and both domestic and international dimensions. After the opening chapter, written by Guangyu Qiao-Franco and Rogier Creemers, Chapter 2, by Dechun Zhang and Ruoxin Su, provides a detailed account of the legal and regulatory evolution of export controls in China. From the early registration requirements for dual-use item exporters in the 1990s to the sophisticated, risk-based system that mirrors key Western features of the 2020s, their analysis shows how China has built a system designed not only to comply with international obligations but also to promote broader national security and economic objectives.

In Chapter 3, Haotian Qi shows how China initially developed export controls to meet international non-proliferation obligations. By analysing China's commitments under the Nuclear Non-Proliferation Treaty, the Biological Weapons Convention and the Chemical Weapons Convention, the chapter traces the institutional foundations that continue to shape Beijing's regulatory approach, which combines a gradual strengthening of WMD compliance with strategic leverage over critical technologies.

Chapter 4, by Ewan Smith, examines the application of export controls in emerging technology sectors, particularly AI, by placing law within the CCP's broader strategic and economic security objectives. It shows that export controls function as flexible tools to manage the AI value chain, encouraging the diffusion of hardware while tightly controlling access to data, knowledge, and critical inputs.

Export controls not only affect markets and firms; they also shape international research and academic cooperation. In Chapter 5, Cong-rui Qiao explores how China's three regulatory sectors, including export control, security, and science and technology, influence international

joint research projects and academic exchanges, reflecting Beijing's effort to balance control with conditional openness.

Chapter 6, authored by Douglas Fuller, shifts the focus to private industry. It examines the exceptional case of drone manufacturer DJI, as well as other firms' – especially Huawei's – responses to U.S.-led semiconductor controls, and how decoupling may incentivise Chinese high-technology firms to support, rather than resist, further decoupling.

In Chapter 7, Qiaochu Zhang examines China's outbound technology transfer in the context of export controls, highlighting the tension between economic interests and national security. The chapter explores how firms and the government navigate increasing national security considerations, managing the risks and opportunities of technology transfer abroad while balancing these with commercial objectives.

Chapter 8, by Chenghao Sun and Chong Wang, turns to China's responses to foreign export restrictions. In particular, it assesses Beijing's countermeasures to restrictions imposed in the semiconductor and rare earth sectors. Their analysis highlights both the limits and the potential of China's emerging strategy from policy discourse and the deployment of concrete policy instruments, as well as the broader implications for global technology governance in an increasingly fragmented world.

Chapter 2. Legal and Regulatory Evolution of China's Export Controls

1. Introduction and context

Amid intensifying global technological competition, China's export control regime has undergone a profound legal and institutional transformation. What began in the 1990s as a fragmented, registration-based system has developed into a comprehensive, centralised, and increasingly sophisticated framework, anchored by the 2020 Export Control Law (ECL) and subsequent implementing regulations. Today, China's export controls serve not only as defensive measures to prevent the unauthorised transfer of sensitive technologies and materials, but also as strategic instruments deployed in response to foreign trade and security restrictions. This evolution reflects not merely reactive adjustments to external pressures, but a deliberate effort to safeguard China's rapidly expanding technological capacities, to secure access to critical resources, and to strengthen Beijing's ability to wield economic leverage in geopolitical competition. As China's use of export controls becomes more assertive and integrated into its broader economic statecraft, understanding the logic, scope and implications of this shift is increasingly important for European policymakers.

This chapter offers a comprehensive analysis of the legal and regulatory evolution of China's export control system. It traces the trajectory from the early, decentralised mechanisms of the 1990s to the unified framework established by the 2020 ECL and further refined by the 2024 Dual-Use Items Export Control Regulations. The report examines China's enforcement tools—including restricted entity lists, licensing procedures, and the system's expanding extraterritorial reach—alongside sector-specific impacts and compliance challenges for foreign industry. It also assesses how China's export controls interact with its broader anti-foreign sanctions architecture. The chapter concludes with key findings and actionable policy recommendations designed to support European decision-makers in navigating this complex and rapidly evolving landscape.

2. Evolution of China's export control system

Initial stage: Registration-based controls since the 1990s

Prior to the 1990s, China's export regime operated under a strict state monopoly, with foreign trade conducted almost entirely through state-owned enterprises[56]. The 1950 *Interim Rules for the Administration of Foreign Trade* imposed a uniform licensing requirement on all trade, so without a dedicated framework for differentiating ordinary goods from strategically sensitive items. This early model was rendered ineffective by the dramatic expansion and decentralisation of trade during the 1980s reforms[57]. Concurrently, international pressure grew over China's proliferation of Weapons of Mass Destruction (WMD)-related goods and technologies, as its formal controls were minimal[58]. These combined internal economic and external geopolitical pressures necessitated the shift to a formalised, item-specific export control system in the 1990s.

The mid-1990s marked a significant turning point in China's export control evolution. The legal cornerstone of this era was the 1994 Foreign Trade Law (FTL), later revised multiple times, most recently in December 2025[59]. Article 1 sets out its objectives—expanding opening-up, developing foreign trade, maintaining trade order, protecting operators' rights, and promoting the socialist market economy. While affirming the principle of free import and export (Article 13), the FTL authorises the state to restrict or prohibit trade for statutory reasons such as safeguarding national security or fulfilling international obligations (Article 15). For all restricted or prohibited items, MOFCOM must publish control catalogues and administer quotas or licensing (Articles 17–18). The FTL thus introduced a registration-based system and provided the foundational legal basis for later, more detailed regulations, marking a shift from ad-hoc administration to a formalised export control framework.

Following the FTL, China embarked on a decade-long process of designing sector-specific regulations for militarily sensitive items, focusing on nuclear, chemical, biological and conventional arms, and missile-related areas. For instance, in the nuclear field, the government issued the Regulations on the Control of Nuclear Export (1997) and the Regulations on the Administration of the Export of Dual-Use Nuclear Items and Related Technologies (1998) (Dual-Use Nuclear Items Regulations) (See Chapter 3 of this report for more detail). These regulations emphasise the state's non-proliferation obligations, mandating that nuclear exports be solely for

[56] Jiangyu Wang, "The evolution of China's international trade policy: Development through protection and liberalization," in *Economic Development through World Trade*, ed. Yong-Shik Lee (The Hague: Kluwer Law International, 2007), 195, https://ssrn.com/abstract=1126206

[57] Bin Li, "Export control practice in China," *CISTEC Journal*, July 2007, https://www.cistec.or.jp/jaist/event/other/070728/haifu2_Export_Control_Practice_in_China%EF%BC%88LiBin%EF%BC%89.pdf

[58] Evan S. Medeiros, "History of Chinese export controls.," in *Chasing the Dragon: Assessing China's System of Export Controls for WMD-Related Goods and Technologies*, 1st ed. (RAND Corporation, 2005), 5–20, https://www.jstor.org/stable/10.7249/mg353.9

[59] Original Chinese text available at: https://www.mofcom.gov.cn/zwgk/zcfb/art/2025/art_03fbae1ec4bd48459099930e803bce5e.html

peaceful purposes subject to International Atomic Energy Agency (IAEA) safeguards, and be monopolised by organisations designated by the central government.

In the arms export field, China's views on missile non-proliferation began to change in the 1990s due to global concerns and international sanctions. In 1995, China issued its first white paper on arms control, signalling its intention to strengthen export controls[60]. This was followed by the 1997 Regulations on Administration of Military Products Export (revised in 2002), and the *Military Products Export Control List*. Similarly, the Regulations on the Administration of the Controlled Chemicals and its Controlled Chemicals List were drawn up in 1995 (amended slightly in 2011 and 2020), imposing strict license and declaration obligations for chemical exports[61].

These sector-specific regulations marked China's first concerted move towards a licensing-based system with end-use assurances. However, regulatory categories remained dispersed, while fragmented and still-developing departmental oversight produced overlapping mandates and inconsistent enforcement[62]. While these reforms signalled China's intention to tighten export controls and align with international non-proliferation norms, the lack of an integrated regulatory framework and mature interagency coordination limited overall coherence and effectiveness.

Dynamically strengthening the framework in the period 2000-2010

The period from the early 2000s to the late 2010s saw China further consolidate and refine its export control framework, moving towards greater centralisation and a more explicit focus on balancing non-proliferation, security, and economic competitiveness. The registration system established by the FTL remained the cornerstone, while undergoing gradual legislative updates through detailed administrative regulations and the dynamic evolution of control lists to address emerging technological advancements and strategic priorities.

A key development was the implementation of the *Regulations on Administration of Import and Export of Technologies* in 2001 (last revised in 2020)[63]. These regulations operationalised the FTL's provisions on technology controls, establishing a unified administrative system. They categorised technologies into three tiers: (a) prohibited technologies (absolute bans); (b) restricted technologies (requiring a stringent two-stage licensing process by MOFCOM in coordination with the Ministry of Science and Technology, MOST); and (c) freely tradeable

[60] State Council, "China's arms control and disarmament (中国的军备控制与裁军)", November 1995, https://www.gov.cn/zhengce/2005-05/25/content_2615741.htm

[61] MOFA, "The chemical weapons convention," last updated 29 August 2025, https://www.fmprc.gov.cn/eng/wjb/zzjg_663340/jks_665232/kjlc_665236/shwq_665244/202406/t20240606_11405161.html

[62] Medeiros, "History of Chinese export controls."

[63] Original Chinese text available at: https://policy.mofcom.gov.cn/claw/clawContent.shtml?id=87982

technologies (requiring contract registration). Following these regulations, the *Catalogue of Technologies Prohibited and Restricted from Export* serve as the pivotal instrument defining controlled technologies (issued in 2001 and lastly revised in July 2025).

In the non-proliferation field, China enacted the *Regulation on Controlling the Export of Guided Missiles and Related Items and Technologies* in 2002 (abolished in 2024)[64], aligning with international non-proliferation mechanisms like the Missile Technology Control Regime[65]. These regulations introduced a mandatory licensing regime for exporters as well as end-use requirements. Building on this, China launched complementary export-control regulations covering dual-use biological products and certain chemicals in the same year and revised the 1998 Dual-Use Nuclear Items Regulations in 2007. Together, these sector-specific regulations gradually created a comprehensive non-proliferation framework reliant on internationally recognised control lists, centralised MOFCOM licensing and end-user pledges.

Moreover, in 2006 MOFCOM and General Administration of Customs jointly issued the *Measures on the Administration of Import and Export Licenses for Dual-Use Items and Technologies*. This standardised the licensing process for dual-use goods and codified the mechanism by which customs authorities release shipments based strictly on valid licenses. On this basis, these two regulators have been updating the *Management Catalogue for the Import and Export of Dual-Use Items and Technologies Licenses* annually[66]. Legislative developments during this period further strengthened China's export control framework, paving the way for a more mature and unified framework in the 2020s.

Unification and legalisation: the 2020 ECL

The evolution of China's export control regime culminated in the adoption of the ECL on 17 October 2020[67]. In a geopolitical context including U.S.-China trade friction, China felt an urgent need to safeguard export security and core technologies through a dedicated legal framework

[64] This regulation was formally abolished on 1 December 2024 as part of a 2024 consolidation of China's Dual-Use Items Export Control Regulations (Dual-Use Items Regulations). Article 47 of Dual-Use Items Regulations integrates the items listed in the missile control list into the military goods export management list, to be governed under the Regulations on the Administration of Military Products Export.

[65] The Missile Technology Control Regime (MTCR) is an informal political understanding among states that seeks to limit the proliferation of missiles and missile technology. See "Missile technology control regime," https://www.mtcr.info/en. While China is not a member of MTCR, China has borrowed the regime's guidelines and has implemented domestic export control regulations. See MOFA, "The missile technology control regime," last updated 7 April 2011, https://www.fmprc.gov.cn/eng/wjb/zzjg_663340/jks_665232/kjlc_665236/wkdd_665246/202406/t20240606_11405168.html

[66] This catalogue was lastly updated in December 2024: https://www.mofcom.gov.cn/zwgk/zcfb/art/2024/art_636ab584a448477d906e54f63719b27f.html

[67] Original Chinese text available at: https://exportcontrol.mofcom.gov.cn/article/zcfg/gnzcfg/flfg/202111/226.html

equivalent to the matured export control systems of developed countries[68]. Accordingly, the ECL serves as the foundational and overarching legislation, unifying previously scattered regulations on dual-use items, military products, nuclear materials and other goods, technologies, and services deemed relevant to safeguarding national security and interests or fulfilling international non-proliferation obligations. Its enactment marked a significant departure from the previous piecemeal approach, providing the first comprehensive and centralised legal framework for China's export control system.

The ECL serves multiple purposes: safeguarding national security and interests, fulfilling international obligations, and strengthening export controls. It explicitly positions export controls as an instrument of economic statecraft, enabling China to respond to foreign restrictions. The law defines "export control" broadly to include the transfer of controlled items from China, as well as "deemed exports"—the provision of controlled items by Chinese entities to foreign counterparts even within China. It also covers transit, transshipment, transportation, and re-export of controlled items; exports from special customs supervision areas; and re-exports of controlled items by foreign entities.

A defining feature of the ECL is its extraterritorial reach. Article 44 allows China to hold foreign organisations and individuals legally accountable for violations committed in China or for unlawfully re-exporting Chinese-origin controlled items abroad. However, questions remain over how broadly this applies—for example, whether foreign products incorporating controlled Chinese inputs or technologies would count as "re-exported controlled items." Article 48 further introduces reciprocity, allowing China to take countermeasures when other countries "abuse" export controls to jeopardise China's national security, signalling Beijing's intention to assert jurisdiction globally and deploy export controls in response to perceived foreign economic coercion.

The ECL consolidates three core regulatory mechanisms: (a) export control lists (Article 9) covering dual-use, military, nuclear, and other national-security-related items; (b) export licensing (Article 12), required not only for listed and temporarily controlled items but also for items exporters know—or should know—could pose national security, WMD-proliferation, or terrorism risks; and (c) an importer and end-user "control list" (Article 18) for entities that violate

[68] Xinyu Liu, Yunfeng Jing, and Jia Li, "The dust has settled: A comprehensive and quick interpretation of China's export control law (尘埃落定，全面速解中国《出口管制法》)," *King & Wood Mallesons Research* (WeChat), 18 October 2020, https://mp.weixin.qq.com/s/BBXc4moy9S--KU_0pY9T1w

end-use commitments or pose security risks, enabling regulators to restrict or suspend transactions.

During this period, the Catalogue of Technologies Prohibited or Restricted from Export—first issued in 2001—underwent major revisions. The 2020 update, introduced amid intensifying trade tensions, added controls on 3D printing, drones, laser technologies, and "personalised information push service technology based on data analysis." In December 2023, MOFCOM and MOST streamlined the catalogue by reducing the number of controlled items, refining classifications (such as laser radar systems), and tightening restrictions on drone-related technologies and rare earth extraction and processing. These changes reflect China's effort to protect critical technologies while managing international engagement.

Under the ECL, exporters bear primary liability and may face administrative penalties including warnings, cease-and-desist orders, license revocation, confiscation of illegal gains, and fines up to 20 times the value of illegal transactions. Third-party service providers—such as freight forwarders, customs brokers, e-commerce platforms, and financial institutions—also face penalties if they knowingly facilitate unlawful exports. Forging, altering, or trading in export licenses carries additional legal liabilities.

Towards a more nuanced legal framework: The 2024 Dual-Use Items Export Control Regulations

Building upon the ECL, China further refined its export control apparatus through the Dual-Use Items Export Control Regulations (Dual-Use Items Regulations)[69], which entered into force on 1 December 2024, alongside the country's first unified Export Control List of Dual-Use Items (Export Control List)[70]. These regulations replace a series of sector-specific control lists (e.g., on nuclear dual-use items, missiles, and biological agents), creating a harmonised catalogue covering approximately 700 items. However, the Regulations on the Administration of the Controlled Chemicals (2011) and the Regulations on Administration of Arms Export (2002) remain effective.

A key feature of the 2024 regulations is the unified and standardised Export Control List. Prior to this, exporters navigated multiple, often overlapping lists managed by different ministries. The consolidated catalogue now clearly delineates each controlled dual-use item by technical specification and potential end-use, offering greater transparency and predictability. The Export Control List creates a standalone five-character coding system similar to the U.S.'s Export

[69] Original Chinese text available at: https://www.gov.cn/zhengce/content/202410/content_6981399.htm
[70] Original Chinese text available at: https://www.gov.cn/zhengce/zhengceku/202411/P020241119387520616554.pdf.

Control Classification Number (ECCN) and the EU list of dual-use items[71], facilitating international trade reference. This approach also aligns China's practice more closely with major export control regimes while accommodating domestic industry growth.

The 2024 regulations further streamline the licensing framework, introducing three types of export licenses: (a) single license: for one specific export to a single end-user, valid for up to one year; (b) general license: allowing multiple exports of specific items to one or more end-users, valid for up to three years and requiring an established and well-operating internal compliance system, relevant export records, and stable export channels; and (c) registration-based export certificate: a new regime requiring exporters to report relevant information to MOFCOM before each export in specific circumstances (e.g., temporary export for repair, testing or exhibitions) and to obtain an export certificate. Moreover, the Dual-Use Items Regulations abolished the previous registration requirement for dual-use item exporters, which was often a cumbersome step before the licensing process.

Furthermore, items not on the regular control list but subject to temporary export control measures (implemented by MOFCOM with State Council approval) now trigger a mandatory application for a temporary export license. These controls have a maximum initial duration of two years, with potential for cancellation, limited extension (up to two times, max 2 years each), or permanent listing. This mechanism shifts focus towards dynamic, transaction-specific vetting based on current proliferation risks or geopolitics.

The 2024 Dual-Use Items Regulations substantially strengthen end-user and end-use controls across the entire export lifecycle. At the licensing stage, exporters must submit end-user and end-use declarations—often signed directly by the ultimate recipient[72]—and legally binding commitments not to divert, retransfer, or alter items without permission. The regulations empower MOFCOM to conduct on-site pre-license inspections of both exporters and end-users. During the export process, exporters must keep MOFCOM informed of shipment, arrival, installation, and operational status, and must halt exports if key details change. Post-shipment, exporters are also required to report and address any risks to national security posed by the items or if end-user commitments are found to be false (Article 35). These measures mark a significant

[71] George Grammas, Ju (Lindsay) Zhu, and José María Viñals, "China releases consolidated dual-use items control list," *Squire Patton Boggs*, December 2024, https://www.squirepattonboggs.com/insights/publications/china-releases-consolidated-dual-use-items-control-list/

[72] Weiyang Tang et al., "Interpretation and reflections on the regulations on export control of dual-use items (《两用物项出口管制条例》的解读与思考)," *JunHe*, 26 November 2024, https://www.junhe.com/legal-updates/2560

shift from a largely paper-based regime to an interactive, risk-based framework that holds exporters continuously responsible for ensuring lawful end use.

Another significant change is the legally expanded scope of export controls and its extraterritorial effect. Article 49 specifies that MOFCOM may require foreign entities and individuals to comply with Chinese regulations if they transfer certain goods or technologies outside China. This includes dual-use items manufactured outside China that "contain, integrate or are mixed with specific China-origin dual-use items", or "are produced using specific China-origin dual-use technologies". This expanded scope is analogous to the *de minimis rule* and Foreign Direct Product Rule under the U.S. Export Administration Regulations[73], indicating China's intent to mirror and counteract foreign export control systems. However, the precise threshold and enforcement practices remain subject to MOFCOM's case-by case discretion and assessment[74].

In addition to the ECL's "control list", the 2024 regulations introduce a complementary "watch list" system. This list targets entities that fail to cooperate with MOFCOM during end-use(r) verification. Exports to "watch list" entities face greater hurdles, such as only being eligible for single-use licenses and requiring a risk assessment report. This designation is intended as an interim measure; MOFCOM may remove an entity once verification is complete or escalate it to the more stringent "control list" if an entity continues to violate end-use(r) restrictions or otherwise poses national security risks. This reflects a shift towards an interactive oversight model with follow-up audits.

3. Enforcement, industry impact, and relationship with other national trade laws

Enforcement

The enforcement of China's export controls is currently multifaceted, relying on a combination of a licensing system, restricted entity lists, and a robust penalty framework, with an increasingly extraterritorial reach. The licensing system is central, requiring exporters to obtain specific licenses from MOFCOM. *2024 Dual-Use Items Regulations* formalise three license types, all of which mandate end-user commitments. Non-compliance carries substantial penalties under the

[73] Jeff Zhang and Martha Wang, "China issues regulation on export control of dual-use items," *Orrick*, 12 November 2024, https://www.orrick.com/en/Insights/2024/11/China-Issues-Regulation-on-Export-Control-of-Dual-Use-Items

[74] Eversheds Sutherland, "Effective 1 December 2024: PRC's new regulation on the export control of dual-use items," 4 December 2024, https://www.eversheds-sutherland.com/en/global/insights/effective-1-december-2024-pr-cs-new-regulation-on-the-export-control-of-dual-use-items

2020 ECL and 2024 regulations, including warnings, confiscation of illicit gains, and fines up to RMB 5 million (or multiples of illegal turnover). Serious breaches, such as unlicensed or out-of-scope exports and license fraud, can trigger criminal liability, and service providers that facilitate or fail to report violations face comparable penalties.

China's enforcement also relies on restricted entity lists, including the "control list" and the "watch list". The legal basis for the "control list" was established by the 2020 ECL, but it was not actively used until January 2025. The "control list" targets importers and end-users who violate end-use requirements, endanger national security, or use items for WMD or terrorist purposes. Transactions with listed entities are prohibited or restricted without special MOFCOM approval. Since January 2025, China has begun applying the "control list" more proactively to "safeguard national security and interests" and to "safeguard the legitimate rights and interests of Chinese entities". This shift followed the entry into force of the Dual-Use Items Regulations and the unified Dual-Use Items List on 1 December 2024, which operationalized MOFCOM's authority and procedures for entity designation. MOFCOM's first public use of this list was the designation of 28 U.S. companies on 2 January 2025. By November 2025, MOFCOM had designated more than 80 entities—mostly U.S.-based—in sectors like defence, aerospace, unmanned systems, and advanced intelligence technology (see Table 2.1). The "watch list", introduced in the 2024 regulations to target non-cooperation with MOFCOM verification, has not yet been publicly applied.

Table 2.1: Summary of entity "control list" announcements by MOFCOM (by November 2025)

Date	Origin of Entities	Number of Entities	Main Sectors	Notes
2 January 2025	United States	28	Defence & Dual-Use Technology	Initial large-scale listing of major U.S. defence and dual-use tech firms
4 March 2025	United States	15	Defence, Aerospace & AI Technology	Continue listing of major U.S. defence, aerospace and AI tech firms
4 April 2025	United States	16	Avionics & Intelligence Systems	Focusing on specialised avionics and intelligence firms
9 April 2025	United States	12	Unmanned Systems & Photonics	Continued decrease in U.S. listings; emphasis on drone, photonics, and sensor companies
14 May 2025				MOFCOM announced that, to "implement the China–U.S. trade-talks consensus" in Geneva, export control measures against 28 U.S. entities listed on 4 and 9 April 2025

				would be suspended for 90 days; exports still require licenses[75].
9 July 2025	Taiwan Region	8	Defence Manufacturing & R&D	Shift to Taiwanese defence-related organisations; further streamlining of list
12 August 2025				MOFCOM announced that, "in line with the consensus reached during the high-level China-U.S. economic and trade meeting in Stockholm", export control measures against 16 U.S. entities listed on 4 April would remain suspended for an additional 90 days; export control measures against 12 U.S. entities listed on 9 April would be lifted[76].
25 September 2025	United States	3	Defence and Engineering Services	Reflects continued focus on U.S. defence contractors
10 November 2025				MOFCOM announced that export control measures against 15 U.S. entities listed on 4 March would be lifted; measures against 16 U.S. entities listed on 4 April would remain suspended for an additional 1 year[77].

Source: Compiled by the authors based on MOFCOM Export Control Notices 1, 13, 21, 22, 35 & 51.

While MOFCOM serves as the primary regulator in export controls, publicly available cases suggest that day-to-day enforcement has largely been carried out by the General Administration of Customers (GAC)[78]. The GAC applies the 2020 ECL in its border inspections, imposing administrative fines on exporters of undeclared or misclassified controlled goods and detaining suspect shipments. Under its 2025 Announcement No. 123, customs may initiate formal "customs challenge" procedures if a valid export license is not presented for goods suspected of

[75] State Council, "Joint statement of the China-U.S. Geneva economic and trade talks (中美日内瓦经贸会谈联合声明)," 12 May, 2025, https://www.gov.cn/yaowen/liebiao/202505/content_7023399.htm

[76] State Council, "China continues to suspend or removes export-control measures on some U.S. entities: Ministry," 12 August 2025, https://english.www.gov.cn/news/202508/12/content_WS689aaddfc6d0868f4e8f4c69.html

[77] MOFCOM, "MOFCOM Spokesperson answers reporter questions regarding adjustments to export control control list measures (商务部新闻发言人就调整出口管制管控名单措施答记者问)," 5 November 2025, https://www.mofcom.gov.cn/xwfb/xwfyrth/art/2025/art_7e09fc75390f4a078466b56ac9d6503a.html

[78] See Zhiguo Yu and Qingling Jin, "A review of export control enforcement and administrative penalties in 2023 (2023年出口管制执法和行政处罚综述)," *Zhonglun*, 26 January 2024, https://www.zhonglun.com/research/articles/52569.html; Zhiguo Yu, "A review of China's export control enforcement cases in 2024 (2024年中国出口管制执法案例综述" *Zhonglun*, 8 February 2025, https://www.zhonglun.com/research/articles/54172.html

being fit for dual-use[79]. In recent years, GAC's oversight and enforcement have been significantly strengthened.

Industry impact

A primary industry impact of China's export controls framework is the increased compliance burden on companies involved in export activities. The 2020 ECL and 2024 Dual-Use Items Regulations are moving the system beyond simple licensing to complex risk management involving multiple lists and extensive reporting obligations. Exporters now are required to establish and maintain robust internal compliance programmes, conduct thorough due diligence on end-users, and navigate complex licensing procedures. The shift to a new unified export control coding system for dual-use items also necessitates significant adjustments for businesses. Third-party service providers, including financial institutions and logistics firms, now face explicit reporting obligations and potential liabilities.

Foreign companies also face substantial compliance risks arising from the extraterritorial reach of China's export control law. The 2024 Dual-Use Items Regulations explicitly state that organisations and individuals outside China can be held liable for violations involving foreign-made products incorporating specified Chinese-origin dual-use items or technologies. A notable example is MOFCOM's decision to apply these extraterritorial controls to the rare earth sector in October 2025, holding foreign entities accountable for the unauthorised use or re-export of controlled rare earth materials[80]. This provision could create concrete legal and operational dilemmas for multinational corporations—for example, how to respond when a business partner's downstream use may trigger Chinese jurisdiction, and whether compliance with one country's rules will expose the company to liability under another. Because the scope and application of the controls remain unclear in several respects—including how specific items are identified and exactly when extraterritorial jurisdiction applies—companies still face persistent challenges in terms of legal ambiguity. These uncertainties make robust internal compliance programmes essential to identify risks early, make defensible decisions, and demonstrate good-faith mitigation efforts.

[79] GAC, "Notice No. 123 of 2025 of the General Administration of Customs (Notice on Matters Concerning Customs Challenges to Export Controls on Dual-Use Items) (海关总署公告2025年第123号关于两用物项出口管制海关质疑有关事项的公告)," 16 June 2025, http://www.customs.gov.cn/customs/302249/2480148/6577952/index.html

[80] MOFCOM, "Notice No. 61 of 2025 Announcing the Decision to Implement Export Controls on Relevant Overseas Rare Earth Items (商务部公告2025第61号公布对境外相关稀土物项实施出口管制的决定)," 9 October 2025, https://aqygzj.mofcom.gov.cn/qdml/art/2025/art_fbc5f7e23bff4bb184d5c49ff878f8ad.html

Notably, China's export controls are actively reshaping global supply chains in strategically critical sectors. Since 2023, China has introduced and expanded export restrictions on a range of critical minerals, including antimony, gallium, germanium, and other rare earths elements, by requiring export licences for these materials and related technologies under its export control framework. These measures build on China's existing role as the dominant producer and processor of many of these inputs, particularly rare earths, which are essential to numerous industries including defence, clean energy, automotive and electronics[81]. For instance, in April 2025, China imposed further export restrictions on seven rare earth materials and magnets in retaliation against U.S. tariffs, requiring MOFCOM export approval[82]. Furthermore, China implemented a blockchain-based supply chain monitoring system to track rare earth materials from the mine to the point of export[83]. Given China's significant share of global production and processing capacity, these regulatory developments have been closely watched by major markets such as the United States and the EU, both for their implications for supply chain resilience and for how they interact with broader industrial and trade policy objectives[84].

Relationship with other national trade laws

China's export controls are not an isolated legal domain, but a cornerstone of a broader integrated legal framework, operating in concert with other key trade and economic laws to create a comprehensive statecraft toolkit to safeguard national security. A direct relationship exists with the anti-foreign sanctions framework, anchored by the 2021 Anti-Foreign Sanctions Law (AFSL), which provides the legal basis for countermeasures against foreign sanctions and other discriminatory measures[85], and MOFCOM's 2020 *Provisions on the Unreliable Entity List*[86]. The "Unreliable Entity List" (UEL) is a blacklist of foreign entities deemed to have engaged in conduct harmful to Chinese interests, such as endangering China's national security, cutting off supplies or adopting discriminatory measures against Chinese enterprises for non-commercial reasons.

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[81] Laura Pierssens, "Critical minerals: Chinese export controls threaten supply chains across many industries," *Credendo*, 16 May 2025, https://credendo.com/en/knowledge-hub/critical-minerals-chinese-export-controls-threaten-supply-chains-across-many

[82] MOFCOM, "Notice No. 18 of 2025 Announcing the Decision to Implement Export Controls on Certain Medium and Heavy Rare Earth-Related Items (商务部 海关总署公告2025年第18号公布对部分中重稀土相关号公布对部分中重稀土相关物项实施出口管制的决定)," 4 April 2025, https://aqygzj.mofcom.gov.cn/flzc/gzjgfxwj/art/2025/art_f3a1432ba20248eca12ff7b91bc73fda.htmlBut note that in response to evolving economic and diplomatic engagement with the United States, Beijing later agreed to a temporary suspension of certain recently issued restrictions on rare earths and other strategic resources from November 2025 through November 2026.

[83] John Zadeh, "China-US rare earth battle: The trade war's critical minerals," *Discovery Alert*, 16 May 2025, https://discoveryalert.com.au/rare-earth-minerals-modern-technology-2025/.

[84] European Parliament, "Commission must tackle China's export restrictions on rare earth elements," 10 July 2025, https://www.europarl.europa.eu/news/en/press-room/20250704IPR29456/commission-must-tackle-china-s-export-restrictions-on-rare-earth-elements

[85] Original Chinese text available at: http://www.npc.gov.cn/npc//c2/c30834/202106/t20210610_311892.html

[86] Original Chinese text available at: https://www.gov.cn/zhengce/2020-09/19/content_5712450.htm

Since early 2023, the Chinese government has actively utilised the UEL, primarily targeting U.S. defence contractors involved in arms sales to Taiwan, such as Lockheed Martin Corporation and Raytheon Missiles & Defense[87]. Subsequently, other U.S. defence companies (including Boeing Defense, Space & Security, General Atomics and General Dynamics) have been added for similar reasons[88]. These actions often come with severe punitive measures, such as prohibitions on China-related trade, bans on new investments, and entry denials for senior management. Since 2025, the UEL's application has become more proactive, extending beyond defence to other sectors like apparel and biotechnology.

The UEL is widely seen as a retaliatory tool, distinct from the ECL's entity "control list" which acts as a gatekeeper for preventing controlled items from being acquired by foreign entities[89]. However, the two are intertwined, with one often acting as a consequence of the other. A foreign entity placed on the UEL (e.g., for cutting off supplies to a Chinese firm) may then face export prohibitions under the ECL, barring it from receiving Chinese-origin goods or technology. This is designed to deter foreign firms from complying with third-country extraterritorial sanctions and to provide a reciprocal countermeasure.

Since 2025, China has strategically utilised the UEL and ECL "control list" in parallel as diplomatic instruments. For example, in April 2025, MOFCOM designated numerous U.S. entities on both lists[90], only to announce a 90-day suspension of these measures on 14 May following China-U.S. trade talks in Geneva[91]. Further suspensions and removals followed talks in Stockholm on 12 August[92]. This parallel deployment and occasional suspension demonstrate that China has progressively integrated these lists into a flexible toolkit with which to safeguard

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[87] MOFCOM, "Notice of the Unreliable Entity List Working Mechanism on Adding Lockheed Martin Corporation and Raytheon Missiles & Defense to the Unreliable Entity List (不可靠实体清单工作机制关于将洛克希德·马丁公司、雷神导弹与防务公司列入不可靠实体清单的公告)," 16 February 2023, https://aqygzj.mofcom.gov.cn/flzc/gzjgfxwj/art/2023/art_37761ceb51764e7095bfe3d0214f1d4e.html

[88] Xinhua, "China adds some US companies to unreliable entities list," *State Council Information Office of the People's Republic of China*, 20 May 2024, http://english.scio.gov.cn/pressroom/2024-05/20/content_117200330.htm

[89] Yue-Zhen Li, "The rare earth leverage? China's export control law and 'Xi Jinping's thought on law-based governance'," *University of Pennsylvania Asian Law Review* 20 (2025): 312, https://doi.org/10.58112/alr.20-2.3

[90] See MOFCOM Notices No. 7-8 and 21-22: https://www.mofcom.gov.cn/zwgk/zcfb/art/2025/art_e4f474d3aeba4672913db1042d845d78.html; https://www.mofcom.gov.cn/zwgk/zcfb/art/2025/art_c29bed8111a5406ea44f363694865ac2.html; https://www.mofcom.gov.cn/zwgk/zcfb/art/2025/art_906685e3930048baa0fd95a651fd628d.html; https://www.mofcom.gov.cn/zwgk/zcfb/art/2025/art_c6b190344a154e6f831e0fdfc190e41e.html

[91] Xinhua, "China halts unreliable entity list, export control measures on certain US firms," *State Council Information Office of the People's Republic of China*, 15 May 2025, http://english.scio.gov.cn/pressroom/2025-05/15/content_117876291.html

[92] Xinhua, "China continues to suspend or removes export-control measures on some U.S. entities: Ministry," *The State Council of the People's Republic of China*, 12 August 2025, https://english.www.gov.cn/news/202508/12/content_WS689aaddfc6d0868f4e8f4c69.html; Xinhua, "China adjusts unreliable entity list measures on certain U.S. firms: ministry," *The State Council of the People's Republic of China*, 12 August 2025, https://english.www.gov.cn/news/202508/12/content_WS689aad53c6d0868f4e8f4c67.html

economic security and counter foreign sanctions. They function as coordinated levers that can be applied or paused as part of diplomatic negotiation.

This coordinated approach extends to other areas. UEL designations can be amplified by other tools, such as investment restrictions that align with China's foreign investment screening. Similarly, tariffs and subsidies, while separate legal frameworks, can be strategically deployed alongside export controls to punish rivals or bolster domestic industries, thereby reinforcing China's broader policy goals of technological self-sufficiency and national security.

4. Recommendations

China's legal framework has matured from a registration-based regime to a transaction-by-transaction, risk-based and interactive framework that holds exporters continuously responsible for lawful end-use. Its legal and practical sophistication increasingly mirrors Western/U.S. models (e.g., entity lists, extraterritorial provisions), reflecting a deeper strategic intent to build a parallel, reciprocal system. More than merely a reactive measure, this regime is now a proactive tool aimed at safeguarding national security and projecting economic power. Observers should monitor changes in control lists, licensing requirements, and the use of these measures in broader diplomatic or trade negotiations, as the ECL functions as a flexible instrument of China's economic statecraft.

Recommendations

In response, European policymakers are recommended to adopt a proactive and integrated strategy to manage the challenge posed by China's evolving export control landscape.

- Strengthen EU regulatory coherence: The EU should review its Dual-Use Regulation (Regulation (EU) 2021/821) to ensure its comprehensive application, close potential legal and enforcement gaps, and strengthen coordination mechanisms for consistent enforcement across Member States. This review should include developing a clear framework for responding to the extraterritorial application of third-country laws, including China's export control law.
- Reduce strategic dependencies: Given China's increasing use of export restrictions on critical materials, the EU should accelerate efforts to mitigate strategic dependencies. Priority actions include conducting a systematic assessment of supply-chain vulnerabilities, ensuring robust implementation of the Critical Raw Materials Act

(CRMA), expanding domestic R&D and manufacturing capacity, and diversifying supply chains through partnerships with trusted international partners.

- Maintain targeted diplomatic engagement: Maintain dedicated EU-China dialogue channels focused on export controls. The objective should be to enhance transparency, particularly regarding list-based designations and end-user verification processes, to reduce misunderstandings and manage trade tensions.
- Support business community compliance: Strengthen engagement with the European business community. National and EU-level bodies should support companies in developing robust internal compliance programmes that account for the extraterritorial provisions and end-user scrutiny detailed in China's regulations. This includes facilitating timely information sharing on regulatory changes and enforcement trends.
- Prepare responsive trade instruments: Ensure the EU's trade defence and anti-coercion instruments are prepared and sufficiently robust to respond, in a manner consistent with international law, to any unjustified Chinese export controls that constitute economic coercion.

Chapter 3. Evolution of China's Non-Proliferation Regime and Export Control Activities

Haotian Qi (Peking University)

1. Introduction

China's role in international non-proliferation and export control has transformed significantly from the 1990s to the present. Once criticised as a source of sensitive technology for weapons programmes, China has increasingly integrated into global arms control regimes and built a domestic export control system to fulfil its treaty obligations. Over the past three decades, it has enacted laws and regulations to uphold commitments regarding weapons of mass destruction (WMD). China's export control and non-proliferation posture has substantially evolved in normative terms over the past three decades: its legal architecture, control lists, licensing practice and participation in key treaty-based regimes have increasingly converged with widely accepted international standards. In other words, the maturation of China's non-proliferation governance is not merely rhetorical or tactical—it reflects a real shift towards institutionalised compliance capacity and a stronger "responsible stakeholder" narrative. Meanwhile, in the last few years this normative, compliance-oriented trajectory has been layered with an additional pattern. Export controls are also treated as a pragmatic instrument providing bargaining leverage in wider technology and geopolitical disputes, rather than being confined to risk management alone.

This chapter addresses the evolution of China's actions, from treaty accessions in the 1980s–1990s to more recent measures of export restrictions. During the 1980s and 1990s, China joined major WMD treaties (BWC 1984; NPT 1992; CWC signed 1993) and began issuing regulations on nuclear, chemical and arms exports[93]. In the 2000s, China started to implement more comprehensive controls and joined supplier regimes (NSG 2004), responding to incidents of illicit transfers in the 1990s. In the 2010s, China continued to refine laws and cooperate internationally, including revising its export compliance guidelines and nuclear export guidelines in 2006 and

[93] Regulations on Nuclear Export (Released on 10 September 1997, revised on 9 November 2006) https://exportcontrol.mofcom.gov.cn/article/zcfg/gnzcfg/gzjgfxwj/202111/440.html, https://www.gov.cn/gongbao/content/2007/content_487018.htm

issuing export compliance guidelines for dual-use nuclear and related technologies in 2007[94]. In the 2020s, China joined the Arms Trade Treaty (ATT), enacted its first unified Export Control Law, published a state White Paper on export control, tightened compliance requirements, and imposed new controls on emerging technologies such as drones and semiconductor materials[95]. The following provides a detailed account of these changes and their explanations.

2. China's commitments and practices regarding WMD regulation

China is one of the five recognised nuclear-weapon states under the NPT, which it acceded to in 1992. Officially, Beijing affirms strong support for the NPT's goals – it "firmly stands by...the international order underpinned by international law" and "resolutely opposes the proliferation" of nuclear weapons[96]. Even before NPT accession, China took steps to integrate with the nuclear safeguards regime. It joined the International Atomic Energy Agency (IAEA) in 1984 and voluntarily placed its civilian nuclear facilities under IAEA safeguards in 1988. In the late 1990s and early 2000s, China reinforced its non-proliferation credentials by signing the IAEA Additional Protocol in 1998 and becoming the first nuclear-weapon state to bring that protocol into force in 2002. It also joined nuclear exporter groups – the Zangger Committee in 1997 and the Nuclear Suppliers Group (NSG) in 2004 – committing to observe their guidelines on nuclear export controls[97]. After joining the NPT, China began to curtail assistance involving related technologies. In 1996, Beijing issued a public pledge not to export nuclear technology to facilities not safeguarded by the IAEA, effectively cutting off direct support to Pakistan's weapons program me. By the early 2000s, U.S. officials acknowledged that China had made "vastly improved" legal and procedural strides in controlling nuclear exports[98], even as they urged stronger enforcement. Overall, over the past two decades China has not been implicated in direct transfers of nuclear weapons technology and

[94] MOFCOM, Decision of the State Council on Amending the Regulations of the People's Republic of China on the Control of Nuclear Dual-Use Items and Related Technology Export (国务院关于修改《中华人民共和国核两用品及相关技术出口管制条例》的决定), State Council Order No. 484, 26 January 2007, https://www.gov.cn/zwgk/2007-02/16/content_529172.htm

[95] National People's Congress, Decision to Join the Arms Trade Treaty (ATT), 20 June 2020, http://www.xinhuanet.com/politics/2020-06/20/c_1126139501.htm; Standing Committee of the National People's Congress, Export Control Law of the People's Republic of China, 17 October 2020, https://exportcontrol.mofcom.gov.cn/article/zcfg/gnzcfg/flfg/202111/226.html;

State Council, White Paper on China's Export Controls [《中国的出口管制》白皮书], 2021,

http://www.scio.gov.cn/zfbps/ndhf/2021n_2242/202207/t20220704_130730.html.

MOFCOM, Notice on the Issuance of the Export Control List of Dual-Use Items of the People's Republic of China, 15 November 2024, https://www.gov.cn/zhengce/zhengceku/202411/content_6987846.htm. The attached dual-use item list is available at https://www.gov.cn/zhengce/zhengceku/202411/P020241119387520616554.pdf.

[96] State Council, White Paper on China's Export Controls.

[97] Ibid.

[98] Ibid.

has supported global non-proliferation efforts such as the Iran nuclear deal and U.N. sanctions on North Korea.

China became a state party to the BWC in 1984, committing never to develop, produce, or stockpile biological weapons and not to assist others in doing so. In its 2021 White Paper, China highlighted that it had tightened export controls on dual-use biological agents and updated control lists in line with BWC objectives. In 2020, China enacted a Biosecurity Law that strengthens oversight of dangerous pathogens and research, further bolstering compliance mechanisms. Beijing often points out that it has implemented domestic measures well beyond the minimum BWC requirements, such as criminalising prohibited biological activities and strictly controlling dual-use biotech exports. The Chinese government also highlights that it provides international assistance on biosecurity, for instance by training other countries' labs, thereby framing itself as a responsible stakeholder in countering biological threats.

China signed the CWC in January 1993 and ratified it in 1997, becoming an original state party when the convention entered into force. By 2024, China had hosted more than 500 OPCW inspections to confirm the absence of any active CW programme. China has maintained export licensing for dual-use pathogens and related equipment, in accordance with a control list harmonised with the Australia Group (AG) – even though China is not an AG member[99]. China established a National Authority office to coordinate CWC implementation, enacted regulations on the administration of controlled chemicals, and built a licensing system for exports of sensitive chemical precursors[100]. In 2020, Beijing promptly implemented new CWC schedule amendments, adding Novichok nerve agents to Schedule 1 by updating its domestic law, thereby demonstrating technical compliance with CWC updates[101]. China's behaviour under the CWC is viewed as largely compliant. The OPCW has never found China to be in non-compliance. Beijing has also conducted end-use verification visits abroad with partner countries for sensitive chemicals, as a sign of its enforcement efforts[102].

3. Evolution of China's non-proliferation regime

To fulfil its international obligations and prevent WMD proliferation, since the 1990s China has steadily constructed a domestic export control regime. This regime encompasses laws,

[99] NTI data, https://www.nti.org/countries/china/
[100] State Council, White Paper on China's Export Controls.
[101] Ibid.
[102] Ibid.

regulations, licensing authorities, enforcement bodies, and compliance mechanisms aimed at controlling the export of nuclear, biological, chemical, and missile-related items. The development of China's system can be divided into several stages: initial regulatory reforms in the 1990s; a major overhaul in the early 2000s; incremental improvements through the 2010s; and a comprehensive modernisation in the 2020s. Throughout this period, a clear pattern emerges: Chinese policy has often advanced in reaction to specific incidents or external pressures, evolving from rudimentary controls to a relatively mature system today.

In the mid-1990s, Beijing issued a set of administrative regulations targeting different categories of sensitive exports – essentially the legal foundation of its non-proliferation policy. By the end of the 1990s, China had enacted regulations on controlled chemicals, nuclear exports, arms exports, and nuclear dual-use items. The 1997 Regulations on Nuclear Export and the 1998 Regulations on Nuclear Dual-Use Items and Related Technologies Exports aligned Chinese practice with the guidelines of the Zangger Committee and the NSG, forbidding nuclear transfers to unsafeguarded facilities and instituting case-by-case government approval for nuclear-related sales. Likewise, the Arms Export Administration Regulation was issued in 1997 to exercise state control over conventional weapons sales, which until then had been handled opaquely by state companies. By 1998, China had also tightened informal controls on missile-related technologies following several scandals, and a dedicated missile export regulation followed a few years later. In general, regulations in the 1990s were relatively opaque and implemented via secret internal directives, and punishment for violators was rare. Awareness of these new rules among Chinese industries remained limited. By 1999, China had laid the legal groundwork, but the system remained nascent.

The turning point in China's non-proliferation policy came in the early 2000s, when Beijing introduced a comprehensive package of export control measures covering WMD-related materials and technologies, as China shifted to a more transparent, law-based system consistent with international norms[103]. China issued the Regulations on Export Control of Missiles and Missile-Related Items and Technologies in August 2002, and the Regulations on Export Control of Dual-Use Biological Agents and Related Equipment and Technologies in October 2002[104]. It also

[103] Jing-dong Yuan, Phillip C. Saunders, and Stephanie Lieggi, "Recent developments in China's export controls: new regulations and new challenges," *Nonproliferation Review* 9 (3) (2002), pp. 153–167.
[104] The former was already obsolete, https://exportcontrol.mofcom.gov.cn/article/zcfg/gnzcfg/gzjgfxwj/202111/443.html; the latter, https://www.gov.cn/gongbao/content/2002/content_61806.htm

updated its munitions control list and refined the nuclear export rules around the same period[105]. For the first time, China published detailed control lists and licensing procedures for these categories, filling major gaps in its framework. In addition, clear lines of institutional/bureaucratic responsibility were established. For example, the Ministry of Commerce (MOFCOM) was assigned to license dual-use exports, with input from the Ministry of Defence for missiles and from the Ministries of Health or Agriculture for pathogen-related exports[106]. As a result of these steps, by 2003 China's system more closely resembled those of Western supplier states, both in scope and in its use of public rule-sets.

Despite these impressive regulatory strides, enforcement in this period remained a work in progress. U.S. officials in the early 2000s took a "wait-and-see" attitude, and indeed, Chinese entities continued to be implicated in illicit exports for a few years. But this period of enforcement friction also spurred progress. Chinese authorities began engaging with offenders to improve compliance. By 2007, MOFCOM had issued formal Guiding Opinions on internal export control compliance for dual-use exporters – an initiative aimed at spreading best practices across industry.

Institutionally, China created a more coordinated enforcement apparatus during the 2000s. MOFCOM took primary responsibility for implementing export licensing (e.g., scrutinising end users and vetting applications across departments), while the General Administration of Customs and its anti-smuggling bureau ramped up border enforcement efforts. An inter-agency mechanism was established so that the Foreign Ministry, Defence establishment, Customs, Atomic Energy Authority and other relevant bodies could all consult on sensitive export cases. During this period, China also started building an "internal watchlist" of suspect foreign end-users to deny licenses if those entities were involved in proliferation[107]. End-use verification practices were gradually adopted – for example, requiring documentation of the final recipient, and occasionally dispatching officials abroad to confirm end-user bona fides. By 2004, China's progress was significant enough for it to be formally admitted into the NSG, marking its first membership in a multilateral export control regime.

[105] State Council, Decision of the State Council on Amending the Regulations of the People's Republic of China on the Control of Nuclear Export (国务院关于修改《中华人民共和国核出口管制条例》的决定), State Council Order No. 480, 9 November 2006, https://www.gov.cn/gongbao/content/2007/content_487018.htm

[106] State Council, White Paper on China's Export Controls.

[107] Evan S. Medeiros, "Chasing the dragon: assessing China's system of export controls for WMD-related goods and technologies," https://www.rand.org/pubs/monographs/MG353.html

By the mid-2000s, China's legal infrastructure for export control was largely in place, although gaps still existed between policy announcements and actual behaviour. China had made crucial efforts in creating laws and regulations, establishing interagency review processes, and educating officials. Yet enforcement remained the relatively weaker link, hindered by limited resources and practical experience, as well as by the challenges of adapting implementation to rapidly evolving domestic and international political-economic conditions.

During the 2010s, China's export control system underwent further refinement and institutionalisation against a shifted and more complex international context, with new challenges like North Korea's proliferation activities and emerging U.S.-China strategic competition. China upgraded legal authorities during this period: the Foreign Trade Law was amended to explicitly provide a basis for export controls and to increase penalties for illicit exports[108]. China also updated its Criminal Law to add or strengthen clauses criminalising the illegal export of controlled items[109].

By the late 2010s, Chinese courts began handling a few cases. For instance, in 2016 Chinese authorities arrested the executives of Dandong Hongxiang, a trading company, for aiding North Korean procurement in violation of export controls and sanctions. The Foreign Ministry stated that the company's head was "suspected of economic crimes and [China's] judiciary is dealing with this matter according to law," emphasising China's commitment to uphold U.N. non-proliferation sanctions[110].

China also expanded control lists and guidance to close loopholes. For example, as new technologies became relevant, such as carbon fibre materials for centrifuges or drones for delivery systems, China added them to its control rosters. In 2011, China updated its missile control list to better reflect the MTCR's technical parameters. In 2017, following U.N. Resolution 2321, China added a range of dual-use items, such as certain valves and electronics, prohibiting their export to North Korea. Guidance to industry also increased: MOFCOM and affiliated agencies vastly expanded outreach seminars and trainings in the 2010s, reporting around 30,000 personnel trained annually in compliance practices by the 2020s[111]. Enterprises were encouraged

[108] Four revisions took place in 2004, 2016 and 2022 respectively, https://www.ssf.gov.cn/portal/rootfiles/2023/02/09/1677610939000791-1677610939249736.pdf

[109] The Criminal Law underwent more than 10 rounds of revisions, including those in 2010s, http://www.chnlawyer.net/law/subs/xingfa.html

[110] MFA Press Conference, 24 July 2019, https://www.mfa.gov.cn/fyrbt_673021/jzhsl_673025/201907/t20190724_5417805.shtml

[111] State Council, White Paper on China's Export Controls.

to establish internal compliance units; while initially voluntary, this became quasi-mandatory for major exporters.

In addition, Chinese enforcement agencies stepped up coordination with foreign counterparts on specific cases. For instance, in 2014, China worked with the U.S. and Interpol to seize a shipment of Chinese-made pressure transducers destined for Iran's enrichment programme, indicating a willingness to act on credible intelligence. By 2020, China had established a more comprehensive set of regulations and demonstrated an increasing capability and willingness to enforce them, especially when aligned with U.N. mandates or when major state interests were at stake. Yet the system remained fragmented across multiple regulations and agencies, and China's leaders recognised the need to modernise and unify it – setting the stage for the landmark Export Control Law (ECL) of 2020.

On 1 December 2020, China's first comprehensive ECL came into effect, marking a milestone in the evolution of its non-proliferation regime[112]. Passed by the National People's Congress in October 2020, this law consolidates and supersedes many previous regulations, placing all dual-use items, military products, nuclear materials and other controlled goods under one legal umbrella. The ECL explicitly aims to prevent WMD proliferation, protect national security, and uphold China's international obligations. It provides clear definitions of "controlled items", including not only tangible goods but also technologies and services. It also unifies the mechanisms of control, which includes a national control list, a licensing system, end-user and end-use certification, temporary (emergency) controls, and punitive measures for violations.
Under the ECL, exporters must obtain licenses for listed items and are required to screen end-users and end-uses to prevent illicit diversion. Notably, the law also introduced a Chinese version of the "entity list" – a restricted persons or companies list – allowing China to prohibit exports to foreign parties that violate non-proliferation rules or endanger national security. This mirrors U.S. practice and was partly a response to it, as the U.S. had blacklisted certain Chinese tech firms in 2019. China now had a legal basis to blacklist foreign end-users or importers in return.

The ECL enhances enforcement powers. It grants authorities the right to investigate and inspect suspected violations, seize goods, and punish offenders with fines, license revocations, and even criminal liability under broader laws such as the Customs Law and Criminal Law. It also has extraterritorial reach: entities outside China that contravene non-proliferation principles, for

[112] National People's Congress, Export Control Law.

example by transferring Chinese-origin controlled items, can be penalised or added to the restricted list. Another notable aspect is a reciprocity clause, under which China may take countermeasures if another country abuses export controls to harm its interests.

In December 2021, China's State Council Information Office released a White Paper titled "China's Export Controls": the first ever comprehensive public account of its export control policies. The White Paper serves as both a policy statement and a reference, intended to "help the international community better understand China's position"[113]. It reiterated China's commitment to all major non-proliferation treaties, highlighting that China "strictly complies with its international obligations, and safeguards international and regional peace and stability"[114]. By publishing this document, China signalled its willingness to be a responsible partner aligned with global norms.

From a compliance standpoint, the net effect of the 2021 policy measures is positive. They raised domestic awareness – the White Paper received significant coverage in Chinese media and industry – and provided a clearer normative framework. The 2021 Guiding Opinions have already prompted many Chinese tech companies to establish export control compliance offices. By institutionalising a compliance culture, China began addressing a historical weakness: the lack of awareness and diligence among exporters.

4. New pattern of pragmatism

In recent years, China has further refined its export controls in response to emerging global security challenges. These developments also point to a new pattern of strategic and political pragmatism. Alongside an increasingly institutionalised commitment to normative non-proliferation obligations, China's export controls have become more closely linked to its broader strategic interests and bargaining leverage. China remains on a long learning curve. Its export control policies are frequently met with criticism and backlash from other countries.

Drones became a focus due to reports of their use in conflicts such as the Russia-Ukraine War. Western governments grew concerned that Chinese-made drones or parts were finding their way to Russian military units via third countries. Although China officially denied supplying any drones

[113] State Council, White Paper on China's Export Controls.
[114] Ibid.

for combat use – stating its products are for civilian use and that any claims of military usage are "unfounded smears" – Beijing moved to tighten drone export oversight starting in 2022–2023. In July 2023, China announced temporary export control measures on certain high-performance drones and drone equipment, which took effect in September 2023[115].

These measures require exporters to seek government approval before shipping drones that meet specific criteria, such as those with over 30 minutes of flight time or capable of carrying certain payloads, as well as associated subsystems like high-end infrared cameras, lidar, and radio transmitters. The rules also ban the export of any civilian drone intended for military purposes. In practice, this means if an exporter knows or suspects the drone will be used in warfare or for WMD delivery, they must refrain from export – essentially a "catch-all" clause for drones.

As the Russia-Ukraine conflict persisted and scrutiny of Chinese dual-use exports intensified, China updated and expanded these controls. In July 2024, MOFCOM and other agencies jointly issued a notice broadening drone export restrictions: they adjusted technical thresholds (for example, adding high-precision navigation and measurement tools used by drones to the control list) and maintained the requirement for licenses for advanced drone models[116].

In parallel, China developed a new regulation on the export control of all dual-use items, as enabled by the 2020 ECL. On 19 October 2024, Premier Li Qiang signed State Council Order No. 792, introducing the Regulations on the Export Control of Dual-Use Items, effective 1 December 2024[117]. These regulations are essentially an implementation tool of the ECL, aiming to "improve transparency and standardisation" in dual-use export policy.

The 2024 regulations set up a more formal permit system for all dual-use exports and created a consolidated restricted items list. Exporters must submit documentation on the end user and end

[115] MOFCOM, General Administration of Customs, State Administration of Science, Technology and Industry for National Defence, and Equipment Development Department of the Central Military Commission, Announcement No. 28 (2023) on Imposing Temporary Export Controls on Certain Unmanned Aerial Vehicles (商务部 海关总署国家国防科工局中央军委装备发展部公告2023年第28号关于对部分无人机实施临时出口管制的公告), 31 July 2023, https://exportcontrol.mofcom.gov.cn/article/zcfg/gnzcfg/zcfggzqd/202307/872.html

[116] MOFCOM, General Administration of Customs, and Equipment Development Department of the Central Military Commission, Announcement No. 31 (2024) on Optimizing and Adjusting Export Control Measures for Unmanned Aerial Vehicles (商务部 海关总署中央军委装备发展部公告2024年第31号 关于优化调整无人机出口管制措施的公告), http://gdfs.customs.gov.cn/customs/302249/2480148/6015321/index.html

[117] State Council, Regulations of the People's Republic of China on the Export Control of Dual-Use Items (中华人民共和国两用物项出口管制条例), State Council Order No. 792, 30 September 2024, effective 1 December 2024, https://www.gov.cn/gongbao/2024/issue_11686/202411/content_6985161.html

use when applying for licenses, a requirement now codified across the board. China, via this regulation, has created a more rigorous system to check end-users. The regulation also likely streamlines the work of Chinese customs and licensing officers by clarifying procedures and enforcement powers.

In addition to the above measures, it is worth noting that China's actions in recent years also reflect its pursuit of strategic interests and bargaining leverage. For example, in August 2023, just days after the U.S. expanded sanctions on Chinese companies for aiding Russia, China imposed its own controls on exports of gallium and germanium, which are critical for semiconductor and military applications – a move widely seen as retaliation.

However, Beijing is careful to justify these actions, maintaining that it is acting within its rights under international law. Beijing's narrative is that it is a staunch defender of the global non-proliferation regime, while the U.S. "politicises" export controls for unilateral advantage. This narrative was on full display at the August 2022 NPT Review Conference, where China criticised sanctions on Iran and North Korea as hindering dialogue, even as it reaffirmed support for the NPT's goals.

The most recent case of China's export control measures with an explicit political dimension is the tightening of rare earth related exports. In October 2025, MOFCOM issued Notices 2025 No. 61 and 62[118]. Notice No. 61 requires foreign "specific export operators" (i.e., outside China) to obtain a MOFCOM dual-use export license before shipping certain rare-earth–related items from one non-Chinese country to another under specified conditions. Applications for foreign military users, or WMD, terrorism, and military-enhancement end uses are presumptively denied; advanced chips or AI uses are assessed case by case. Notice No. 62 imposes licensing requirement on technologies for rare-earth mining, separation, metal smelting, magnet manufacturing and recycling, plus production-line assembly, debugging, maintenance and upgrade know-how. "Export" is broadly defined to include IP licensing, investment, training, joint R&D, consulting, exhibitions, testing, and other activities. Even non-controlled items or services require a license if they are likely to substantially aid these activities abroad.

[118] MOFCOM No. 61, https://www.mofcom.gov.cn/zwgk/zcfb/art/2025/art_7fc9bff0fb4546ecb02f66ee77d0e5f6.html; MOFCOM No. 62, https://www.mofcom.gov.cn/zwgk/zcfb/art/2025/art_6cb42957741440c6984de696b70df9ae.html

The international community perceives these moves as the weaponisation of interdependence, framing them as geo-economic pressure that could tighten bottlenecks. But China claims that the measures align with international practice and are narrow scoped: they include license facilitation and humanitarian relief and are primarily about national security and non-proliferation rather than outright bans[119]. Moreover, these measures remain fluid, responding to shifts in external pressures. For example, they were suspended after China and U.S. reached a new package of trade and tariff deals[120].

China's evolving posture towards export controls as pragmatic bargaining leverage is also illustrated, albeit indirectly, by the China–Netherlands frictions surrounding Nexperia. In recent years, Dutch authorities have tightened investment and national-security scrutiny over sensitive semiconductor assets, with Nexperia becoming a politically salient case. From Beijing's perspective, disputes of this kind reinforce the belief that technology and supply-chain rules are increasingly politicised, highlighting the need for China to retain and flag its own policy instruments, including export controls, as flexible tools for reciprocity and negotiation. While China typically justifies export-control measures in the language of national security and regulatory modernisation, the timing and signalling of certain controls can also serve as tools of geoeconomic leverage—not necessarily to "punish" a specific counterpart, but to shape bargaining space and deter further restrictions on Chinese firms and acquisitions. In this sense, the Nexperia episode fits into the broader pattern in which export controls and adjacent tools, such as entity lists, have become part of an integrated, flexible toolkit for managing disputes.

5. Policy reflections

Overseeing all these developments, China's compliance with the non-proliferation regime and export control practices reflects a gradual and long learning curve towards stronger WMD-related compliance, alongside a newer "dual-face" pattern that combines normative non-proliferation governance with pragmatic bargaining leverage in technical and critical materials.

For Dutch and European public and private stakeholders, certain responses and actions are advisable to address China's maturing non-proliferation governance alongside its growing use of export controls as bargaining leverage. I therefore recommend:

[119] MOFCOM Press Conference, 9 October 2025, https://www.mofcom.gov.cn/xwfb/xwfyrth/art/2025/art_16a0593dcadd4030959c3691cf39bb26.html

[120] White House, "Fact sheet", https://www.whitehouse.gov/fact-sheets/2025/11/fact-sheet-president-donald-j-trump-strikes-deal-on-economic-and-trade-relations-with-china/.

1. Create a two-track EU approach to China export controls. One track on WMD and compliance issues, establishing a standing EU–China technological dialogue focused on control lists, end-use verification, diversion networks, and capacity-building. The other track should focus on techno-geopolitics, treating controls on critical tech and minerals as statecraft instruments and integrating them into EU economic security planning.
2. Close EU implementation gaps and improve enforcement coherence regarding EU-China export control issues. Build an EU export-control implementation consistency mechanism with shared licensing benchmarks, joint training, common red-flag typologies and peer reviews among Member States. Expand investigative and customs capacity targeting transshipment and front-company networks, especially for dual-use items.
3. Set up an EU "conflict-of-laws & extraterritoriality" helpdesk. Provide rapid guidance to firms facing EU-China rule collisions such as re-export, "made-with" tech, entity lists, and end-use attestations. Publish a standard compliance playbook on the cycle from classification to screening, documentation, escalation triggers, audit and recordkeeping.
4. Treat entity lists as operational risks, not just politics. Require critical suppliers and exporters to implement a continuous screening of China's control watch lists and related instruments. Create a common EU approach to remediation, such as halting licenses, disclosing and restructuring, when a counterparty becomes listed.
5. Reduce chokepoint vulnerability in rare earths and critical components by setting measurable resilience targets such as minimum buffer inventories, supplier diversification milestones, and substitution plans for rare earth magnets and key precursors. Accelerate downstream capacity through joint procurement and demand aggregation across Member States.
6. Negotiate "structured de-risking" facilitation lanes. Where EU dependence remains, pursue verifiable licensing facilitation for low-risk civil end uses by conducting audit-friendly documentation and predictable licensing channels. Keep facilitation technical and compliance-framed, separate from political bargaining.
7. Upgrade research-security governance without freezing collaboration with China. Issue EU-level guidance on intangible technology transfer, cloud and data handling, lab access controls, and due diligence for joint R&D. Focus restrictions on clearly defined high-risk domains.

8. Coordinate with key technology gatekeepers, preserving EU autonomy by enhancing alignment on diversion enforcement and critical supply chains. Maintain EU-specific criteria for when to align vs. diverge from partner controls.
9. Establish better signalling and crisis management framework and channels. Build an EU rapid response protocol for new potential China control announcements, including technical scope, licensing bottlenecks, sector exposure, and escalation options. Maintain a standing technical de-escalation channel with China to clarify scope and prevent unintended disruption.
10. Frame the aforementioned measures not as confrontation but as risk management and stability-building. A stronger European compliance and resilience posture can reinforce regional development and security objectives while also creating clearer, more predictable conditions for legitimate EU–China trade and cooperation. In parallel, Europe should proactively expand technical, compliance-oriented engagement with China in areas where interests overlap, such as WMD non-proliferation implementation, end-use verification practices and industry compliance capacity-building.

It is mutually beneficial for the European stakeholders, international community and China to remain engaged in genuine cooperation, and to build mutual trust so that export controls are not seen as a zero-sum tool of competition but as a collaborative development and security endeavour. The aim of the above suggestions is to reduce misunderstandings, prevent inadvertent escalation, and preserve policy space for EU's resilience and room for cooperation. This approach safeguards the security of the European community while maintaining a credible pathway toward more mature EU–China collaboration in development and governance.

Chapter 4. Export Control and Emerging Technology in China

Ewan Smith (University College Londin and Oxford University)

1. Introduction

This chapter provides an overview of China's strategy for export control in emerging technologies including advanced computing and artificial intelligence (AI), with recommendations for European policymakers.

When approaching an issue such as this in a European legal framework, the conventional approach would be to start with the law, then to assess that law, then to consider its implications. This approach is poorly suited to the analysis of national security and foreign relations law in China because it looks at the issue back-to-front. Chinese export control provisions are broadly drafted. Compliance involves ongoing dialogue with the Chinese authorities. Decisions regarding matters of strategy, in cases involving powerful foreign partners, are not ultimately made by judges in court. Hence, this chapter begins with the broad principles – the fangzhen (方针) which animate China's approach to strategic competition in the field of AI. It then considers how that principle is instantiated in specific policy – the zhengce (政策). It then draws conclusions about the sort of law we ought to call export control law in this field and makes recommendations on that basis.

China's export control policy is now under new management. In 2015 China enacted a new National Security Law[121]. The Law essentially functions as a framework for further legislation, which regulates subject matter including data and AI. Article 1 of the Export Control Law 2020 says "this Law is established to safeguard national security and interests." One effect of the National Security Law is to anchor policy decisions in bodies under the Central National Security Commission. The Commission – and its local affiliates – wield power through a National Security Commission Office which coordinates security policy, mediates disputes, and directs operations among other tasks. This new national security architecture will wield influence over strategic export control decision-making.

[121] Yang Zongke, The National Security Law has the attribute of a basic law, *Journal of Comparative Law*, no.4 (2019): 1–15.

These developments echo global trends. Export control now works in service of a much wider conception of national security[122], which includes commercial and geopolitical security as well as violent threats to citizens. Liberal 20th century export regimes are artefacts of the postwar desire to counter arms proliferation and rely on ideas such as dual-use technology. However, the distinction between civil and military technology has eroded. First, from a technical standpoint, many of the technological applications subject to export control – including AI – are both civil and military in nature. As Antony Finkelstein, former UK Government Chief Scientific Adviser for National Security, once said, "the only technology that is not 'dual use' is the nuclear bomb." Second, in China as elsewhere, the conception of national security clearly now includes economic prosperity as a measure of regime security, and technological security as a driver of economic security. Technological security explicitly seeks to preserve and to strengthen competitive advantage[123]. Since around the mid-2010s, more states have restricted access to their markets on security grounds. A senior British diplomat described the debacle of Huawei's access to the UK's 5G network not so much as a case of national security but as "a case of market failure." This wider conception of national security requires states and their corporate interests to pick sides, to see the world of commercial possibility as a team game, played within the parameters of existing alliances. Export control can serve still narrower objectives. When Donald Trump offered to enable Nvidia to sell retrograde microchips to China in return for a 15% cut of the profits for the US government, it was hard to reconcile with any particular conception of national security: protectionist, geopolitical, kleptocratic or other[124].

Successful AI industries require computing power, they require advanced algorithms and they require data on which to train models. The state needs large numbers of data scientists, researchers and coders. It needs access to large, high-quality datasets. It also needs access to the most advanced chips with which to build computational capacity. Each of these parts contains component-parts. To develop algorithmic models, we need a research and development ecosystem, perhaps built around universities, national academies and so on. To manage data, we need lawful and reliable modes of data acquisition, storage and retrieval. To obtain the most advanced chipsets, we need advanced chip designers, photolithography specialists, and ultimately, rare-earths.

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[122] On which see Frédéric Gros, *The Security Principle, from Serenity to Regulation* (Verso, 2019).

[123] Emily Jin, "A policymaker's guide to china's technology security strategy," *Information Technology and Innovation Foundation*, 18 February 2025, https://itif.org/publications/2025/02/18/a-policymakers-guide-to-chinas-technology-security-strategy/

[124] https://www.bbc.co.uk/news/articles/cvgvvnx8y19o

This is one reason why it is unhelpful to address the control of AI, advanced computing and autonomous weapons separately. These are not just technologies with common features: they are products of a common supply chain. To build advanced drones, you need AI, but to establish the right models you need computational capacity built on using microchips made in Taiwan using photolithographic equipment fabricated in the Netherlands containing lasers built in California.

On 9 August 2022, the Biden Administration issued new controls which limited China's access to advanced semiconductors and the technology required to make them[125]. The essence of that strategy is that the key input to AI development is computing power, and the key inputs for computing power are advanced microchips. This strategy has been maintained in a different form by the Trump administration. Assessments by the US Bureau of Industry and Security (BIS) in December 2025 asserted that the US held a hardware lead of around 4 years in training frontier models, but no lead in serving those models to users[126]. Under these circumstances, we should not be surprised to find Chinese restrictions on sales of AI hardware, because there is no advantage for China to trade away. If we look for Chinese export controls on "compute" then there is relatively little to find. Broadly speaking, China's strategy has been to proliferate at very low cost, not to restrict that proliferation[127]. But if we look at the other component parts, they tell a different story.

2. The Fangzhen

In 2014, the PRC government issued a national industrial policy. The aim of the policy was to establish global leadership in all areas of the integrated circuit supply chain by 2030[128]. In July 2017, the State Council published the New Generation Artificial Intelligence Development Plan. It did not define AI but gave examples of its applications. The Plan noted that, in 2017, when compared to "developed" countries, China lacked "core algorithms, key equipment, high-end

[125] U.S. Department of Commerce, Bureau of Industry and Security, "Implementation of additional due diligence measures for advanced computing integrated circuits; amendments and clarifications; and extension of comment period," *Federal Register*, 16 January 2025, https://www.federalregister.gov/documents/2025/01/16/2025-00711/implementation-of-additional-due-diligence-measures-for-advanced-computing-integrated-circuits

[126] Ege Erdil, " What did US export controls mean for China's AI capabilities?," *Epoch AI*, 6 December 2024, https://epoch.ai/gradient-updates/us-export-controls-china-ai

[127] Bulelani Jili, "A technological fix: The adoption of Chinese public security systems," *Georgetown Journal of International Affairs,* 20 January 2023, https://gjia.georgetown.edu/2023/01/20/a-technological-fix-the-adoption-of-chinese-public-security-systems/#:~:text=A%20Technological%20Fix%3A%20The%20Adoption%20of%20Chinese%20Public%20Security%20Systems,-Bulelani%20Jili&text=The%20paper%20examines%20the

[128] John VerWey, "Chinese semiconductor industrial policy: Prospects for future success," *Journal of International Commercial and Economic Law*, (2019): 1.

chips, major products and systems, foundational materials, components, software and interfaces." It concluded that China should "accelerate the accumulation of technological capabilities and massive data resources, the organisation integration of both the huge demand for applications and an open market environment."

We might view this as the end of a period of optimism both in China's development of AI and in its broader industrial development. The Chinese telecommunications firm ZTE has recently accepted a fine, and debate over Huawei's role in global 5G networks continues. Kaifu Li's AI Superpowers, published in early 2018, sought to cast China and the U.S. as equals, in its title and in its argument. The Fourteenth Five Year Plan, published in 2020, took an optimistic view of China's AI future. It underlined the "profound convergence of the Internet, big data, artificial intelligence, etc" with "all industries." It noted that, at the time of publication, China ranked first in global patent application numbers in areas such as 5G, blockchain and AI. The international context against which this played out is described in detail in Chapter 1.

In 2021, the State Council issued a White Paper on Export Control[129]. It stated that "[n]o country or region should abuse export control measures... apply double standards to matters related to non-proliferation, or abuse multilateral mechanisms related to export controls for the purposes of discrimination and exclusion". Export controls "should not undermine the legitimate right of other countries to the peaceful use of controlled items." Since the State Council White Paper was published, Xi Jinping has chaired at least five group study sessions of the politburo devoted to advanced computing[130]. Xi's address to April's collective study session said China "boasts abundant data resources, a comprehensive industrial system, a broad range of application scenarios" and "enormous market potential." He also emphasised "the need to promote extensive international cooperation in AI" to "help countries in the Global South strengthen their technological capacity."

In October 2025, China published the framework for the 15th Five Year Plan. The current approach to AI is broadly consistent with the general line set out here. According to the

[129] State Council, White Paper on China's Export Controls [《中国的出口管制》白皮书], 2021, http://www.scio.gov.cn/zfbps/ndhf/2021n_2242/202207/t20220704_130730.html

[130] Big Data (Mei Hong, Beijing Institute of Technology, December 2017); Artificial Intelligence (Gao Wen, Peking University, October 2018); Quantum Computing (Xue Qikun, Tsinghua University, October 2020); New Quality Productive Forces (Politburo members, January 2024) and, most recently Strengthening the Development and Regulation of Artificial Intelligence (Zheng Nanning, Xi'an Jiaotong University April 2025). See Neil Thomas and Feifei Hung, "Who briefs Xi Jinping? How Politburo Study Sessions help to decode Chinese politics," *Asia Society Policy Institute*, 23 October 2024, https://asiasociety.org/policy-institute/who-briefs-xi-jinping-how-politburo-study-sessions-help-decode-chinese-politics

framework, “Capacity building on national security should be bolstered in emerging domains, including cyberspace, data [and] AI.” Chatham House identified the watchwords for the new economic priorities in the Plan: ‘technological self-reliance’ and ‘economic resilience’. In brief, China’s broad response to the technological containment strategy has been an idea called “dual circulation.” The two aspects to this duality are international circulation and domestic circulation. In short, China needs to remain open to global markets while reinforcing its own. Until such time as China is self-sufficient, it needs to foster dependence on its products in global supply chains, while preventing competitors cutting China’s own supply chains.

In light of the foregoing, we can highlight three aspects of this fangzhen. First, China’s AI strategy does not mimic the US containment strategy, led by export control. Like the US, China’s wider strategy for AI and exports generally is closely connected to a protectionist conception of its security. Unlike the US – at least in this domain – China sees that as embodied in free trade in goods. The 2017 State Council White Paper predicted that the most fertile environment for Chinese success in AI was an “open and cooperative” order. In other chapters, we discuss how Chinese export controls often mirror US approaches, for instance by echoing approaches to extraterritoriality or imitating the "Entity List" system. But we should not expect to see symmetry between US and Chinese export control – we might instead expect China to be closed in areas where the US is open and open in areas where the US is closed.

Second, China has a regulatory strategy with an international dimension and is seeking leadership in AI governance. The last five-year plan stressed the importance of “competition over normative systems in the digital area.” At April’s Politburo Study Session, Xi proposed “to strengthen the alignment and coordination of development strategies, governance rules, and technical standards.” In 2023, the Ministry of Foreign Affairs launched the Global AI Governance Initiative, which called on all countries “to enhance information exchange and technological cooperation on the governance of AI” and to “develop AI governance frameworks, norms and standards based on broad consensus.” Two years prior to that, the same ministry had launched a Global Data Security Initiative, couched in almost identical terms. This is an area in which China aims to achieve its objectives by multilateral means.

Third, and most important for our purposes, China’s approach to AI has always contrasted areas in which it lagged against its strategic competitors with areas of comparative strength. While China does not have a strategic advantage in photolithography or chip design, it does have a strategic stock of the rare earths required to produce advanced chips. We will consider recent export control provisions which target these resources presently. And if, from an American

standpoint, computing power is the "oil" of AI; from a Chinese standpoint, that oil may instead be data[131]. China's scale and system of government allow it to aggregate very large amounts of personal data, and this is a key attraction for biotech research.

3. The Zhengce

This section traces the conclusions of the previous section through the legal detail of China's export control framework. It addresses recent developments, including the Ministry of Commerce's (MOFCOM) Notice 61, issued in October 2025.

The Foreign Trade Law of 1994 enabled the state to control exports of goods in the interests of national security[132]. Since its enaction, China has issued six series of export control regulations[133], along with regulations issued by a range of State Council ministries[134]. In 2020, China enacted a new Export Control Law. The law includes control and licensing lists, which are revised annually by MOFCOM and the General Administration of Customs.

There is no Chinese equivalent to Europe's AI Act or the Biden Administration's AI Diffusion Rule. As Daniel Sprick notes, "China has only enacted a set of highly specific legal regulations, which are targeting those areas of AI application that are considered sensitive to the regime"[135]. China issued its first regulatory scheme for generative AI in August of 2023[136]. In April of 2025, the State Administration for Market Regulation and the Standardisation Administration of China jointly released national standards that regulate generative AI. These laws and regulations do not define "AI"[137]. The central theme is content moderation.

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[131] "The world's most valuable resource is no longer oil, but data: The data economy demands a new approach to antitrust rules," *The Economist*, 7 March 2017, https://www.economist.com/leaders/2017/05/06/the-worlds-most-valuable-resource-is-no-longer-oil-but-data

[132] Art. 17

[133] They are: Regulations on the Administration of Controlled Chemicals (Decree No. 190, 1995), Regulations on the Control of Nuclear Export (Decree 230 of 1997), Regulations on the Administration of Arms Export (Decree 234 of 1997) Regulations on the Control of Nuclear Dual-use Items and Related Technologies Export (Decree No. 245 of 1998, as amended), Regulations on Export Control of Missiles and Missile-related Items and Technologies, (Decree No. 361 of 2002), Regulations on Export Control of Dual-use Biological Agents and Related Equipment and Technologies (Decree No. 365 of 2002).

[134] Art. 18 and 19.

[135] Daniel Sprick, "Aligning AI with China's authoritarian value system," *The Diplomat*, 3 February 2025.

[136] https://www.cac.gov.cn/2023-07/13/c_1690898327029107.htm

[137] Section 22(1) of the 2023 Interim Measures defines "generative AI technology" as technology that can generate "text, images, audio, videos, or other content." Compare e.g. Administrative Provisions on Deep Synthesis in Internet-based Information Services, 10 January 2023; Administrative Provisions on Recommendation Algorithms in Internet-based Information Services, 1 March 2022; Measures for Review of Scientific and Technological Ethics (Trial Implementation 1 December 2023; Practical Guidelines for Cybersecurity Standards – Method for Tagging Content in Generative Artificial Intelligence Services issued by the Information Security Standardization Technical Committee 25 August 2023.

The Export Control law presents at least two problems for our purposes. First, as Köstner and Nonn argue, it is hard to comply with it. The Law "provides substantial room for interpretation by the relevant authorities" who enjoy a "wide discretion... This deliberate vagueness that is typical for PRC legislation leaves room for subsequent ad hoc adjustments and concretisation in the form of implementing measures or administrative regulations. More broadly, it connects Exports to a wider array of national security-related decision-making. The effect is to withdraw what elsewhere might be legal problems away from the courts and into separate decision-making structures. For example, China updated its catalogues in 2020 to include content recommendation algorithms, in response to US moves against TikTok.

In December 2024, China issued new Regulations on Export Control of Dual-use Items. The Regulation created a unified control list, a list of items whose export is either controlled or licensed. This consolidated list was established under fragmented regimes dating back to the Foreign Trade Act 1994. The regulations apply to "information processing technologies" including "artificial intelligence, interactive interface technologies, personalised information recommendation service technologies based on data analysis, speech synthesis and evaluation technologies"[138]. Article 44 of the Export Control Law provides that persons outside China who violate the Regulations "so as to endanger China's national security and national interests" can be held legally liable inside China. It is significant that Article 49 of the Regulations provides that China may implement controls on items produced outside China, provided they contain "items" of Chinese origin. The regime applies not only to goods, but also to services and data. The same Regulations established an Entity List: a list of persons whose acquisition of certain technologies would threaten China's interests. The Entity List broadly parallels the US regime.

On 3 December 2024, MOFCOM for the first time issued a notice banning the export to the United States of certain minerals critical to the production of semiconductors[139]. In October 2025, China issued new export control regulations that license the export of "items" that "contain, integrate, or have mixed in with them" certain listed rare earths, or that use rare earths originally produced in China for certain forms of extraction technology. Controlled uses include armaments and military applications, but the notice also specifies that:

> *Export applications for items for R&D or production of 14 nm or smaller logic chips or 256-or-more-layer memory chips, or for production equipment, testing equipment, or*

[138] MOFCOM and MOST, 2020, Notice No. 38 to Amend the Catalogue of Technologies Prohibited or Restricted from Export.

[139] Yue-Zhen Li, The rare earth leverage? China's export control law and "Xi Jinping's thought on law-based governance," University of Pennsylvania Asian Law Review, 18 July 2025, https://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=1115&context=alr

materials for manufacturing the abovementioned processed semiconductors... will be approved on a case-by-case basis.

Logic chips with 14nm or smaller nodes refer to the chips, produced using Extreme Ultra Violet lithography processes China cannot access, which the US tech containment strategy currently denies to China. The notice demands that "exporters" notify MOFCOM. As a matter of Chinese law, any re-export of these items now requires a license, but export includes "re-exports, and transfers." The point is to insert China into a globally integrated supply chain, or at least to ask importers to consider whether China forms part of that chain.

Hence, one way in which China uses strategic export control is to protect an area of strategic advantage in semiconductor manufacture: its stockpile of key precursors. But as we have already seen, there are two other key inputs China controls: algorithms and data. Much is made of the relative freedom with which young researchers can travel from China to universities and companies in more liberal states, can learn about advanced technology and then bring that technology back to China. Although the US restricts Chinese access to advanced chipsets – with an effect on the profit margin of manufacturers -- broadly speaking its knowledge economy is open. As we discuss in Chapter 5, Chinese researchers have not-quite-unrestricted but still extensive access to universities and other research centres, and experienced AI researchers return to China with their expertise[140]. As Qiao Cong-rui explains in Chapter 5, the same is not true for experienced data scientists working on sensitive technology in Chinese institutes, companies and universities.

China controls the movement, publications and wider scientific activities of its leading computer scientists. Senior staff must surrender their passports to their danwei (单位) and can therefore only leave the country with permission. In March 2025, about two months after DeepSeek was released, there were widespread reports that this rule had been extended to relatively junior staff. By contrast, while leading US AI researchers rarely publish proprietary software, and the Biden Administration forbids exporting AI model weightings, the barriers are far lower. In practice, it is much easier to export algorithms from outside China than from within.

A second key component is data. In 2021, China enacted a Data Security Law whose aim is to protect national security interests in its data. Article 2 of the law states:

[140] One emblematic and recent example is Zhu Song Chun. See Chang Che, "'I have to do it': Why one of the world's most brilliant AI scientists left the US for China," *The Guardian*, 16 September 2025, https://www.theguardian.com/news/ng-interactive/2025/sep/16/song-chun-zhu-why-one-of-the-worlds-most-brilliant-ai-scientists-left-the-us-for-china

> *Data handling activities carried out outside the territory of the PRC that harm the national security of the PRC, the public interest, or the lawful rights and interests of citizens and organisations, are to be pursued for legal responsibility in accordance with law.*

Art. 31 provides that "outbound security management measures for other data handlers collecting or producing important data within the mainland territory of the PRC are to be jointly formulated by the national cybersecurity and informatisation department and relevant departments of the State Council". The Data Security Law essentially acts as an export control for data. This Law, as well as the Personal Information Protection Law, include export certification requirements, even for limited amounts of personal information. It regulates data vaguely labelled "important" or "national core" data. These categories are not defined, but data can be designated as important by the relevant organs. The law necessarily restricts the international trade in the data necessary to train machines.

We can draw three conclusions from this brief survey. First, if we were expecting to find a direct equivalent for the AI Diffusion Regulation then we will come up almost empty-handed. But we do find legislation that parallels some western comparators, but with a stronger role granted to the national security architecture. This legislation is not used to restrict access to hardware or software, or not exactly, but it may be used to restrict access to rare-earths on a global basis. Second, we ought to take a functional approach to export control. In 2025, export control regulations are not merely rules designed to counter proliferation. They are rules that facilitate technological development on the most advantageous terms, protecting what ought to be protected while fostering "an open market environment" for essential items. Looking more broadly at sources such as the Data Protection Law, we see China sharply restricting global trade in one of the key commodities on which the AI boom is built. Third, these two features of the zhengce reflect the fangzhen. China views AI as a field of strategic competition and plays to its strengths. Its approach to the global market reflects the Dual Circulation Strategy. Meanwhile, it is building a regulatory strategy with an international dimension.

4. Conclusions and recommendations

The previous section explained how the general lines of China's industrial and development strategy play out in its export control framework, if we approach export control broadly as a set of tools that governments can employ to achieve strategic national security and foreign policy

objectives. This section sets out three recommendations for policymakers based on that analysis.

This chapter has taken a broad view on what counts as export control and what counts as AI, consistent with the approach of the US and Chinese governments. The things China requires include chips, chipmaking equipment, and technical and algorithmic expertise. The things it seeks to protect include its data, the precursors for semiconductors, and access very large numbers of potential consumers. Meanwhile, both sides demand alignment and mutual alignment is not possible. Washington's export control regime relies on other countries restricting access to advanced chips and the means to make them. These include allies such as the Netherlands. When discussing export control matters with respect to AI, whether with strategic allies or strategic competitors, it is important to bear three things in mind.

First, the nature of export control has shifted away from the post-war counter-proliferation framework towards a more agile tool of national foreign policy. Legal rules that restrict market access to goods, or services, or capital, or data that other states trade freely, might need to be considered in the same frame of reference as "dual use" goods. Within this frame of reference, it may be difficult to distinguish reasons of national security from wider economic and geopolitical considerations. Other states – whether friends, competitors or adversaries – do not approach national security in such close-fisted terms.

Second, and with this in mind, it may be wise to review the export control framework. As a recent CSIS Report demonstrates, some European states may simply be legally unable to take action under their current export control regimes[141]. Statutory frameworks, grounded in multilateral agreements discussed in the introduction, cannot be adapted to more agile uses. This might be accompanied by a review of where these decisions are taken and by whom. Decisions about targeted sanctions, strategic export control, import control and investment control might sensibly be located in the same department. This would help ensure that the right policymakers, with the right expertise, would have to make the right decisions. It would be wise for these frameworks to be harmonised with those of significant allies and partners.

[141] Gregory C. Allen and Isaac Goldston, "Understanding U.S. allies' current legal authority to implement AI and semiconductor export controls," Center for Strategic and International Studies (CSIS), 14 March 2025, https://www.csis.org/analysis/understanding-us-allies-current-legal-authority-implement-ai-and-semiconductor-export

Third, if the effect of our current strategy is to require states to align, before doing so we ought first to imagine the endgame. As Chris Millar's argues in Chip Wars, the delivery of AI services and the manufacture of the technology that enables that delivery, relies on an international supply chain. But it is deceptive to think of that supply chain as global. There are choke points throughout the process that delivers AI services and they pinch and relax according to the foreign policy of the states that control them. Some systems that keep some goods moving may not be compatible with others. These two technological containment strategies leave European States caught in a quandary. Chinese export control regulations demand openness in respect of the things China requires and restrictions in respect of the things it wishes to protect. If this a "trade war", then it is not clear what the victory conditions might be and, meanwhile, non-combatants may have to pick sides.

Chapter 5. China's Export Control and Its Implications for Europe-China Research and Educational Collaborations

Qiao Cong-rui (Law4Sustainability[142])

1. Context and Questions

Europe and China are rewriting their rules governing research and educational collaborations (hereafter: RECs), increasingly intertwined with export control considerations and national security rationales. Once anchored in states' obligations to maintain international peace and security, export control regimes have evolved into integrated regulatory toolkits aimed at safeguarding technological and economic competitiveness[143]. In Europe, export control rules are becoming a key reference point for REC stakeholders in assessing the permissibility of foreign participation in collaborative projects, shifting the focus from traditional academic criteria towards security risk indicators in domains denoted as "critical knowledge and technology"[144]. This evolving trend is observable across multiple jurisdictions such as Norway, the Netherlands and Switzerland[145].

[142] The author thanks the EXACT team, particularly Guangyu Qiao-Franco, Ewan Smith and Rogier Creemers, for their constructive and critical feedback on earlier drafts of this chapter. All remaining errors are the author's sole responsibility.

[143] For a detailed analysis of the cross-regional shift in export control regimes from a post–Cold War emphasis on non-proliferation to their current focus on power and technological competition, see: Guangyu Qiao-Franco and Rogier Creemers, "China's Emergence as a Sanctioner in Export Controls: An Overview" in this report.

[144] The term "Critical knowledge and technology" is defined as knowledge and technology, including know-how, in emerging and disruptive areas and in domains that are key to economic competitiveness, social welfare and the security of the Union and its Member States. See: Council of the European Union, *Council Recommendation on Enhancing Research Security* (C/2024/3510) (Brussels, 30 May 2024), para. (18)-(6), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:C_202403510#ntr2-C_202403510EN.000101-E0002

[145] In Norway, criminal charges brought in 2021 against a professor for hosting academics from sanctioned Iran signalled that researchers are identified as potential conduits for illicit knowledge transfer. See: *AP News*, "Norway charges professor with violating sanctions on Iran," 29 September 2021, https://apnews.com/article/technology-europe-middle-east-iran-denmark-0f44cbb1ba2f6776a85420d758995b2a In the Netherlands, the 2022 National Knowledge Security Guidelines advised universities and researchers to assess the motives of foreign partners prior to entering into RECs. See: Government of the Netherlands, *National Knowledge Security Guidelines: Secure International Collaboration* (The Hague, January 2022), 6, https://open.overheid.nl/documenten/ronl-5379d1b4f8b9784bf518251032507a965be9c92d/pdf

More recently in 2024, ETH Zurich set up an export control team to conduct security screenings of applicants from countries subject to United Nations, United States or European Union sanctions, covering doctoral and master's programmes, academic appointments, and visiting researcher positions. See: Executive Board of ETH Zurich, "Dual use and sanctions: These applications require security screening," 24 October 2024, https://ethz.ch/staffnet/en/news-and-events/internal-news/archive/2024/10/dual-use-and-sanctions-these-applications-require-security-screening.html

In China, the implications of export control for international RECs seem more ambivalent. The scope of export control has expanded to encompass international technological cooperation and data transfer. While foreign REC participants are not subject to targeted scrutiny comparable to the China Initiative in the United States[146], concerns persist about the broadening of security-grounded rules and the resulting uncertainty of the legality of transferring research data from China abroad[147]. On the other hand, China's official stance remains welcoming. In October 2025, following public criticism of a proposal to expand visa access for foreign talent, official media responded swiftly: People's Daily characterised the objections as "outlandish", while Hu Xijin, former editor-in-chief of *Global Times*, argued that China hosts significantly fewer foreign researchers than Japan or South Korea and, indeed, requires more[148]. Survey data also show this bifurcated posture. Among 65 researchers involved in Europe-China RECs, 69 percent perceived the Chinese government as incentivising collaboration with Europe across many or all academic fields, while 74 percent identified similar support at the university level[149].

China's hybrid posture raises a pressing question: how should China's export control regime relevant to international RECs be understood and navigated by European stakeholders? This chapter addresses this question with a doctrinal analysis of China's export control rules and its interaction with security governance and science and technology (hereafter: S&T) regulation. The analysis does not engage directly with enforcement data (such as prosecution notices or court decisions), which, while essential for evaluating regulatory practice, remain fragmented and largely inaccessible, thereby constraining systematic assessment[150]. Admittedly, a doctrinal approach may appear idealist—or even naive—at a time when popular discourse depicts China

[146] The China Initiative, launched in 2018, aims to counter security threats to the United States, including those posed by non-traditional threat parties such as researchers in universities and laboratories. For further information, see: U.S. Department of Justice, "Information about the Department of Justice's China initiative and compilation of China-related cases," 2018, https://www.justice.gov/archives/nsd/information-about-department-justice-s-china-initiative-and-compilation-china-related

[147] David Matthews, "Foreign researchers in China face tightening restrictions," *Nature News*, 6 March 2025, https://www.nature.com/articles/d41586-025-00630-1

[148] New York Times, "China wants foreign scientists. the public says no, thanks," 14 October 2025, https://www.nytimes.com/2025/10/14/world/asia/china-stem-visa-racist-backlash.html

[149] Qiao Cong-rui and Yuozhuo Cai, "How do Chinese universities perceive evolving global and internal conditions for academic collaboration between the EU and China?" in *Changing Perspectives Towards Conditions for Sustainable EU–China Academic Collaboration* (The Hague: China Knowledge Network, March 2025), 42–43, 49–50, https://www.chinakennisnetwerk.nl/sites/ckn/files/2025-03/Changing%20Perspectives%20Towards%20Conditions%20for%20Sustainable%20EU-China%20Academic%20Collaboration.pdf

[150] Publicly reported cases in which researchers were charged for cross-border transfers of data or information are presented in a highly summary form. Available accounts provide little to no detail regarding prosecutorial arguments, defence submissions, or the courts' reasoning. See, for example, "Six cases on endangering national security call for attention (警惕危害国家安全行为 这6个案例令人警醒)," *China Daily*, 14 April 2023, https://china.chinadaily.com.cn/a/202304/15/WS643a5796a31053798936fdf6.html

as a homogeneous entity that exploits the remarkable openness of European universities and researchers, leading to technology leakage and intellectual property losses[151].

Yet for the sake of analytical clarity, a distinction must be made between individual cases and broader trends. Chinese research communities remain the largest or second-largest collaborative partners for major knowledge powers, including Germany and the United Kingdom. Moreover, between 2019 and 2022 Europe–China co-publications increased while China–US co-publications declined[152]. For Chinese researchers, international RECs are not the cherry on top but an integral component of contemporary scientific practice. A 2024 survey found that 44 percent of respondents identified the need to address "scientific nationalism" in Europe and China as a priority concern, while 39 percent ranked the restoration of academic freedom as the second most important remedy for sustaining Europe–China RECs[153].

Hence, this chapter proceeds from the premise that the risk-guided approach neither captures the full realities of Europe–China RECs nor adequately reflects the voices of the research communities most affected by recent regulatory shifts. It offers a detailed analysis of regulatory nuance that remains largely absent from existing academic and policy debates, examining whether China's export control and related governance rules function as constraints on, or as conditional enablers of, Europe–China RECs. The chapter concludes by recommending a shift away from risk-guided securitisation towards a non-collaboration-as-exception approach, one that would help European stakeholders develop sustainable RECs with Chinese counterparts.

2. The tripartite regulatory framework: Conditional openness

This section examines China's evolving rules governing international RECs, drawing on data from three interrelated areas: export control, security governance and S&T governance. It focuses on national-level legislation and policy retrieved from PKULaw (北大法宝), China's most comprehensive legal and policy database.

Data collection employs systematic keyword searches, including combinations such as "export control" and "technology", "security"(安全) and "technology", and "science and technology" and its common abbreviation "S&T (科技)". Inclusion criteria are as follows: (a) the document must

[151] Ingrid d'Hooghe et al., *Assessing Europe–China Collaboration in Higher Education and Research* (Leiden: Leiden Asia Centre, 2018), 35, https://leidenasiacentre.nl/wp-content/uploads/2018/11/LeidenAsiaCentre-Report-Assessing-Europe-China-Collaboration-in-Higher-Education-and-Research.pdf

[152] Peter Gill and Marijk van der Wende, "Trends in international talent and knowledge flows in/out China", 15, *supra* note 8.

[153] Qiao Cong-rui and Yuozhuo Cai, 50, *supra* note 8.

contain at least one keyword in its title or sectional headings; (b) it must be promulgated by national-level authorities, such as the National People's Congress, the State Council or its ministries; and (c) it must contain provisions that closely relate to international RECs.

The resulting corpus is analysed in detail in Parts 2.1, 2.2 and 2.3, collectively revealing a tripartite framework that encompasses both regulatory constraints and enabling provisions governing international RECs.

2.1 Export control rules

Among China's export control rules relevant to international RECs, 56 regulatory instruments are identified, comprising two laws, 12 administrative regulations, 41 ministerial rules, and one bilateral treaty. From this corpus, eight instruments are selected for detailed analysis given their close relevance to international RECs, as summarised in Table 5.1 below.

lied.

Table 5.1 The export control instruments analysed in Part 2.1

Title	Adoption Date
Regulation on the Export Control of Dual-Use Items	18 September 2024
Export Control Law	17 October 2020
Administrative Measures for the General Licensing of the Export of Dual-Use Items and Technologies	13 May 2009
Administrative Measures for Controlling Prohibited and Restricted Export Technologies	20 April 2009
Administrative Measures for Registering Technology Import and Export Contracts	1 February 2009
Regulation on Administering Import and Export of Technologies	10 December 2001
Foreign Trade Law	12 May 1994
Provisional Measures on Regulating the Technology Export	26 June 1990

First and foremost, a defining feature of China's export control rules rests on an expansive definition of controlled technologies. Initially, under the Provisional Measures on Regulating Technology Export adopted in 1990, two types of technology exports were excluded from export control: transfers conducted by foreign-owned companies and their employees located in China to recipients abroad, and transfers undertaken for the purposes of foreign economic assistance

or scientific and technological cooperation (Article 2)[154]. Both technologies and their associated rights and services, including patent rights, technical secrets (such as product development and production, or business operation) and supporting services (such as technical consulting or training) fell outside export control[155].

This exemption-permitting definition started to change in the early 2000s. The Regulation on Administering Import and Export of Technologies, adopted in 2001, removed earlier carve-outs and subjected the transfer of technologies abroad, including patent rights and technical services—even for purposes of technological cooperation—to export control (Article 2)[156]. Subsequent legislation reinforced this expansive definition. The Export Control Law, adopted in 2020, extends control to any technologies or data related to dual-use items, military items, nuclear items, the safeguarding of national security and interests, or the fulfilment of China's international non-proliferation and other treaty obligations (Article 2)[157]. Complementing this, the 2024 Regulation on the Export Control of Dual-Use Items (hereafter: 2024 Regulation) explicitly covers transfers conducted through foreign assistance and international cooperation within controlled export activities (Article 2)[158].

This shift away from an exemption-permitting approach has also changed the scope of compliance. Earlier export control rules, such as the Regulation on Administering Import and Export of Technologies, targeted "export businesses" (Article 13)[159] — a focus maintained under the Export Control Law (Article 11)[160] and the 2024 Regulation (Article 14)[161]. Simultaneously, the current definition of controlled technology export does not exempt non-commercial transfers, leaving unresolved whether compliance duties extend to researchers and research institutes engaged in international RECs.

[154] Article 2, in Provisional Measures on Regulating the Technology Export, adopted by Ministry of Foreign Economic Relations and Trade and State Science and Technology Commission on 26 June 1990 and effective on 26 June 1990, https://law.pkulaw.com/bugui/22917.html

[155] Ibid.

[156] Article 2, in the Regulation of the People's Republic of China on Administering Import and Export of Technologies, adopted by the State Council of the People's Republic of China on 10 December 2001, https://xzfg.moj.gov.cn/front/law/detail?LawID=897

[157] Article 2, in the Export Control Law of the People's Republic of China, adopted by the National People's Congress on 17 October 2020 and effective on 1 December 2020, https://exportcontrol.mofcom.gov.cn/article/zcfg/gnzcfg/flfg/202111/226.html

[158] Article 2, in the Regulation of the People's Republic of China on the Export Control of Dual-use Items, adopted by the State Council on 18 September 2024 and effective on 1 December 2024, https://www.gov.cn/zhengce/content/202410/content_6981399.htm

[159] Article 13, in the Regulation on Administering Import and Export of Technologies, s*upra* notes 15.

[160] Article 11, in the Export Control Law, *supra* note 16.

[161] Article 14, in the Regulation on the Export Control of Dual-use Items, s*upra* notes 17.

Under a strict reading, international RECs involving controlled technologies—but without commercial transactions—may fall below the formal compliance threshold. Yet the lack of explicit exemptions creates a zone of uncertainty that can have to a chilling effect on RECs. A useful parallel can be drawn from the United States' experience under "deemed export" rules, which treated the domestic transfer of technical data to foreign nationals as international exports, resulting in heightened restrictions on RECs involving foreign researchers[162].

Under a broad reading, foreign researchers can face compliance exposure. International RECs involving technologies or data deemed relevant to the safeguarding of China's national security and interests may fall within export control. This raises a critical question: which procedures or mechanisms exist for researchers and research institutes to fulfil their potential obligations? In principle, compliance rests on a licensing procedure and a dual-review process assessing trade- and technology-related risks.

Export operators must obtain a licence from national export control authorities when they know or should know that transferred technologies or data may endanger national security or interests; or be used in weapons of mass destruction; or be used for terrorist purposes[163]. In parallel, export operators need to adhere to China's industrial, technological and social development policies[164]. Policy adherence is assessed via a dual-review procedure: the trade review examines alignment with China's foreign trade policy, national industrial policy and economic development, while the technology review assesses potential risks to national security and evaluates conformity with China's technological policies, including the production of large-scale equipment and high-tech products[165]. For technology export operators who do not transfer controlled technologies, a contractual registration applies. They must register their export contracts with the Ministry of Commerce or its regional offices within 60 days after entry into force, including contract identification and supply and use parties, contractual terms and value, and payment methods[166].

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[162] John Krige, "National security and academia: Regulating the international circulation of knowledge," *Bulletin of the Atomic Scientists* 70, no. 2 (2014): 42–52, https://doi.org/10.1177/0096340214523249

[163] Article 12, in the Export Control Law, *supra* note 16.

[164] Article 4, in the Regulation on Administering Import and Export of Technologies, *supra* note 15.

[165] Articles 8 and 9, in the Administrative Measures for the Prohibited and Restricted Export of Technologies, adopted by the Ministry of Commerce of the People's Republic of China and the Ministry of Science and Technology of the People's Republic of China on 20 April 2009, Order No. 2, https://www.gov.cn/gongbao/content/2009/content_1449021.htm

[166] Articles 6 and 10, in the Measures for Registering Technology Import and Export Contracts, adopted by the Ministry of Commerce of the People's Republic of China on 1 February 2009 and effective on 3 March 2009, https://www.gov.cn/gongbao/content/2009/content_1371360.htm

However, export licensing, dual-review and contract registration procedures are designed for export operators, whereas international RECs examined here generally do not fall within that category. Neither the Export Control Law nor the 2024 Regulation defines "export operator". The Administrative Measures for Controlling Prohibited and Restricted Export Technologies and the Administrative Measures for the General Licensing of the Export of Dual-Use Items and Technologies, both adopted in 2009, provide helpful guidance. The rules assign licensing responsibility to the Ministry of Commerce vis-à-vis technology export operators[167], indicating that compliance procedures also target commercially oriented operators.

2.2 Security governance rules

Regarding China's security governance rules relevant to international RECs, a keyword search for "security and science or technology" in the PKULaw database yields 1296 results, comprising eight laws, eight administrative regulations and 1280 ministerial-level rules. From this corpus, eight instruments are identified as closely relevant to international RECs, as summarised in Table 5.2 below.

Table 5.2 The security governance instruments analysed in Part 2.2

Title	Adoption Date
Regulation on Administering Network Data Security	30 August 2024
Data Security Law	10 June 2021
Biosecurity Law	17 October 2020
Nuclear Safety Law	1 September 2017
Cybersecurity Law	7 November 2016
National Security Law	1 July 2015
Foreign Trade Law	12 May 1994
Law on Guarding State Secrets	5 September 1988

To start with, China's security governance regime is rooted in an ideological orientation, aimed at defending the socialist system under the leadership of the Communist Party of China. This

[167] Article 16, in the Administrative Measures for Controlling Prohibited and Restricted Export Technologies, s*upra* notes 24. And Article 3, in the Administrative Measures for the General Licensing of the Export of Dual-Use Items and Technologies, adopted by the Ministry of Commerce of the People's Republic of China on 13 May 2009 and effective on 1 July 2009, https://policy.mofcom.gov.cn/claw/clawContent.shtml?id=905

orientation is codified in the 2015 National Security Law, which establishes national security to include the protection of China's political system (Article 1)[168]. It adopts what is referred to as the "holistic approach to national security" (总体国家安全观) that expands traditional domains of military and economic security to cover political and cultural security[169].

Despite its broad scope, national security has not always been the primary ground for export control. Under the Provisional Measures on Regulating Technology Export adopted in 1990, the grounds for restricting technology transfers were normatively sequenced with priority given to China's foreign policy, foreign trade policy, and international customary practice, followed by obligations under international treaties and agreements, with national security listed only thereafter (Article 3)[170]. This ordering has shifted in recent years.

The Foreign Trade Law, as amended in 2022, elevates the protection of national security to the foremost ground for restricting technology exports, while China's treaty obligations now appear last (Article 25)[171]. Normatively, the reordering signals that national security has become the primary ground for technology export control. Consistent with this emphasis, certain categories of scientific and technological knowledge are now construed as potential sources of national vulnerability and are accordingly subject to control by the State Secrets authorities[172]. In practical terms, data generated or shared within international RECs may thus fall within the scope of protected secrets. Further reinforcing the control of scientific and technological knowledge, the Regulation on Administering Network Data Security (2024) extends extraterritorial applicability to data-processing activities conducted outside Chinese territory (Article 2)[173].

The critical question is then: under what circumstances is the knowledge or data generated in international RECs categorised as protected secrets or controlled data? Two statutes structure this inquiry. The Cybersecurity Law adopted in 2016 governs the construction, operation,

[168] Article 1, in the National Security Law of the People's Republic of China, adopted by the People's Congress of the People's Republic of China on 1 July 2015 and effective on 1 July 2015, https://www.gov.cn/zhengce/2015-07/01/content_2893902.htm

[169] Article 3, in the National Security Law, *supra* note 27.

[170] Article 3, in the Provisional Measures on Regulating the Technology Export, *supra* note 13.

[171] Article 25, in the Foreign Trade Law of the People's Republic of China, adopted by the National People's Congress on 12 May 1994, revised on 6 April 2004, first amendment on 7 November 2016 and second amendment on 30 December 2022, https://law.pkulaw.com/falv/4719179c90182f57bdfb.html

[172] Article 13(5), in the Law of the People's Republic of China on Guarding State Secrets, adopted by the National People's Congress on 5 September 1988, first amendment on 29 April 2010 and second amendment on 27 February 2024, and effective on 1 May 2024, https://www.gov.cn/yaowen/liebiao/202402/content_6934648.htm

[173] Article 2, in the Regulation on Administering Network Data Security, adopted by the State Council on 30 August 2024, and effective on 1 January 2025, https://www.gov.cn/zhengce/content/202409/content_6977766.htm

maintenance and use of networks within China (Article 2), a scope that plausibly encompasses university digital infrastructure, data repositories, and digital collaboration platforms commonly used in international RECs. It also requires that operators of information infrastructure store domestically any "important data" collected or generated within China (Article 37)[174].

The Cybersecurity Law leaves the term of "important data" undefined, a gap addressed by the Data Security Law that introduces an impact-based data classification. The Data Security Law, adopted in 2021, distinguishes among "core data" defined as data with national-level impacts, "important data" with sectoral or regional significance, and general data (Article 21). Notably, the law also asserts extraterritorial jurisdiction, applying to data-processing activities conducted outside China where such conduct endangers national security (Article 2)[175].

In addition to general security laws, sector-specific regulations affect international RECs in sensitive fields. The Nuclear Safety Law adopted in 2017 promotes research on nuclear facility safety, radiation monitoring and radioactive material management (Article 10), while establishing a State-centric model of international cooperation that vests exclusive authority in State organs, leaving no formal role for private actors or individual researchers in leading cross-border collaborations (Article 13)[176]. The Biosecurity Law, as amended in 2024, imposes explicit cross-border controls over biotechnology RECs: collaborative projects involving China's human genetic resources require prior official approval (Article 56), must ensure the meaningful participation of Chinese researchers throughout the research lifecycle, and must commit to equitable benefit-sharing arrangements (Article 59)[177]. These sectoral laws reflect China's targeted control of international RECs in high-sensitivity scientific domains.

2.3 Science and technology governance rules

Regarding China's S&T governance rules relevant to international RECs, a keyword search for "science and technology" and its variants in the PKULaw database yields 2449 results,

[174] Articles 2 and 37, in the Cybersecurity Law of the People's Republic of China, adopted by the National People's Congress on 7 November 2016 and effective on 1 June 2017, https://digichina.stanford.edu/work/translation-cybersecurity-law-of-the-peoples-republic-of-china-effective-june-1-2017/

[175] Articles 2 and 21, in the Data Security Law of the People's Republic of China, adopted by the National People's Congress on 10 June 2021 and effective on 1 September 2021, https://law.pkulaw.com/chinalaw/5015167.html

[176] Articles 10 and 13, in the Nuclear Safety Law of the People's Republic of China, adopted by the National People's Congress on 1 September 2017 and effective 1 January 2018, https://www.mee.gov.cn/ywgz/fgbz/fl/202110/t20211028_958223.shtml

[177] Articles 2(2), 56 and 59, in the Biosecurity Law of the People's Republic of China, adopted by the National People's Congress on 17 October 2020 and amended on 26 April 2024, https://policy.mofcom.gov.cn/claw/clawContent.shtml?id=100341

comprising 15 laws, 62 administrative regulations and 2372 ministerial-level rules. From this corpus, 10 instruments are selected for further analysis given their close relevance to international RECs, as summarised in Table 5.3 below.

Table 5.3 The S&T governance instruments analysed in Part 2.3

Title	Adoption Date
General Principles on Strengthening the Governance of Science and Technology Ethics	March 2022
14th Five-Year Plan for National Economic and Social Development and the Long-Range Objectives Through the Year 2035	March 2021
Guidelines on Further Strengthening the Construction of Scientific Research Integrity	May 2018
Interim Measures on Administering Leadership Personnel of Research Institutions	January 2017
Provisions on the Confidentiality of Science and Technology	16 November 2015
Law on Popularising Science and Technology	29 June 2002
Regulation on National Science and Technology Awards	23 May 1999
Law on Applying Scientific and Technological Achievements	15 May 1996

To start with, the Chinese State assumes a dual role as both enabler and gatekeeper of international RECs. As an enabler, since the early 1990s China has enabled a broad spectrum of actors, including universities, research institutes, companies and independent researchers to participate in international collaboration[178]. Complementing this, the Law on Applying Scientific and Technological Achievements, adopted in 1996, incentivises innovation through mechanisms such as government procurement and subsidies, and through policy promoting research into climate change mitigation, environmental protection, public health, agriculture and poverty alleviation (Article 12)[179].

Furthermore, China's S&T governance rules explicitly protect the freedom of scientific inquiry and the right to research independence. The Law on Scientific and Technological Progress, as amended in 2021, provides that the State shall safeguard the freedom to conduct research and

[178] Articles 80-82, in the Law of the People's Republic of China on Scientific and Technological Progress, adopted by the National People's Congress on 2 July 1993, first amendment on 29 December 2007 and second amendment on 24 December 2021, https://www.pkulaw.com/chl/dfa1ef63595e73febdfb.html?way=listView

[179] Article 12, in the Law of the People's Republic of China on Applying Scientific and Technological Achievements, adopted by the National People's Congress on 15 May 1996, and amended on 29 August 2015, https://www.most.gov.cn/xxgk/xinxifenlei/fdzdgknr/fgzc/flfg/201512/t20151204_122621.html

protect the lawful rights of scientific and technological personnel to pursue independent inquiry, including the selection, design and implementation of research (Article 8). It also promotes openness, inclusiveness and reciprocity in international cooperation (Articles 79–82)[180]. Similarly, the Law on Popularising Science and Technology, adopted in 2002, seeks to cultivate a societal culture that respects science and values innovation (Article 3)[181].

The enabling orientation is also reflected in China's ethical governance. The Opinions on Strengthening the Governance of S&T Ethics, issued in 2022, frame China's approach as balancing ethical universalism embracing principles such as scientific openness, human dignity and fairness across cultural and social contexts, with national particularism[182]. Likewise, the 14th Five-Year Plan, passed in 2021, calls for deeper integration into global innovation ecosystems and encourages the participation of foreign scientists in domestic S&T projects[183], reaffirming the stance supporting international collaboration that had already been articulated as early as 2018[184].

Collectively, these rules safeguard researchers' autonomy and promote international cooperation. Al-though no case law has directly interpreted these protections in the context of international RECs, recent judicial guidance from the Supreme People's Court illustrates a balancing approach between protecting commercial technology secrets and preserving researchers' freedom to innovate, which followed a series of high-profile patent ownership disputes presided over by Justice Tao Kaiyuan in 2024, where researchers' autonomy was upheld against excessive contractual constraints[185].

As a gatekeeper, China's S&T governance rules allow authorities to condition domestic participation in international cooperation. As early as 1986, the Rules on Participation in

[180] Articles 8 and 79-82, in the Law on Scientific and Technological Progress, *supra* note 37.
[181] Article 3, in the Law of the People's Republic of China on Popularising Science and Technology, adopted by the National People's Congress on 29 June 2002, amended on 25 December 2024, https://www.pkulaw.com/chl/418d23eee859aaedbdfb.html?way=listView
[182] General Principles and Ethical Principles, in the Opinions on Strengthening the Governance of Science and Technology Ethics, Issued by the General Office of the Central Committee of the Communist Party of China and the General Office of the State Council in 2022, https://www.pkulaw.com/chl/1a327f01d6c3ec92bdfb.html?way=listView
[183] Section 3 "Actively Promoting Openness and Cooperation in Science and Technology" in Chapter 7, in the Outline of the 14th Five-Year Plan for National Economic and Social Development, https://www.gov.cn/xinwen/2021-03/13/content_5592681.htm
[184] Para. 28, in the Opinions on Further Strengthening Scientific Research Integrity, Issued by the General Office of the Central Committee of the Communist Party of China and the General Office of the State Council in 2018, https://www.gov.cn/zhengce/2018-05/30/content_5294886.htm
[185] Press Release on "Opinions of the Supreme People's Court on Ensuring Scientific and Technological Innovation through High-Quality Adjudication", published 1 January 2025 by the Supreme People's Court, https://ipc.court.gov.cn/zh-cn/news/view-3826.html

International Scientific and Technological Organisations already required any engagement with international scientific organisations involving politically sensitive issues, such as the Taiwan issue, to conform to China's policy positions (Article 2). Participation in such organisations also needed to be reviewed by the China Association for Science and Technology and approved by the State Science and Technology Commission in coordination with the Ministry of Foreign Affairs (Article 7)[186].

From the mid-1990s onward, gatekeeping was reinforced through a principle of domestic prioritisation. The Law on Applying Scientific and Technological Achievements, adopted in 1996, encourages scientific and technological achievements to be first applied or commercialised within China, and requires that any subsequent transfer or licensing to foreign entities comply with export control and national security regulations (Article 6)[187]. Moreover, research whose disclosure to unauthorised parties could undermine national security and technological competitiveness may be classified as confidential and subject to export control[188].

Gatekeeping is also reflected in the governance of research talent. The Regulations on National Science and Technology Awards, as amended in 2024, integrate the pursuit of scientific excellence with the promotion of national values, rewarding original discoveries and breakthroughs while requiring alignment with socialist values (Articles 4 and 5)[189]. Senior scientific personnel are required to undertake training in S&T policy, research ethics and management skills and are encouraged to engage in overseas exchanges that combine international exposure with domestic capacity-building objectives (Article 29)[190].

2.4 Summary

[186] Articles 2(2) and 7, in the Rules on Participation in International Scientific and Technological Organisations, adopted by the National Science and Technology Commission and the Ministry of Foreign Affairs on 1 April 1986, http://www.iscea.ac.cn/__local/A/73/82/92A6BE41317869308CBEBF093EE_3A9DA870_1A8E9.pdf

[187] Article 6, in the Law on Applying Scientific and Technological Achievements, *supra* note 38.

[188] Articles 2 and 9, in the Rules on the Confidentiality of Science and Technology, adopted by the Ministry of Science and Technology and the National Administration for the Protection of State Secrets on 16 November 2015 and effective on 16 November 2015, http://tradeinservices.mofcom.gov.cn/article/zhengce/hyfg/201711/48539.html

[189] Articles 4 and 5, in the Regulation on National Science and Technology Awards, adopted by Decree No. 265 of the State Council of the People's Republic of China on 23 May 1999, first amendment on 20 December 2003, second amendment on 18 July 2013, third amendment on 7 October 2020, and fourth amendment on 26 May 2024, https://www.gov.cn/zhengce/content/202405/content_6954576.htm

[190] Article 29, in the Interim Measures on Administering Leadership Personnel of Research Institutions, adopted by Central Organisation Department of the CPC and the Ministry of Science and Technology in January 2017 and effective on 13 January 2017, https://www.most.gov.cn/satp/kjzc/zh/202201/t20220119_179066.html

Although China's export control rules have evolved from an exemption-permitting approach towards an expansive definition of controlled technologies and data, this expansion does not, as a matter of law, generate directly applicable compliance obligations for non-commercial parties to international RECs. Legally binding duties require not only a clearly defined compliance scope but also accessible and operational procedures—elements that remain largely lacking for researchers and research institutes. Consequently, export control obligations are not legally enforceable for RECs lacking a commercial component.

China's security governance rules apply an impact-based regulatory logic rather than a blanket restriction on cross-border data transfer. The decisive trigger for controlling data transfers lies in whether research data qualify as "important", based on their potential sectoral or regional impact. Although the statutory definition of impact is under-specified, it functions as an implicit limiting principle: compliance obligations arise when the foreseeable effects of data transfer extend beyond the research context to implicate regional or sectoral security or interests.

Finally, China's S&T governance rules safeguard research autonomy and encourage scientific openness, with judicial opinions upholding researchers' freedom against excessive constraints. However, this enabling orientation is coupled with gatekeeping mechanisms that condition international collaboration on domestic prioritisation and alignment with policy objectives. International RECs are therefore not categorically restricted but operate within a framework of conditional openness: collaboration is encouraged insofar as it aligns with China's developmental priorities and national security imperatives.

3. Conclusion and recommendations

China's tripartite regulatory framework exhibits conditional openness for international RECs. Export control rules do not impose directly applicable compliance obligations on non-commercial technology or data operators; security governance applies impact-based controls to cross-border data transfers; and S&T governance safeguards research autonomy while promoting international collaboration. International RECs are therefore not categorically constrained under Chinese rules but are conditionally enabled.

Such nuanced openness requires an equally nuanced response by European stakeholders. Rather than relying on risk-driven, generic indicators—such as civil-military fusion strategies or

human rights records in risk appraisals[191], REC stakeholders should adopt a non-collaboration-as-exception, project-specific approach. Practically, this entails distinguishing between the general scope of international RECs and the subset of projects potentially subject to export and security control, defined in the EU as "critical technology and data" and in China according to the sectoral or regional impact of the data and knowledge involved.

For general international RECs, risk-guided securitisation models tend towards centralisation, exemplified by proposals such as a "one-stop-shop platform"[192]. While well-intentioned, such technocratic approaches risk misalignment with Europe's heterogeneous higher education and research ecosystem. With 2.2 million academic staff across diverse disciplines as of 2021[193], centralised mechanisms could disproportionately prioritise a minority of "critical technologies and data", diverting attention and resources from the broader, legitimate research landscape.

Under Chinese rules, international RECs without commercial components are not subject to formal compliance obligations. Consequently, REC projects should remain primarily under the discretion of participating researchers and institutes, with assessments focused on academic indicators such as research innovation, collaborative output or talent development, which academic committees are best positioned to evaluate. This constitutes the academic materiality approach, already embedded in common REC practice and requiring no additional resources.

By contrast, only projects involving critical technologies and data as listed in EU control lists, or subject to export control and security review under Chinese law, should engage with non-academic actors, such as export control or national security agencies. Non-academic oversight should be triggered by evidence-based indicators, such as the presence of controlled technologies and knowledge or unlawful transfers thereof. This constitutes the non-academic materiality approach, implementable by existing institutional or governmental security teams.

Together, the double-materiality approach to governing international RECs ensures that non-academic impact scrutiny remains exceptional, preserving scientific freedom and openness while enabling proportionate risk mitigation. Given that China's regulatory framework does not

[191] Council of the European Union, *Council Recommendation of 23 May 2024 on Enhancing Research Security* (Brussels, 2024), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:C_202403510#ntr2-C_202403510EN.000101-E0002
[192] Ibid.
[193] European Commission / EACEA / Eurydice ,*Bologna Process Implementation Report 2023: The European Higher Education Area in 2024* (Luxembourg: Publications Office of the European Union, 2024), 37, https://ehea.info/Immagini/the-european-higher-education-area-in-2024-EC0224018ENN.pdf

constitute a blanket risk, European stakeholders can adopt an opportunity-guided, evidence-based collaboration strategy, applying academic materiality to general RECs while activating non-academic materiality for projects involving critical or controlled data and knowledge, thereby supporting sustainable Europe–China research and educational collaborations.

Chapter 6. The Role of Corporations in China's Export Controls

Douglas Fuller (Copenhagen Business School)

1. Introduction

This chapter examines the role of Chinese corporations in high-technology-related export control policies in China. Originally, the chapter planned to give equal weight to analysing the role of corporations in two different types of export control policies: China's own export control policies and China's countermeasures to foreign export control policies targeting China. Unfortunately, there were challenges to studying how corporations attempt to shape China's policies utilising publicly available documents because much of this lobbying (to the extent it exists) is neither public nor under the scrutiny of a free press that can report on what happens behind the scenes. This is even truer for China's own export policies than the countermeasures China has adopted in the face of other states' export controls, since China's countermeasures often come with enticing subsidies that corporations enthusiastically accept, so at least engagement with these countermeasures is readily observable.

The chapter proceeds as follows. First, the chapter will examine the case of DJI getting ahead of the state's own policymaking regarding export controls and why it may be a relatively singular case. Then, the chapter will turn to examine how firms engaged with the countermeasures the state undertook to deal with the foreign, principally American, export controls in semiconductors targeting China. Finally, the chapter will offer recommendations for the Dutch government.

2. A dual use case study in China: DJI's proactive export controls for drones

DJI announced on 26 April 2022 its own export controls on drones for military uses in the wake of the Russian invasion of Ukraine. In order to deal with the dual use functionality of drones during military conflict, DJI decided to suspend temporarily all drone sales to both Russia and Ukraine. Of course, DJI did not make this decision irrespective of commercial considerations. The Ukrainian government had pressured DJI to stop selling to Russia, and DJI felt responsible to its

German retailers which were forced to remove DJI's products from their shelves due to an online campaign critical of DJI's sales to Russia[194]. There is no evidence of pressure from the Chinese government to adopt this policy. In the intervening years, sufficient evidence has accumulated that the Chinese government has allowed sales of war-related material to continue nearly unabated to Russia, so it is unlikely the Chinese state pressured DJI to halt sales in 2022.

Moreover, the Chinese government's major efforts followed rather than preceded DJI's announcement. The major significant controls on drones came into effect on 1 September 2023, and restricted drone exports along several metrics and capabilities: 1) controlled flight beyond visual line of sight (BVLOS), 2) endurance of 30 minutes or more, and 3) maximum take-off weight of 7 kg/empty take-off weight of 4 kg. In another notice with same effective control date of 1 September, unmanned aerial vehicle (UAV)-related equipment, specifically anti-drone systems, were also restricted. These were not outright bans, but requirements to have exports go through the required vetting procedures to prove that they are being exported for civilian uses[195]. These controls were based on Notices 27 and 28 issued jointly by the Ministry of Commerce (MOFCOM), the General Administration of Customs, the State Administration of Science, Technology and Industry for National Defence, and the Equipment Development Department of the Central Military Commission, on 31 July 2023.

DJI drones were involved in a number of smuggling cases although these cases do not suggest active non-compliance by DJI. For example, in 2023 a trading company was caught smuggling DJI drones in Xiamen[196]. In Guangxi in 2024, there was another case of smuggling agricultural drones to Vietnam[197]. In neither case was DJI the party responsible for the smuggling. Drone smuggling is not surprising given the strong demand abroad. In the first half of 2025, drones accounted for 19 percent of dual-use items smuggling cases[198].

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[194] "DJI, unwilling to be drawn into military conflict, suspends drone sales and services in Russia and Ukraine (大疆不愿卷入军事冲突 在俄乌两国暂停无人机销售及服务)," *Caixin*, 27 April 2022, https://m.caixin.com/m/2022-04-27/101877430.html

[195] Chen Qingqing and Yu Xi. 2023. "China imposes export controls on certain UAVs to safeguard national security, interests; curbs to take effect on September 1," *Global Times,* 31 July 2023.

[196] "Xiamen Yizhanpeng International E-commerce Co., Ltd. was found to have made false declarations regarding the export of DJI agricultural drones (厦门易展鹏国际电子商务有限公司大疆植保无人机品名申报不实出口案)," Xiamen Customs, 8 July 2024, http://gdfs.customs.gov.cn/xiamen_customs/zfxxgk22/3017978/491099/491101/491103/5974227/index.html

[197] "Nanning Dongzhong Customs cracked a case involving the smuggling of DJI drones, a controlled export item (南宁峒中海关查处一起夹带走私出口管制物项大疆无人机案件)," n.d., https://www.tclegal.cn/content-detail/?id=19025307091809116 18&type=0&utm

[198] Yu Zhiguo and Piao Yanmei, "Overview of China's export control enforcement and administrative penalties in the first half of 2025 (2025年上半年中国出口管制执法和行政处罚综述)," *Zhonglun*, 3 September 2025.

To try to find another channel through which firms could engage in shaping export controls, I examined whether the Chinese People's Political Consultative Committee (CPPCC/政协), which acts as a bridge between society and the party, has contributed to export controls. I did not find much evidence of this. I found one instance in 2012 that touched upon export controls[199]. At the National CPPCC in March 2012, during the Two Sessions (the concurrent meetings of the National People's Congress and the CPPCC), members called for building up a national strategic reserve of rare earths and suggested that exports were excessive and needed to be restrained[200]. Of course, the situation in 2012 is the opposite of today where, in light of heightened tensions with the U.S., the Chinese government has been leaning into export controls rather than encouraging exports.

3. Huawei and countrering foreign export controls on semiconductors and AI compute in China

Developed over the first Trump administration and continued under the Biden administration, American export controls explicitly targeted Huawei, AI compute (the chips necessary to run AI) and semiconductor fabrication equipment development in China. Additionally, the multilateral Wassenaar Arrangement had already placed extreme ultraviolet (EUV) lithography on its controlled list and thus prevented exports to China prior to the Biden administration's 2022 controls targeting semiconductor fabrication equipment. Thus, it is unsurprising that Huawei and other firms in these sectors were often willing or even proactive partners in the Chinese state's efforts to counteract these foreign export controls.

In the face of American and multilateral export controls, what did Huawei and China's semiconductor suppliers do to influence the Chinese government's response? Again, the challenge is to distinguish real corporate initiative to push and shape government policy from efforts to merely echo and reflect policy compliance or an eagerness to be the prime beneficiaries of government policy. After all, if the government moves to open the financial spigots for a sector,

[199] Given the thousands of suggestions made at the CPPCC but never turned into law, it is hardly surprising that nothing has come out of the CPPCC on export controls, but even discussion of this issue seems rare. Furthermore, others have argued that CPPCC has never been the place to do lobbying because people with real clout do not need to do their lobbying within the confines of the CPPCC. For more information, see Shannon Tiezzi, 2021 "What is the CPPCC anyway?" *The Diplomat*, 4 March, and Felix Wiebrecht, 2022. "Explaining activity in authoritarian assemblies: Evidence from China," *Journal of East Asian Studies* 22(3): 435-455.

[200] "CPPCC members call for the establishment of a national rare earth resource reserve system (政协委员呼吁建立国家稀土资源储备制度)," 14 March 2012, https://news.sina.com.cn/green/news/roll/2012-03-14/103524113357.shtml?utm

corporations are going to do and say what they need to do in order to access these funds. However, it must also be acknowledged that Chinese firms that were not already explicit targets of foreign export controls (e.g., the Entity List of the US Department of Commerce) might also pursue lobbying very discreetly to avoid attracting unwanted attention from foreign export control watchdogs.

Huawei, in reaction to the restrictions placed upon it by the Trump administration, began to push back rhetorically. For example, during the 2019 Huawei Annual Report and Press Conference on 31 March 2020, Huawei's CEO Eric Xu called for retaliatory measures: "If the U.S. imposes these new measures, the Chinese government will have no choice but to do the same for some U.S. companies... Why wouldn't it be possible for the Chinese government to prohibit the use of 5G chips made by U.S. companies in the Chinese market... citing the same cyber security concerns?"[201]. While the Chinese government responded later in September 2020 with MOFCOM's Unreliable Entities List targeting foreign firms, MOFCOM had announced in May 2019—almost a year before Huawei's press conference—–that it intended to create such a list.

At the same time, Huawei was careful to indicate that it took compliance with foreign regulations seriously. In both its 2020 and 2021 annual reports, Huawei emphasised that it was implementing internal organisational measures to ensure compliance with export controls[202].

Beyond public announcements, Huawei was trying to become the centre of China's efforts to build alternative supply chains to those weaponised by the U.S. and others. Huawei made plans for a chip factory in Shanghai in cooperation with ICRD (上海集成电路研发中心)[203]. Around the same time, Huawei's Hubble Technology (哈勃科技) made investments in an array of semiconductor-related firms along the supply chain[204].

Beyond Huawei, Chinese semiconductor capital equipment makers had a great interest in taking advantage of export control-induced supply chain anxieties by advocating domestication of the

[201] "Huawei 2019 annual report press conference Q&A, " Huawei, n.d., https://www.huawei.com/jp/facts/voices-of-huawei/huawei-2019-annual-report-press-conference-q-a?utm

[202] See Huawei 2021 Annual Report, https://www.annualreports.com/HostedData/AnnualReportArchive/h/huawei_2021.pdf?utm, and Huawei 2020 Annual Report https://www.annualreports.com/HostedData/AnnualReportArchive/h/huawei_2020.pdf?utm

[203] "Huawei develops plan for chip plant to help beat US sanctions," *Financial Times*, 31 October 2020, https://www.ft.com/content/84eb666e-0af3-48eb-8b60-3f53b19435cb?utm

[204] "What has Huawei invested in its dedicated supply chain platform over the past year in response to US sanctions? (美国制裁下华为专设平台投资供应链 一年多来都投了什么)," *Caixin*, 24 September 2020, https://m.caixin.com/m/2020-09-24/101609332.html

semiconductor capital equipment supply chain. The three most critical steps in the fabrication of chips are lithography, etching and deposition[205]. Several Chinese companies have become significant suppliers in etching and deposition including NAURA (北方华创), Advanced Micro-Fabrication Equipment Corporation (AMEC) (中微半导体设备) and ACMR (盛美半导体).

As with Huawei, these companies were active in taking advantage of government policies encouraging the very lines of business these firms were in, but there is not much evidence that the firms changed the direction of government policy. With the American decision to weaponise the supply chain for semiconductor equipment, the Chinese response was relatively immediate and rational. The Chinese government added more policies to try to accelerate domestic production of such capital equipment with relatively more funding for this industry segment in the second tranche of the Big Fund (the central government's investment fund for semiconductors) in July 2019[206], and with new tax incentives for this industry segment in the August 2020 State Circular 8[207]. NAURA's chairman, Zhao Jinrong, in an interview in 2020 acknowledged that domestication of the supply chain was a trend and one his firm was determined to take advantage of. He did not give the impression that the government policies behind this trend were due to bottom-up advocacy from his firm or others[208]. AMEC's IPO document indicated similar dependency on the state's policies by noting that the firm benefitted from various beneficial government policies, and that there was some policy risk for the company if such policies were to end[209].

After more than a year and a half in office, the Biden administration finally announced its new export control strategy in October 2022. The twin goals of this new policy were to target the fabrication equipment going into advanced fabrication (as the Department of Commerce defined it) and advanced computing. While there are no American providers of lithography equipment, the largest lithography supplier, the Netherlands' ASML, had equipment with high levels of

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[205] Douglas B. Fuller, 2021. "China's counter-strategy to American export controls in integrated circuits," *China Leadership Monitor*, no. 67.

[206] "The Big Fund second tranche holds promise to spur one trillion yuan into the industry (大基金二期有望带动万亿元资金进场)," *First Financial Daily* (第一财经日报), 23 March 2020, https://m.yicai.com/news/100560040.html

[207] Fuller, 2021. "China's counter-strategy."

[208] "Chairman of Naura Technology Group: "New infrastructure" brings new opportunities to semiconductor equipment (北方华创董事长："新基建"为半导体设备带来新机遇)," 22 April 2020, https://www.10100.com/article/7844768?utm

[209] "Initial public offering and listing announcement of Advanced Micro-Fabrication Equipment (Shanghai) Co., Ltd. on the Science and Technology Innovation Board (中微半导体设备（上海）股份有限公司首次公开发行股票科创板上市公告书)," *Shanghai Security News* (上海证券报), 19 July 2019.

embedded American technology and would be potentially subjected to American controls. Beyond that, the American government targeted etching, deposition and process control equipment from American companies, as American firms in specific types of equipment within each category had a near-monopoly position[210].

At first, the Chinese government and corporate reaction to the radically expanded American controls under Biden was dramatic. The government announced a U.S.$143 billion third tranche of the Big Fund to confront reliance on overseas semiconductor equipment[211]. Soon the government announced this new funding was being scaled back due to the costs of COVID in early 2023[212], but given the emphasis on making Chinese policy even more opaque to prying foreign eyes, this reduction may just have been a feint. Luo Junwei and Li Shushen of the Chinese Academy of Sciences' Semiconductor Research Institute gloomily talked of China's semiconductor industry entering a "dark forest" (heian senlin/黑暗森林) in the wake of the American controls while calling for a variety of basic research and industrial policy measures to address the semiconductor chokehold the U.S. had on China's technological development[213]. The third tranche of the Big Fund finally launched in 2024 after some delays in 2023[214]. This tranche has been quite large, 344 billion RMB[215], with the purpose of trying to create local alternatives to foreign equipment as well as to invest large amounts into fabrication itself.

The state's push to indigenise equipment has been partially successful as demonstrated by the increasing share of local equipment in non-critical and semi-critical equipment for mature fabrication facilities (fabs). In the following paragraphs we will go over the advances of China's domestic makers in the most critical equipment for fabrication: lithography, etch, deposition and process control.

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[210] Center for New American Security (CNAS). 2022. "A conversation with under Secretary of Commerce Alan F. Estevez," 27 October, https://www.cnas.org/publications/transcript/a-conversation-with-under-secretary-of-commerce-alan-f-estevez

[211] China readying $143 billion package for its chip firms inface of U.S. curbs," *Reuters*, 14 December 2022. https://www.reuters.com/technology/china-plans-over-143-bln-push-boost-domestic-chips-compete-with-us-sources-2022-12-13/

[212] "Unpredictable Xi spurs $100 billion rally with abrupt shifts," *Bloomberg News*, 10 January 2023, bloomberg.com/news/articles/2023-01-09/xi-spurs-100-billion-rally-with-abrupt-shifts-that-may-not-last

[213] Luo, Junwei and Li, Shushen, 2023 "Strengthen the building of semiconductor basic research capacity to light the beacon of semiconductor self-reliance and self-improvement (加强半导体基础能力建设 点亮半导体自立自强发展的灯塔), "*Bulletin of Chinese Academy of Sciences* (中国科学院院刊) 38, no.2:187-192.

[214] There were reports that local governments and others were reluctant to contribute, and also speculation that China was reluctant to pursue the third round amidst COVID. See, for example, "China's economic malaise hits efforts to raise $41bn chip fund," *Financial Times*, https://www.ft.com/content/521c8ac3-1933-4077-88b9-e9086a0196ca; and "China hits pause on giant chip spending aimed at rivaling US," SemiWiki, https://semiwiki.com/forum/threads/china-hits-pause-on-giant-chip-spending-aimed-at-rivaling-us.17279/

[215] "China raises $47bn for chip industry in drive for self-sufficiency," *Financial Times*, https://www.ft.com/content/175a36b0-c928-4285-bbc1-41b6026e4f92

China's SMEE has frequently been in the news over the last several years with reports promising a major breakthrough in lithography[216]. Nothing has ever come of these reports in terms of equipment in mass production fabs. Instead, SMEE has created demonstration equipment in its laboratory. What is most interesting from a corporate lobbying point of view is that SMEE itself tends to keep a very low profile, whereas the news coverage heralding a new breakthrough tends to come from government officials.

Etching equipment is dominated by Lam Research followed by Tokyo Electron and Applied Materials, and technology trends are playing into their dominance. As the technology frontier for fabrication nodes has advanced[217], the market for etching technology has doubled. The Chinese firms tend to do better at trailing or even just mature (e.g., 28 nm) nodes where etching equipment is used less frequently and there is lower demand. NAURA and AMEC both have entered this market. AMEC offers conductor and dielectric etching equipment at 28 nm for noncritical and semi-critical processes and non-critical equipment at 5 nm. NAURA only offers noncritical and semi-critical equipment at 28 nm for conductor etching. Local firms have solidified their dominance in more mature nodes. In deposition, there are at least five Chinese producers reportedly undertaking mass production of equipment: Piotech, NAURA, AMEC, ACM Research (ACMR) and Wanye. NAURA and Piotech are the main vendors by market share.

There have been marketing presentations from Chinese firms claiming more progress, perhaps with a view to garnering more support from the state. A marketing presentation from AMEC in September 2023 claimed that after verification of its etching equipment, this equipment would be able to provide 90% of the etching equipment needed for Yangtze Memory Technologies (YMTC), a leading Chinese semiconductor manufacturer, and would soon be able to provide all of the inductive coupling plasma ion etching for Changxin Memory Tech (CXMT)[218].

[216] For example, in 2021 reports claimed SMEE could produce lithography equipment for 28 nm processes (https://www.verdict.co.uk/chips-china-us-semiconductors/) but this equipment never saw the light of day in the open market. Recent reports claimed that SMEE could produce lithography equipment able to manufacture 90 nm chips (Eduardo Jaramillo, "China's Semiconductor Industry Can't Quit German Optics," The China Project, 1 May 2023) but there isn't any evidence that they can do even that at mass manufacturing level.

[217] NAND stands for "not-and" for the Boolean operator that defines the logic gates of this non-volatile memory that stores data even when it is turned off.

[218] The names of these two companies are not named but YMTC was the only domestic NAND producer and CXMT the only domestic DRAM producer in production at that time and these products were identified as going to NAND and DRAM producers, respectively, in the promotional material.

The major proactive corporate player in dealing with American export controls has been Huawei. It has connections to and perhaps even equity stakes in three new fabrication companies, Swaysure, Pengxinxu and Pengxinwei, and connections to a fourth, SiEn. Moreover, Huawei has engaged with all the major Chinese capital equipment makers involved with these new chipmaking companies[219].

At the same time, it is still unclear how effective this Chinese response will be in building an independent supply chain for chipmaking. The first two rounds of restrictions aimed at the broader Chinese semiconductor industry in 2022 and 2023 included both lax enforcement and many loopholes. Huawei's "breakthrough" with the Mate 60 with its 7-nm chip produced at SMIC was built with an array of American equipment. While the Mate 60 came out before the October 2023 revisions to American export control laws, American regulators still viewed the existing loopholes and lenient licensing as significant concerns.

Thus, the U.S. government was still unsatisfied with the controls on several grounds. The controls on chips for AI still had major loopholes beyond smuggling as Chinese firms could access offshore AI chips via the cloud. Moreover, AI chips were still available via smuggling because sales were only restricted to a small number of countries. The technologies for High-Bandwidth Memory (HBM) crucial for advanced memory chips, which in turn were crucial for AI computing, were not yet restricted. Moreover, the revised DRAM rules actually lowered rather than raised the bar of the technical metrics for DRAM exports, making these export rules less restrictive. Actual implementation of licensing still provided licenses to many companies of dubious background. For example, the U.S. was still granting licenses to the Chinese chipmaker, Swaysure, even though this firm was rumoured to have strong links to Huawei, the original target of many of the American chip controls. Finally, the U.S. had allowed license exemptions for American semiconductor capital equipment vendors producing offshore, mainly in Southeast Asia. This rule simply encouraged more production to move offshore.

With limited further buy-in from its partners, the Biden administration embarked on a new round of revisions starting in December 2024, as its time in power was running out. First, the U.S. expanded the China-wide bans on DRAM, HBM and advanced packaging-related equipment. Second, the U.S. addressed the issue of using older equipment to do multi-patterning to fabricate

[219] "Inside Huawei's mission to boost China's tech prowess," *Nikkei Asia*, 18 December 2024, https://asia.nikkei.com/business/technology/tech-asia/inside-huawei-s-mission-to-boost-china-s-tech-prowess

advanced logic chips by placing node agnostic bans on certain types of equipment necessary for multi-patterning, such as ion implantation tools. Third and most importantly, new Foreign Direct Product Rules were introduced for semiconductor capital equipment that leveraged the American inputs into the capital equipment of American firms and other producers to extend the long arm of American law. Equipment made in the Netherlands and Japan was given a full license exemption. Equipment made in other allied nations including most of the EU, Australia and the UK was given a partial exemption[220]. This new FDPR addressed the issue of American offshoring equipment production to Southeast Asia to escape licensing, while levelling the playing field with Dutch and Japanese competitors, who were similarly restricted from offshoring under the FDPR. Notably absent were Korea and Taiwan—the former has some semiconductor capital equipment production capability, and Chinese capital equipment makers are actively recruiting talent in the latter[221]. We should expect that Huawei and China's semiconductor equipment makers will continue to participate in China's state efforts to break these American imposed chokeholds on China's semiconductor industry.

Unfortunately, decoupling may engender more coalitions in favour of decoupling in China even with the weakness of Chinese businesses as a collective actor in policymaking. The recent rare earth elements restrictions suggest that aside from the rare earth processers themselves, which will suffer from these restrictions, many Chinese high-technology firms may view such export controls as very helpful for their business. NAURA, for example, is situated to benefit greatly from these restrictions by leveraging cheaper rare earth inputs than its foreign rivals[222]. With such incentive structures, it may be unlikely that foreign countries can cultivate Chinese high-technology corporations as allies to restore freer trade.

4. Conclusion and recommendations

For both China's export controls and China's countermeasures to foreign export controls, the role of firms as major drivers and shapers of policy appears to be quite limited. Therefore, there are

[220] Gregory C. Allen, *Understanding the Biden Administration's Updated Export Controls* (Washington DC: Center for Strategic and International Studies, 2024), https://www.csis.org/analysis/understanding-biden-administrations-updated-export-controls

[221] Interview with Taiwanese technology policy official about how Chinese semiconductor equipment makers are trying to recruit Taiwanese personnel (7 October 2024).

[222] " China's recent implementation of export controls on rare earth items and related technologies... (中国近期对稀土物项和相关技术实施出口管制政策.....)," *Eastmoney*, 10 October 2025, https://caifuhao.eastmoney.com/news/20251010053903348767280?utm

three recommendations for the Dutch government in trying to engage with Chinese corporations as part of its diplomacy towards China.

First, priority should be placed on engaging directly with the Chinese government with the aim to address some of the issues under dispute, given the weak political role of China's corporate sector.

Second, the Dutch government should leverage the strengths of Dutch civil society, particularly its corporate sector, to pursue Dutch interests in China. This leveraging will require some coordination in messaging between the Dutch state and its major corporate actors. For example, ASML's continued activities and sales in China and messaging about its commitment to the Chinese market can at least partially assuage China's understandable concern about being cut-off from high quality lithography equipment and could slow any corresponding moves by China that would be inimical to Dutch commercial interests. Such messaging would be most effective if supported and echoed by the Dutch government.

Third, Dutch policy should try to weaken any nascent or existing domestic Chinese coalitions aimed at closing off China by creating new and highlighting existing economic opportunities with the Netherlands and wider Europe. As an illustration, to the extent that Chinese semiconductor capital equipment makers begin to see export bans on rare earths as beneficial to their competitiveness, the Dutch government should try to emphasise the wider economic opportunities of continued trade for members of a nascent counter coalition for openness. These members would include rare earths processors, other export-dependent Chinese industries of which there are many, and—most importantly— the national and local government officials in China who are invested in the well-being of these adversely affected industries.

Chapter 7. Outbound Technology Transfer Between Security and Economic Interests in the Context of Export Controls

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1. Introduction

Since the launch of China's reform and opening-up policy, state-owned and private enterprises have become increasingly active in exporting goods and making direct investments abroad to expand market reach and increase profits. As these outward-facing activities have grown, China has sought to strengthen its position within global supply chains and reduce its technological dependence on Western countries. Through national initiatives such as Made in China 2025 and extensive state-led investment, China has rapidly enhanced its technological capabilities, particularly in information and communication technologies (ICT). Consequently, China has shifted from being primarily a recipient of foreign technologies to becoming an influential exporter of technological innovation. These outward transfers allow Chinese technology companies to enter emerging markets, access new consumer bases, and advance the internationalisation of their platforms, products and digital services. At the same time, however, the introduction of the Export Control Law (2020) and subsequent regulations targeting sensitive sectors such as artificial intelligence (AI), semiconductors and advanced telecommunications – framed predominantly in terms of national security – have intensified tensions between safeguarding security interests and promoting economic growth.

Against this backdrop, this chapter examines how China regulates outbound technology transfers, with particular attention for recent developments in its export control regime. Specifically, it analyses the ways in which China attempts to balance the protection of national security – primarily through the implementation of export controls – with the economic benefits derived from outward-facing technological activities. By focusing on China's outbound technology transfers, especially those directed towards countries in the Global South, the chapter argues that the Chinese government has become increasingly aware of the national security implications of these activities. This growing awareness is reflected in a clearer and more proactive regulatory approach, indicating that further development and expansion of China's export control regime is highly likely.

The chapter aims to make two main contributions. First, while academic and policy debates have largely concentrated on the risks, challenges and geopolitical implications of technology transfer into China, far less attention has been paid to China's governance of technology flowing outwards. This analysis therefore considers how China is managing the tensions between the strategic opportunities created by outbound transfers and the security risks these transfers pose. Second, drawing in particular on Chinese-language literature and research, the study examines the relative importance of economic interests and national security in the formulation of China's export control regime from China's own perspective.

The remainder of this chapter is organised as follows. It begins with a brief overview of China's outbound technology transfers. The next section examines the two central considerations shaping the formulation of China's export control regime in the context of ongoing outbound technology transfer activities: the economic interests derived from such transfers and the national security concerns they generate. The discussion provides a detailed analysis of how China understands and manages this tension. The report concludes by summarising the key findings.

2. Background: China's increasing outbound technology transfers

With China's reform and opening-up policy, state-owned and private enterprises have become increasingly active in exporting goods and engaging in outbound technology transfers to expand their market presence. These technology transfer activities generally take two main forms. The first form takes place through the export and development of physical infrastructure and digital platforms. Specifically, Chinese technology companies – such as Huawei and ZTE – have built telecommunications networks and digital infrastructure in the Global South regions, particularly in Southeast Asia and Africa. In Africa, for instance, Huawei has played a pivotal role in supporting 4G network development and is collaborating with the African Union on the continent's Digital Transformation Strategy under Agenda 2063[223]. Another prominent case is the 2Africa project, a 37,000-kilometre subsea cable capable of 180 terabits per second, jointly developed by China Mobile International in partnership with global actors such as Facebook, Orange, and the West

[223] Daouda Cissé, *Partnership for the Development of Africa's Telecommunications Sector Under Agenda 2063: African and Chinese Telecommunications Companies in Africa*, in Bhaso Ndzendze and David Monyae ed. (Springer Cham, 2023), 73–97, https://doi.org/10.1007/978-3-031-38395-3_5

Indian Ocean Cable Company[224]. E-commerce platforms are also expanding through international partnerships; for instance, Alibaba has expanded its digital infrastructure and e-commerce ecosystem through Lazada, its flagship platform in Southeast Asia[225]. By investing in cloud computing, digital payment systems and logistics networks, Alibaba has transformed Lazada into an e-commerce hub and a vehicle for technology transfer, providing local entrepreneurs and small businesses with access to advanced digital tools, data analytics and online retail technologies[226]. In addition, Chinese technology companies such as China Unicom have been collaboratively developing terrestrial and submarine cable networks with local partners in Southeast Asia; for example, China Unicom initiated the SEA-H2X Submarine Cable project, which was launched in May 2022, and also invested in the Asia Direct Cable, the construction of which began in 2020[227].

A second and increasingly important form of technology transfer concerns the outbound flow of data, particularly data that embody or support technological capabilities. In the digital economy, data itself – including user data, industrial data and algorithmic models derived from such datasets – has become a form of intangible technology. Data constitutes the common denominator of all ICT[228]. The cross-border movement of such data, often facilitated through cloud computing and digital platforms, therefore constitutes a subtle yet consequential channel of outward technology diffusion. In this context, Chinese technology companies have established data centres across Southeast Asia and Africa, enabling the storage, processing, and transfer of data beyond China's borders. In Southeast Asia, Chinese firms have built at least 43 data centres, with major players such as Huawei, ZTE, and Alibaba Cloud leading this wave of investment[229]. Alibaba Cloud opened its first overseas data centre in Singapore in 2015, followed by additional facilities in Malaysia (2017) and Indonesia (2018), positioning itself as a key regional provider of cloud computing services[230]. A similar pattern can be observed in Africa, where Huawei Cloud has played a central role in developing the continent's digital infrastructure. The company

[224] Ovigwe Eguegu, "The Digital Silk Road: Connecting Africa with new norms of digital development," *Asia Policy* 17, no. 3 (2022): 30–39, https://doi.org/10.1353/asp.2022.0049

[225] Lulu Yilun Chen and Selina Wang, "Alibaba expands in Southeast Asia with $1 billion Lazada deal," *Bloomberg.Com*, 12 April 2016, https://www.bloomberg.com/news/articles/2016-04-12/alibaba-to-pay-1-billion-for-control-of-lazada-e-commerce-site

[226] "Southeast asia's e-commerce giant lazada to cultivate 8 mln e-commerce entrepreneurs, SMEs by 2030," *Xinhua,* 5 November 2018, http://www.xinhuanet.com/english/2018-11/05/c_137583401.htm

[227] Wang Zheng, *China's Digital Silk Road (DSR) in Southeast Asia: Progress and Challenges* (ISEAS-Yusof Ishak Institute, 2024), https://www.iseas.edu.sg/wp-content/uploads/2024/01/ISEAS_Perspective_2024_1.pdf

[228] Matthew S Erie and Thomas Streinz, "The Beijing effect: China's "Digital Silk Road" as transnational data governance," *NYU Journal of International Law and Politics* 54, no. 1 (2021): 1–92.

[229] Zheng, *China's Digital Silk Road (DSR) in Southeast Asia: Progress and Challenges*.

[230] Sam Phillips, "Alibaba cloud expands AI footprint with data centres in Malaysia, Philippines," *South China Morning Post*, 2 July 2025, https://www.scmp.com/tech/big-tech/article/3316610/alibaba-cloud-expands-ai-footprint-asia-new-data-centres-malaysia-philippines

constructed the Diamniadio National Data Centre in Senegal, a key facility supporting the country's digital governance and e-government initiatives[231]. Moreover, with the involvement of Huawei and ZTE, several "smart city" initiatives have been launched across a number of African countries, including Botswana, Côte d'Ivoire, Ghana, Kenya, Mauritius, Morocco, South Africa, Uganda and Zambia. These projects integrate digital technologies such as AI, big data, and the Internet of Things (IoT) to enhance urban management, improve service delivery, and promote more efficient governance[232]. For example, in 2019 Huawei secured a U.S.$172.5 million contract to support the development of the Konza Technopolis Data Centre and Smart Cities project in Kenya[233]. These developments not only support the operation of digital platforms and services but also contribute to the expansion of China's influence within global data networks.

3. Economic interests versus national security

These outbound technology transfer activities yield economic benefits for both Chinese firms and the state. Specifically, such activities play a vital role in alleviating China's longstanding problem of industrial overcapacity by creating external markets for surplus technological and industrial output[234]. By channelling excess production abroad, China not only sustains the profitability of key sectors but also reduces the domestic economic pressures associated with oversupply. In addition, as noted by Chinese-language sources, the revenue, technological feedback and operational experience gained from exporting advanced technologies create strong incentives for domestic firms to pursue continuous innovation[235]. Participation in international markets enables

[231] Société Senegal Numerique, "The Diamniadio datacenter, the driving force behind Senegal's digital transformation," 22 June 2021, https://senegalnumeriquesa.sn/en/actualites/le-datacenter-de-diamniadio-lieu-d%E2%80%99impulsion-de-la-transformation-digitale-du-s%C3%A9n%C3%A9gal

[232] Henry Tugendhat and Julia Voo, *China's Digital Silk Road in Africa and the Future of Internet Governance*, China Africa Research Initiative (CARI) (Johns Hopkins University, 2021), http://www.sais-cari.org/publications-working-papers

[233] Paul Triolo, 'The Digital Silk Road and the evolving role of Chinese technology companies', *Adelphi Series* 60, nos 487–489 (2020): 65–88, https://doi.org/10.1080/19445571.2020.2151126

[234] Hong Shen, 'Building a Digital Silk Road? Situating the Internet in China's Belt and Road initiative', *International Journal of Communication* 12 (2018): 2683–701; Clayton Cheney, *China's Digital Silk Road: Strategic Technological Competition and Exporting Political Illiberalism*, no. 19 (Pacific Forum, 2019), https://pacforum.org/wp-content/uploads/2019/08/issuesinsights_Vol19-WP8FINAL.pdf

[235] Minghao Ye, "Upgrading from the 'world's factory' to a 'global supply-chain hub': insights into new trends in the development of China's supply chains (从"世界工厂"向"全球供应链枢纽"升级——透视我国供应链发展新趋势)," Xinhua, 10 September 2025, http://www.news.cn/fortune/20250910/6b9c7222a9a740bc9e5908b8d100b3a9/c.html; Bing Sun, "China's innovation expands overseas (中国创新大出海)," people.cn, 30 July 2025, https://paper.people.com.cn/zgjjzk/pc/content/202507/30/content_30093296.html; "A surge of innovation, multidimensional advancement: a data-driven view of the '14th Five-Year Plan' transformation of listed companies (创新潮涌 多维进阶 数观上市公司"十四五"蝶变)," *Xinhua*, 17 October 2025, http://www.news.cn/20251017/73cfbe633eaf45aeb63c7d2888b371b0/c.html

firms to refine their capabilities, improve product quality, and adapt to and shape global standards, all of which facilitate their ascent into higher value-added segments of global production[236]. This dynamic aligns closely with the government's broader objectives under Made in China 2025, which aims to enhance China's position within global value chains by cultivating competitive, innovation-driven industries[237].

At the same time, because export control policies determine which technologies may cross national borders, the Chinese government faces the ongoing challenge of balancing the economic opportunities created by such transfers with the security risks they may entail. Limiting the export of certain technologies can constrain the commercial interests of Chinese firms and potentially reduce state revenue, while continued technological engagement can also contribute to industrial upgrading and international influence, which may in turn support broader security objectives. Under Xi Jinping, national security has become a more prominent consideration in national policymaking than under previous administrations. This shift is reflected in Xi's articulation of a "holistic national security" (总体国家安全观), first introduced in 2014, which encompasses sixteen categories of security ranging from traditional domains such as military and territorial security to newer areas including technological, cyber, ecological and biosecurity[238]. The breadth of this framework, together with the expanding tendency to frame diverse policy issues in security terms, indicates the leadership's strong emphasis on national security[239]. Moreover, within this framework, regime security is placed at the apex of national security concerns[240]. Therefore, the technological transfers subject to restriction extend not only to physical technologies but, more importantly, to data and information that could potentially undermine the authority or stability of the party-state.

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[236] Di Zhou, "China's foreign trade sends new 'signals' as upgrading in home appliances, automobiles and other industries optimises the export structure (中国外贸释放新"信号"，家电、汽车等产业升级带动出口结构优化)," *21st Century Business Herald* (21世纪经济报道), https://m.21jingji.com/article/20250122/herald/5a3822b2982ea45a908afd90b4c282f4.html; Jiang Liqin, *White Paper on the Overseas Expansion of China's Manufacturing Enterprises: Riding the Waves Ahead as Chinese Manufacturers Accelerate High-Quality Global Development (中国制造业企业出海白皮书：踏浪前行，中国制造业企业加速高质量"全球化"发展)* (KPMG Global China Practice, 2024), https://assets.kpmg.com/content/dam/kpmg/cn/pdf/zh/2024/04/chinese-manufacturing-enterprises-globalization-white-paper.pdf

[237] "Export figures beat expectations, showcasing the strength of "Made in China" (出口数据"超预期"，"中国制造"彰显竞争力)," *People's Daily*, 26 May 2025, https://paper.people.com.cn/rmrbhwb/pc/content/202505/26/content_30075206.html

[238] 'A holistic view of national security', *Qiushi*, 2020, http://en.qstheory.cn/HolisticApproachtoNationalSecurity.html

[239] Katja Drinhausen and Helena Legarda, '"Comprehensive national security' unleashed: How Xi's approach shapes china's policies at home and abroad," 2022, https://merics.org/en/report/comprehensive-national-security-unleashed-how-xis-approach-shapes-chinas-policies-home-and

[240] Shengli Ling and Fan Yang, "The evolution of China's national security concept over the past 70 years (新中国70 年国家安全观的演变: 认知, 内涵与应对)," *Journal of International Security Studies(国际安全研究)* 6 (2019): 3–29.

This heightened salience of national security considerations is evident in the case of Didi, China's leading ride-hailing firm. To be specific, although Didi had long collected extensive personal data including personal information and location records for commercial and AI-training purposes, the Cyberspace Administration of China (CAC) imposed severe penalties only after the company listed on the New York Stock Exchange – a decision that involved the transfer of user data beyond China's borders[241]. At this point, Didi's data practices were viewed as intersecting with national security risks. The timing indicates that concerns over cross-border data flows and their potential national security implications prompted the state to intervene decisively[242]. This case demonstrates the increasingly important role of national security considerations and shows that such concerns can, at times, override firms' commercial interests, reflecting the fact that the state and businesses do not necessarily share the same priorities.

More broadly, national security considerations underpin China's formulation and implementation of its export control regime. According to the joint press briefing by the Ministry of Justice and the Ministry of Commerce on the Regulations on the Export Control of Dual-Use Items, the legislation is explicitly rooted in China's overarching doctrine of "holistic national security"[243]. In this sense, export controls are now designed not only to regulate commercial activity but also to safeguard strategic technologies and to strengthen China's security interests in a rapidly changing technological environment. Official Chinese media similarly tends to frame the creation of an export control regime as a crucial step in "upholding the holistic national security approach and protecting national security and interests"[244]. This emphasis is also evident in the revisions made to the wording of the Export Control Law. In the first draft released in December 2019, the stated purpose was "to fulfil international obligations such as non-proliferation, safeguard national security and interests, and strengthen export control". In both the second draft and the final adopted version, the order was reversed so that "safeguard national security and interests" precedes "fulfil international obligations such as non-proliferation", and

[241] Julie Zhu et al., "China fines DiDi $1.2 bln but outlook clouded by app relaunch uncertainty," *Reuters*, 21 July 2022, https://www.reuters.com/technology/china-fines-didi-global-12-bln-violating-data-security-laws-2022-07-21/

[242] Ruoxi Wang et al., "Justifying a privacy guardian in discourse and behaviour: The People's Republic of China's strategic framing in data governance," *The International Spectator* 59, no. 2 (2024): 58–76, https://doi.org/10.1080/03932729.2024.2315064

[243] Chinese Ministry of Justice, "Officials from the Ministry of Justice and the Ministry of Commerce Answer Reporters' Questions on the Regulation of the People's Republic of China on the Export Control of Dual-Use Items (司法部、商务部负责人就《中华人民共和国两用物项出口管制条例》答记者问), https://www.moj.gov.cn/pub/sfbgw/zwxxgk/fdzdgknr/fdzdgknrjdhy/202410/t20241019_508024.html

[244] "From 1 August, China will impose export controls on gallium, germanium and related items — a necessary measure to safeguard national security (8月1日起，中国对镓、锗相关物项实施出口管制—— 维护国家安全的必要之举)," *People's Daily*, 12 July 2023, https://paper.people.com.cn/rmrbhwb/html/2023-07/12/content_26005314.htm; "Focusing on the Export Control Law: Implementing the holistic approach to national security (聚焦出口管制法：贯彻总体国家安全观)," *Xinhua*, 17 October 2020, http://www.xinhuanet.com/politics/2020-10/17/c_1126624428.htm

this ordering is consistently maintained in Articles 2, 9, 10 and others[245]. These changes underscore the centrality of national security considerations to the law's core purpose.

When examining China's introduction of its export control regime, Chinese analyses by academics and law firms emphasise that allowing advanced technologies to spread or be misused without proper controls (a concern described in Chinese discourse as "技术外流") carries significant risks, including the loss of proprietary knowledge and potential threats to national security[246]. Such concerns are increasingly framed under the rubric of "technological security", a concept that highlights the strategic importance of safeguarding critical technologies from external exploitation[247]. As Chinese firms deepen their global footprint by providing telecommunications equipment, AI systems and other digital technologies, their international activities involve not only the export of physical products but also the transfer of embedded technical expertise and operational know-how. This knowledge transfer can occur through system deployment, maintenance and collaborative projects, but in some cases, it can be mandated by foreign governments or corporate clients. For instance, the EU has considered mechanisms that would require Chinese investors or technology providers to disclose certain technologies or operational know-how as a condition for securing investment approval[248].

According to several Chinese analyses, such dynamics heighten the likelihood that recipient states or firms may seek to reverse-engineer, replicate, or modify Chinese technologies for their own developmental or commercial gain – or, in more troubling instances, for strategic or military purposes that run counter to Beijing's national interests, as illustrated by concerns surrounding

[245] Haichuan Wang, "Interpreting the Export Control Law from the perspective of national security and interests (从国家安全和利益角度解读《出口管制法》)," Debund Law Office, 10 November 2020, http://www.debund.com/article?id=1645

[246] "China's export control system in 2025: A comprehensive upgrade from strategic items to technology and data (2025年中国出口管制体系全面升级：从战略物项到技术与数据的多维管控)," Sohu, 11 October 2025, https://www.sohu.com/a/943046023_121123759; Xing Sun and Yunfeng Jing, "Trade security and export controls: confronting new national security challenges in a changing global trade landscape (贸易安全和出口管制——迎接全球贸易新格局下的国家安全新挑战)," Lexology, 28 March 2024, https://www.lexology.com/library/detail.aspx?g=6bb34e3c-7753-4e86-af4c-16f18e4f3f87; Jiaolong Zhang, "Accelerate the establishment of a national science and technology security governance system (加快构建国家科技安全治理体系)," China Institute of International Studies (中国国际问题研究院), 6 June 2024, https://www.ciis.org.cn/yjcg/sspl/202406/t20240606_9278.html

[247] "Zhang, "Accelerate the establishment of a national science and technology security governance system (加快构建国家科技安全治理体系)."

[248] "EU considers forced tech transfers for new Chinese investments," *Bloomberg*, 14 October 2025, https://www.bloomberg.com/news/articles/2025-10-14/eu-considers-forced-tech-transfers-for-new-chinese-investments

electric vehicles (EVs) and rare earths[249]. This risk is particularly pronounced when the recipient countries are developing economies where intellectual property protection mechanisms are weak or unevenly enforced, making unauthorised appropriation or diversion of technology more likely[250]. These concerns become even more acute with respect to dual-use technologies, which have both civilian and military applications[251]. Some Chinese discussions raise the possibility that such technologies could be adapted for military ends in ways that diverge from, or even undermine, China's security interests[252]. These analyses suggest that the introduction of export controls on dual-use technologies is intended to mitigate these vulnerabilities by preventing their uncontrolled external transfer[253].

The domestic debate also points out that outbound data transfers from Chinese-operated digital networks create the added risk of an inadvertent disclosure of sensitive technological or commercial information[254]. Beyond the potential economic implications, such exposures can carry national security consequences for China itself[255]. Data moving across borders may be intercepted and analysed by foreign intelligence services, thereby offering insights into strategic

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[249] Li Xin, "As it "sells its know-how" to enter the U.S. market, will CATL face the risk of technology leakage? ("卖知识"进军美国，宁德时代会不会技术外流?]," Sina, 14 February 2023, https://finance.sina.cn/tech/csj/2023-02-15/detail-imyfsncq9259674.d.html; "Ministry of State Security: Foreign espionage and intelligence agencies have long kept China's rare-earth industry under close watch (国家安全部：境外间谍情报机关长期紧盯我稀土行业)," *People's Daily*, 30 May 2024, https://www.peopleapp.com/column/30045098371-500005445807; "Beware the risk of technology leakage: how China seeks to preserve its technological and military edge (警惕技术外流风险！中国如何守住科技军事领先优势)," Toutiao, 2 July 2025, https://www.toutiao.com/article/7522400476038496794/?wid=1765307752645

[250] Directorate-General for Trade and Economic Security, "Commission releases its report on intellectual property rights in third countries - trade and economic security," 17 May 2023, https://policy.trade.ec.europa.eu/news/commission-releases-its-report-intellectual-property-rights-third-countries-2023-05-17_en; Xiangling Chen, "Legal governance of the risks of external transfer of intellectual property rights of key core technologies (关键核心技术知识产权对外转移风险的法律治理)" (Xiangtan University, 2024), https://www.cnki.net/KCMS/detail/detail.aspx?dbcode=CDFD&dbname=CDFDLAST2025&filename=1025466831.nh&uniplatform=OVERSEA&v=Mrm5jCw1RH5uZ3cNja0lcC-vcMg0uiLTD0zxs1DjgHkjoV2FmU3xQZb9Qlra1H4F

[251] Andrea Frosinini, "Navigating the complexities of exporting dual-use items: a strategic perspective," *Medium*, 12 March 2025, https://medium.com/@tradefin101/navigating-the-complexities-of-exporting-dual-use-items-a-strategic-perspective-d5773fb85712

[252] People's Daily, "From 1 August, China will impose export controls on gallium, germanium and related items — a necessary measure to safeguard national security (8月1日起，中国对镓、锗相关物项实施出口管制—— 维护国家安全的必要之举);" People's Daily, "Ministry of State Security: Foreign espionage and intelligence agencies have long kept China's rare-earth industry under close watch (国家安全部：境外间谍情报机关长期紧盯我稀土行业);" Toutiao, "Beware the risk of technology leakage: how China seeks to preserve its technological and military edge (警惕技术外流风险！中国如何守住科技军事领先优势)."

[253] For instance, Zhang, "Accelerate the establishment of a national science and technology security governance system (加快构建国家科技安全治理体系)."

[254] Yanqing Hong, "Rebalancing China's data exit security governance: A perspective based on inter-state data competition strategies (中国数据出境安全管理制度的"再平衡"——基于国家间数据竞争战略的视角)," China Law Review (中国法律评论), 24 December 2024, https://fzzfyjy.cupl.edu.cn/info/1035/16823.htm

[255] Zheng Liang, "An exploration of information security issues in cross-border data flows (跨境数据流动中的信息安全问题探究)," People's Forum (人民论坛), 1 September 2023, https://paper.people.com.cn/rmlt/html/2023-09/01/content_26018500.htm

industries or supply chains that Beijing considers critical to its long-term security and competitiveness[256]. These vulnerabilities could therefore weaken China's ability to safeguard what it classifies as "important data" under the Data Security Law (2021) and the Cybersecurity Law (2017), and more broadly erode its own conception of national security by exposing the state and its key sectors to external scrutiny or exploitation[257]. These Chinese-language sources collectively share the view that China's development of regulations governing data transfers – particularly those that restrict and supervise the outflow of important data – is timely and commendable, as such measures are seen as effective in mitigating these national security concerns.

Compared with the extensive debate on how technological and data transfers may threaten national security – and on how export controls and related regulatory tools might mitigate such risks – the potential economic costs associated with implementing these controls have received less attention in Chinese domestic discussions. Most analyses and official statements merely reiterate the need to "balance security and development," without examining in depth what such a balance might entail in practice or how firms may be affected by heightened regulatory constraints[258]. Chinese firms, for their part, rarely comment publicly on the export control regime and instead concentrate on how to comply with the new regulations set out in policy documents[259]. Furthermore, when discussing economic impacts, Chinese domestic analyses tend to emphasise the losses caused by export restrictions or technological blockades imposed on China by other countries, notably the US[260], while giving comparatively little attention to the economic burdens generated by China's own export control measures. Although tighter controls

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[256] Xiangling Wu and Shuzhong Ma, "Improving China's cross-border data security review system (完善我国跨境数据安全审查体系)," Chinese Social Sciences Net (中国社会科学网), 26 December 2024, https://cssn.cn/skgz/bwyc/202412/t20241226_5827074.shtml

[257] Chuanxing Ye and Wenguang Yan, "A study of the current state, problems, and relief pathways of China's cross-border data regime (论中国数据跨境制度的现状、问题与纾困路径)," *Journal of Beihang University (Social Sciences Edition)* (北京航空航天大学学报社会科学版), http://lti.ruc.edu.cn/sy/xsgd/sjygrys_/7bf219fe4b2041fe94e6668d3356f769.htm

[258] Chinese Ministry of Justice, "Officials from the Ministry of Justice and the Ministry of Commerce answer reporters' questions on the regulation of the People's Republic of China on the export control of dual-use items (司法部、商务部负责人就《中华人民共和国两用物项出口管制条例》答记者问);" Sun and Jing, "Trade security and export controls: Confronting new national security challenges in a changing global trade landscape (贸易安全和出口管制——迎接全球贸易新格局下的国家安全新挑战)."

[259] Dongfeng Zhao et al., "The impact of China's export control laws on Chinese engineering enterprises' "going out" strategy and related precautions (我国出口管制法律对我国工程企业"走出去"的影响及其注意事项)," Chang-an Law Firm, 22 April 2024, http://www.changanlawfirm.com/case-detail/1441.html

[260] Cuihong Cai and Jiahui Yin, "US economic sanctions on China: Trends and impacts (美国对华经济制裁：趋势与影响)," *International Studies (国际问题研究)* 6 (2024): 32–52; Yan Wang and Jing Li, "The impact of the us export control list system on China and possible responses (美国出口管制清单制度对中国的影响及应对)," *Commentary on Trade and Economic Law (经贸法律评论)*5 (2022): 75–90.

may increase compliance costs for firms or constrain their access to overseas markets, such concerns have not featured prominently in mainstream policy analyses. Instead, public discussions generally frame China's export controls as necessary defensive responses to external pressure, particularly the U.S. export control regime[261], leaving limited space for a substantive assessment of their domestic economic implications.

4. Conclusion and policy implications

This chapter has argued that, despite official claims to balance development and security when formulating the export control regime, national security considerations in practice play an increasingly important role in shaping China's governance agenda under Xi Jinping's administration. Given this, the chapter suggests that further development and expansion of China's export control regime is highly likely. In practical terms, this is expected to include the introduction of more detailed regulatory instruments, the extension of controls to a broader range of strategic sectors, and the strengthening of enforcement mechanisms as the government seeks to align trade, technology and data flows more closely with its security priorities. This trajectory is already visible. China has not only formalised a comprehensive framework for overseeing outbound transfers of sensitive technologies[262], but has also tightened controls on cross-border data flows through the Measures for Security Assessment of Outbound Data Transfers and the accompanying Guide to the Application for Security Assessment of Outbound Data Transfers (First Edition)[263]. These measures establish a structured review process to evaluate, and where necessary to restrict, the export of data deemed to pose national security risks. Taken together, the data security assessment mechanism and the expanding export control system illustrate China's concerted efforts to ensure that outbound technological transfers – whether of goods, knowledge, or data – are managed in accordance with national security imperatives.

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[261] Sun and Jing, "Trade security and export controls: confronting new national security challenges in a changing global trade landscape (贸易安全和出口管制——迎接全球贸易新格局下的国家安全新挑战);" Wang, 'Interpreting the Export Control Law from the perspective of national security and interests (从国家安全和利益角度解读《出口管制法》);" Sohu, "China's export control system in 2025: A comprehensive upgrade from strategic items to technology and data (2025年中国出口管制体系全面升级：从战略物项到技术与数据的多维管控)."

[262] Giulia Interesse, "China new export control regulations: What businesses need to know?," *China Briefing News*, 18 November 2024, https://www.china-briefing.com/news/china-issues-new-export-control-regulations/

[263] Junchao Liu, "China's security assessment measures for outbound data transfers," *Journal of East Asia and International Law* 16 (2023): 267; Arendse Huld, "Cross-border data transfer - new measures for security review," *China Briefing News*, 17 April 2024, https://www.china-briefing.com/news/cross-border-data-transfer-new-measures-offer-clarification-on-security-review/

Chapter 8. China's Strategic Response to Foreign Export Restrictions

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1. Introduction: Framing China's strategic response

As China's comprehensive national strength grew, the United States gradually began reorienting its China strategy from engagement toward strategic competition during the Obama administration's second term. This shift became explicit under the Trump administration with the 2017 National Security Strategy, which labelled China a strategic competitor. The competitive dynamic further intensified under the Biden administration. Since then, the U.S. has escalated strategic competition with China through a whole-of-government approach, coordinating with allies to impose export restrictions on critical technologies—a calculated effort to constrain China's advancement in high-tech sectors[264].

As export controls imposed by major Western countries, led by the United States, continue to escalate, China views these controls as part of a broader national security framework. The framework integrates political, economic and technological development with supply chain security within the overarching concept of national security[265]. President Xi Jinping has particularly emphasised that 'to safeguard industrial and national security, it is essential to build independent, controllable, safe, and reliable industrial and supply chains'[266]. Article 3 of the Export Control Law of the People's Republic of China (ECL) explicitly states that 'export control efforts shall adhere to the overall national security outlook, safeguard international peace, coordinate security and development, and improve export control management and services.' Amid increasing external pressures and ongoing self-reforms, China's export control system has evolved into a comprehensive legal framework and administrative structure. The scope and

[264] Guozhu Liu, "The historical origins and contemporary manifestations of American technological nationalism," People's *Forum magazine*, 28 April 2023.

[265] On 15 April 2014, General Secretary Xi Jinping first articulated the major strategic vision of the Holistic National Security Concept. In an important speech, he elaborated in detail on its connotations and scope, distilling it into five essential elements and five key relationships. The Holistic National Security Concept encompasses eleven domains: political security, territorial security, military security, economic security, cultural security, social security, scientific and technological security, information security, ecological security, resource security, and nuclear security.

[266] Hutao Yang, "Why should safeguarding industrial security be given top priority?" *Economic Daily,* 4 July 2023, http://theory.people.com.cn/n1/2023/0704/c40531-40027183.html; Xinhua News Agency, "Communiqué of the Fifth Plenary Session of the 19th Central Committee of the Communist Party of China," 29 October 2020, Xinhuanet, http://www.xinhuanet.com/politics/2020-10/29/c_1126674147.htm

precision of the controls have continually improved, with export controls transitioning from a primarily defensive tool aimed at addressing external pressures to a comprehensive strategic instrument for national security and technological governance, incorporating both offensive and defensive capabilities. As a result, how China maintains its security and development interests under multiple pressures has become a critical issue worthy of further research. This study, through a comprehensive analysis of policy texts, academic literature and corporate behaviour, focuses on specific cases such as semiconductor and advanced chip manufacturing, as well as rare earths and critical minerals. The aim is to explore the evolution of China's policy language and the deployment of actual policy tools. The research will reveal how China integrates export controls into the broader strategic framework of its overall national security concept, as well as how it leverages its export control system to exert a profound influence on the global technology governance landscape, offering corresponding policy recommendations.

2. China's Responses to Foreign Export Restrictions: Case Studies

How China responds to external challenges such as export controls imposed by other countries is not only crucial to the survival and development of specific industries but also serves as an important lens for observing China's strategic choices amid shifts in the international power structure. This study selects two representative sectors through case studies: semiconductor and advanced chip manufacturing, and rare earths and critical minerals. In the semiconductor case, China had adopted a defensive posture, focusing on strategic technological self-reliance to overcome bottlenecks and ensure industrial security. Conversely, in the rare earths case, China has adopted an offensive posture, using its resource advantage to gain policy influence and discursive leverage in pursuit of strategic countermeasures and deterrence.

Semiconductors and advanced chip manufacturing: Strategic self-reliance amid external containment

Semiconductors are a foundational technology for future industries and a critical element of national military modernisation. Technologies such as quantum computing not only serve as the cornerstone of national modernisation and industrialisation but have also become strategic frontiers in superpower competition.

Since 2016, the U.S. Department of Commerce has placed Chinese companies, including ZTE, on the Entity List for violating export control regulations and imposing export restrictions on them.

The Chinese Ministry of Commerce has expressed the hope that the U.S. would handle the issue appropriately, considering the broader context of Sino-U.S. economic and trade relations, to avoid destabilising the healthy development of bilateral trade[267]. However, the U.S. restrictions on the export of components have caused a chain reaction affecting China's telecommunications equipment and even its entire system network. The Ministry of Commerce repeatedly emphasised that China would not exchange its core interests with the U.S., while central media frequently uses terms like 'chokepoints' (卡脖子ka bo zi), 'technology blockade' (技术封锁ji shu feng suo), and 'external suppression' (外部遏制wai bu e zhi), highlighting the passive situation arising from external technological dependence[268]. China has realised that achieving self-sufficiency in core technologies is crucial to becoming a world-leading technological power. It also sees this as key to fully harnessing innovation as a driving force for development.

In 2015, the State Council of China issued the Made in China 2025 initiative, which first emphasised the need to 'break through key areas such as integrated circuits and specialised equipment to achieve 'independence and controllability'[269]. Following the ZTE incident, the call for 'independence and controllability' (自主可控zi zhu ke kong) in critical technologies, such as semiconductors, has grown louder. President Xi Jinping has emphasised the need to accelerate the construction of a manufacturing powerhouse and to ensure the security of industrial and supply chains[270]. In 2019, China enacted the ECL and accelerated the construction of self-sufficient supply chains, reducing dependence on external technologies through policy and technological innovation.

By 2021, the U.S. had defined competition as the core paradigm of its strategy towards China, focusing on emerging technologies as the key element of this competition[271]. In the face of

[267] MOFCOM, "Ministry of Commerce holds a regular press conference," 9 March 2017, http://www.mofcom.gov.cn/xwfb/lxxwfbh/art/2017/art_c8122f70c75c476fabf30d2109977050.html

[268] MOFCOM, "White Paper on China's Position Regarding Certain Issues in China-U.S. Economic and Trade Relations," 9 April 2025, https://www.mofcom.gov.cn/syxwfb/art/2025/art_af2778220dfd4649b5729b2dc1bb69ac.html; MOFCOM, "MOFCOM Spokesperson's Response to U.S. Coercion via Tariffs Pressuring Other Countries to Restrict Economic and Trade Cooperation with China," 2025, https://www.mofcom.gov.cn/xwfb/xwfyrth/art/2025/art_3277f51446f143eda489a1bd5de6f72f.html

[269] State Council, "Made in China 2025 Outline," 19 May 2015, https://www.gov.cn/zhengce/content/2015-05/19/content_9784.htm

[270] State Council, "Report of the 19th National Congress of the Communist Party of China," 27 October 2017, https://www.gov.cn/zhuanti/2017-10/27/content_5234876.htm; People's Daily Online, "Master the key core technologies in our own hands," 25 June 2018, Peoples Network, http://opinion.people.com.cn/n1/2018/0625/c1003-30081365.html

[271] U.S.-China Economic and Security Review Commission, "U.S.-China competition in emerging technologies," November 2024, https://www.uscc.gov/sites/default/files/2024-11/Chapter_3--U.S.-China_Competition_in_Emerging_Technologies.pdf; U.S. Department of Defense, "2022 National Defense Strategy," 27 October 2022, https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.pdf

increasingly stringent technological blockades and strategic encirclements by the U.S., China further strengthened its discourse on 'independent and controllable', deepened its 'innovation-driven' (创新驱动chuang xin qu dong) and 'Strengthen and shore up industrial chain' (强链补链 qiang lian bu lian) strategies, and further detailed the 'strong chain and supplementary chain' strategy in the 14th Five-Year Plan for Information Technology[272]. China is focusing on key core technologies through mechanisms such as the unveiling of a list of potential projects and the appointment of the best candidate as project leader (揭榜挂帅 jie bang gua shuai), as well as the 'horse racing' mechanism (赛马 sai ma), which pits competing teams against each other to accelerate research and development. Both approaches are designed to drive technological reengineering and innovation[273].

As China's institutional design and strategic mechanisms continue to improve, starting in 2023 China has accelerated its 'strategic initiative' (战略主动zhan lue zhu dong) under its institutional discourse system. In 2024, the 20th Party Congress proposed the further establishment of a 'new nationwide system' (新型举国体制）through measures such as export controls[274], countermeasures, and the formulation of technical standards to build China's strategic initiative in global technological governance.

In summary, facing export control pressures in the semiconductor sector, China has gradually shifted from the 'strangling' crisis to 'self-sufficiency', further refining its response through 'innovation-driven', 'strong chain and supplementary chain', and 'strategic initiative' strategies. In this process, export controls have evolved from defensive measures to strategic tools that balance 'offence' and 'defence'. China has increased its investment in the semiconductor

[272] State Council, "China's Government Work Report," 13 March 2021, https://www.gov.cn/xinwen/2021-03/13/content_5592681.htm; State Council, "State Council Gazette No. 4, Serial No. 1687," 10 February 2020, https://www.gov.cn/gongbao/content/2020/content_5480486.htm

[273] The term 'Jie bang Guashuai' (揭榜挂帅) refers to a mechanism driven by demand and evaluated based on the ability to solve specific problems, whereby capable and responsible teams are entrusted with tackling key tasks in core technology development. 'Saima' (赛马) denotes a novel project organisation approach implemented within the exploration of the 'Jiebang Guashuai' mechanism, aiming to optimise the system for core technology research and development.

[274] The 'new nationwide system' is a framework that prioritises national development and security as its fundamental goals. It seeks to scientifically coordinate efforts, concentrate resources, optimise mechanisms and promote collaborative research, thereby centralising and efficiently allocating resources during the organisation and implementation of major national science and technology projects to maximise their effectiveness. People's Daily, "Xi Jinping's speech at the National Science and Technology Innovation Conference," 20 March 2020, *CPCnews*, http://theory.people.com.cn/GB/n1/2020/0320/c40531-31640512.html

industry and pushed for alignment with international technical standards to enhance its strategic initiative in global technological governance.

One of the most notable manifestations of the shift in the national discourse system is seen at the enterprise level. Enterprises, as key players at the intersection of technology and industry, are central to technological breakthroughs and the restructuring of supply chains. Under the guidance of national policy, they have continuously adjusted their export compliance strategies and expanded risk-mitigation market layouts to adapt to the profound changes in the international technological environment. Huawei serves as a representative case. Since 2019, when Huawei was placed on the Entity List, the company took short-term measures like large-scale stockpiling. With the shift in national policy and discourse, Huawei strengthened its internal design and hardware-software coordination, vertically integrating and coordinating with upstream and downstream parts of the industry to reduce dependence on external technologies, including in areas like photolithography and chip technology. By 2025, Huawei gradually phased out Qualcomm chips, shifting entirely to self-developed Kirin processors, and continued to explore 5nm-equivalent processes (N+3). In August, Huawei open-sourced CANN (Ascend chip AI ecosystem), benchmarking Nvidia's CUDA and supporting developers in optimising AI training and inference independently[275].

Rare earths and critical minerals: Reconfiguring resource power into policy leverage

Rare earth elements encompass 17 metals including lanthanum, cerium, neodymium, praseodymium, terbium, and dysprosium, possessing irreplaceable application value in new energy, electric vehicles and high-end electronics. According to 2024 data from the U.S. Geological Survey, global rare earth reserves amount to approximately 140 million metric tons of oxide equivalent[276]. China holds about 34% of these reserves, ranking first worldwide. China continues to dominate global rare earth supply, accounting for approximately 70% of global mining output and over 90% of processing capacity[277].

[275] Guangzhou Outsourcing Association, "Guangzhou Outsourcing Industry Development Report 2025," *Guangzhou Outsourcing Industry News*, 7 August 2025, http://en.gzoutsourcing.cn/Article/20250807/47401.html

[276] U.S. Geological Survey, "Mineral commodity summaries 2024: rare earths," January 2024, https://pubs.usgs.gov/periodicals/mcs2024/mcs2024-rare-earths.pdf

[277] Sam Meredith and Dylan Butts, "A lesson for the West? Japan was better prepared than most for China's rare-earth mineral squeeze," Consumer News and Business Channel, Jun 20, 2025, https://www.cnbc.com/2025/06/20/rare-earths-japan-more-prepared-than-most-for-chinas-mineral-squeeze.html

Since the 1970s, China has made significant breakthroughs in rare earth extraction processes, advancing the country's technological capabilities to the forefront globally. However, during this period China's foreign trade policy focused on exporting for foreign exchange, which led to long-term disorderly mining and market competition, resulting in issues such as resource wastage and environmental damage[278]. In 2005, China cancelled the export tax rebate policy for rare earths and gradually reduced the number of companies receiving export quotas. By April 2006, the Ministry of Land and Resources further strengthened the management of rare earth resources by suspending the issuance of mining licenses, thereby implementing comprehensive control over mining, smelting, processing and export[279]. In May 2010, the Ministry of Industry and Information Technology issued the Rare Earth Industry Access Conditions (draft for public comments), setting industry access standards from the perspective of production scale for the first time[280]. In 2014, the WTO ruled that China's rare earth export restrictions violated international trade rules. At this point, China realised the need to build a more robust rare earth strategic reserve system, to enhance its international pricing and regulatory influence, to shift from being a major rare earth producer to a leading rare earth power, and thereby to address geopolitical and economic challenges[281].

After 2018, China started to systematically strengthen its leadership in the rare earth industry chain, elevating its strategic importance to national security. In 2020, Article 9, Paragraph 3 of the ECL provided the highest legal basis for controlling critical materials such as rare earths. In October 2020, the Suggestions of the Central Committee of the Communist Party of China on Formulating the 14th Five-Year Plan for National Economic and Social Development and Long-Term Goals for 2035 proposed strengthening the planning and control of strategic mineral resources, enhancing reserve security capabilities, and implementing a new round of mineral exploration breakthroughs[282]. This marked the formal inclusion of rare earths in the top-level national security framework, establishing their importance as strategic resources.

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[278] China Times, "China strengthens export controls on strategic minerals, tungsten, molybdenum, indium and other items are included," 1 July 2025, https://www.chinatimes.com/cn/newspapers/20250701000626-260109?chdtv

[279] China News Service, "Ministry of Commerce: China's rare earth export policies follow international norms, not targeting any specific country," 25 July 2011, https://www.chinanews.com.cn/cj/2011/07-25/3206978.shtm

[280] China News Service, "Statement from the Ministry of Commerce Spokesperson on China's rare earth export policies," 25 July 2011, https://www.chinanews.com.cn/cj/2011/07-25/3206978.shtml

[281] "China's rare earth white paper: accusations of 'resource nationalism' are unfounded," *People's Daily*, 29 April 2014, http://news.12371.cn/2014/04/29/ARTI1398720479186171.shtml

[282] State Council, "Outline of the 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives through 2035 (Full Text)," 13 March 2021, https://www.gov.cn/xinwen/2021-03/13/content_5592681.htm

Amidst the complexities of international geopolitics and technological competition, China further emphasised the importance of rare earths for national security and gradually refined its laws and regulatory systems, systematically converting its rare earth resource advantages into a sustainable strategic lever and industrial strength. In 2021, the Rare Earth Management Regulations were opened for public comment, marking a significant step towards legal and systematic management and laying the foundation for precise control. In 2024, China introduced the Export Control Regulations for Dual-Use Items and related announcements, gradually establishing a more comprehensive rare earth export control system, with rare earths increasingly seen as a countermeasure weapon. In December 2024, the Ministry of Commerce released the Announcement on Strengthening Export Control of Dual-Use Items to the U.S., implementing stricter controls on items like tungsten, molybdenum, and antimony[283]. In October 2025, China's Ministry of Commerce issued Notices No. 61 and No. 62, formally bringing rare earth extraction, processing and utilisation technologies into the export control system. This move enabled comprehensive control over the entire rare earth industry, from raw materials to technology, transforming China's resource advantage into strategic leverage[284]. These measures aim to drive high-end industry development and counter external technological suppression. This shift marks a transition from temporary administrative measures to a long-term legal and institutional framework, expanding control from export restrictions to broader governance across mining quotas, smelting, technology and finished products. This integration strengthens China's rare earth advantage within its national security and strategic policy framework, thereby boosting its international influence[285].

The national regulatory policies have provided a clear strategic blueprint and development boundaries for the rare earth industry. However, the effective implementation of this top-level design ultimately depends on the active response and strategic transformation of enterprises across the industrial chain. In the early stages, after China implemented export quotas and tariffs for rare earths, some rare earth enterprises were forced to reduce exports due to insufficient quotas, which particularly affected the profit margins of upstream mining companies. This put

[283] MOFCOM, "Notice No. 14 of 2024 on Export Control of Tungsten, Tellurium, and Related Items," 20 June 2024, https://aqygzj.mofcom.gov.cn/flzc/gzjgfxwj/art/2024/art_daaa02c05d8946179dcf5d1ba499ac46.html

[284] MOFCOM, "Notice No. 61 of 2025 on Export Control of Rare Earth-Related Technologies and Items," 31 October 2025, https://aqygzj.mofcom.gov.cn/qdml/art/2025/art_054730cc0e5b49dfaad3f0fc4f9d0893.html ; MOFCOM, "Notice No. 62 of 2025 on the Catalogue of Technologies Prohibited and Restricted from Export (Rare Earth Related Technologies)," 31 October 2025, https://aqygzj.mofcom.gov.cn/qdml/art/2025/art_fbc5f7e23bff4bb184d5c49ff878f8ad.html

[285] MOFCOM, "Notice No. 61 of 2025 on Export Control of Rare Earth-Related Technologies and Items," 31 October 2025, https://aqygzj.mofcom.gov.cn/qdml/art/2025/art_054730cc0e5b49dfaad3f0fc4f9d0893.html; MOFCOM, "Notice No. 62 of 2025 on the Catalogue of Technologies Prohibited and Restricted from Export (Rare Earth Related Technologies),"31 October 2025, https://aqygzj.mofcom.gov.cn/qdml/art/2025/art_fbc5f7e23bff4bb184d5c49ff878f8ad.html

enterprises in a situation of passive adaptation to national policies. Starting in 2011, China began integrating rare earth enterprises, gradually shifting from an export-oriented model to domestic resource allocation. In 2015, the rare earth sector, which had consisted of dozens of small producers, was consolidated into six major groups, marking a significant restructuring of the industry. This consolidation brought together the majority of the nation's rare earth resources and smelting enterprises, establishing a centralised, group-led industrial framework. At the same time, private enterprises like Ningbo Yunsheng began to reduce their reliance on export markets and to actively explore domestic high-value-added application markets instead.

The implementation of the ECL in 2020 tightened controls on rare earths, making them strategic materials and prompting companies to build compliance systems. Major firms like Northern Rare Earth and Xiamen Tungsten shifted from passive compliance to active internalisation. In 2021, China Aluminium, China Minmetals, and Ganzhou Rare Earth merged to form China Rare Earth Group, becoming the world's largest rare-earth supplier and enhancing China's pricing power. At the same time, companies like Northern Rare Earth expanded into high-value downstream sectors, increased R&D investments, and achieved breakthroughs in high-end product production processes.

Looking back at its development journey, China's rare earth industry has evolved from its initial phase of rectifying disorder to a global contest for dominance in the industrial chain. Chinese rare earth enterprises have resonated with the nation's overall security perspective, undergoing a transformation from passive adaptation and compliance internalisation to proactive alignment with national strategy.

3. China's export control measures and their impact on the global technology governance landscape

Amidst intensifying global technological competition and contests over strategic autonomy, export controls are no longer merely traditional instruments of trade policy but have evolved into a central tool of technological governance and strategic rivalry. In recent years, China has progressively refined its export control system through a series of laws, regulations and control lists, strengthening restrictions on the export of critical items and technologies. China's export control regime has thus transcended the conventional scope of trade and industrial policy, profoundly reconfiguring the foundational structure and evolutionary trajectory of global technological governance. This development carries several important implications.

First, China's export control system challenges the monopoly of Western norms. China is actively building a domestic export control framework based on the ECL, serving as a complementary or alternative option for Global South nations to break away from traditional Western-dominated models in relevant fields, thereby enhancing the representation and voice of developing countries. China consistently advocates for a more inclusive, equitable and sustainable global technology governance system. It is committed to encouraging the international community to jointly address the opportunities and challenges brought by technological development on the basis of mutual respect and mutual benefit. This approach aims to make global technology governance more rational and democratic, ultimately realising the vision of "technology for good" and building a community with a shared future for mankind.

Second, China's export control system may intensify institutionalised strategic competition among nations. Exemplified by China-American rivalry, the U.S. has taken the lead in strengthening regulatory containment, compelling China to upgrade its own export control mechanisms as a countermeasure. This has objectively transformed export controls into a critical instrument in geopolitical competition. It has also heightened uncertainties for third-party nations regarding critical items and technologies, exposing them to systemic risks and strategic pressures. Simultaneously, it has triggered a broader and deeper restructuring of global technology value chains. This process is marked by two mutually exclusive forces—de-Chinaisation and re-Chinaisation—which collectively shape the strategic choices and configurations of states and enterprises within global technology governance.

Third, the evolution of China's export control regime may trigger the proliferation of global export control systems. The refinement and implementation of China's export controls have become a critical variable in reshaping global rules governing technology trade and supply chain security. As China refines its framework, other economies will adopt or upgrade their regulatory mechanisms to address evolving geopolitical and technological pressures, thereby catalysing a wave of global export control tightening. This trend will not only erode strategic mutual trust in bilateral and multilateral negotiations but also fragment global technology governance norms, driving the contentious evolution and increasing complexity of the international regulatory landscape.

Fourth, China's export control system will generate spillover effects beyond its immediate scope. Currently, export control policies are increasingly intersecting with other regulatory domains

such as data governance, AI ethics and national security review mechanisms, forming a comprehensive regulatory network spanning technology, security and values. Against this backdrop, the significance of export controls has not only been amplified but has also driven the evolution of global governance structures towards fragmentation and bloc-based alignment. By linking export controls with other regulatory mechanisms, China is not only enhancing its influence in shaping international rules but also driving divergences among economies regarding technological pathways, data sovereignty and security concepts. This is accelerating the fragmentation and restructuring of the international rules system.

4. Policy suggestion for the Netherlands

In September 2025, the Netherlands government invoked the Cold War era Goods Availability Act (1952) to demand an effective takeover of Nexperia, an overseas semiconductor company with Chinese capital. The Dutch authorities cited corporate governance deficiencies and expressed concerns that Nexperia's critical semiconductor technologies, intellectual property, and production capacity might be transferred to China, jeopardising European supply chain security. China swiftly reacted by issuing an export control order on 4 October 2025, targeting Nexperia's subsidiaries and their contractors in China. This order banned the export of specific chips and components produced in China and was widely seen as a retaliatory measure against the Netherlands government's actions.

After approximately seven weeks of tense standoff, the Netherlands government announced in November 2025 the suspension of the state seizure measures against Nexperia, with the possibility of returning control to Wingtech. This move was viewed as an effort to ease tensions with China and stabilise the global supply chain. However, the risk of supply chain and industrial disruption, particularly in the automotive sector, remained unresolved. With the institutionalisation of export controls, the supply chain has become a key battleground for national security and industrial competitiveness.

For the Netherlands, the strengthening of China's export control system and the evolution of the global tech governance landscape have significant implications for a high-tech industrial powerhouse and an open economy. To mitigate the uncertainties arising from export controls and their spillover effects, the Netherlands needs to:

First, promote risk assessment and contingency planning in relevant fields. For the Netherlands, it is crucial to enhance risk assessment mechanisms in the technology sector and develop effective contingency plans. These plans should address potential risks such as technological disruptions, supply chain breakdowns, market contraction and policy changes, ensuring preparedness for various contingencies and safeguarding the stability and security of the technology supply chain. Particularly for companies in key technological fields, the Netherlands should conduct regular risk assessments to identify potential risk factors that could impact production and supply, and develop corresponding emergency plans. This will help ensure that businesses retain operational flexibility during emergencies, ensuring business continuity and adaptability. Moreover, the Netherlands must enhance intelligence-sharing and early warning systems to improve the monitoring of global technological trends and potential threats.

Second, enhance technological self-innovation capacity and increase investment in research and development (R&D). The rise of countries such as China in the technological domain has led to profound changes in the global tech governance landscape. The strengthened export controls may pose risks to industries in the Netherlands that rely on external technologies. Therefore, enhancing domestic technological capabilities and reducing reliance on external supply chains and technologies, particularly in core technological fields, is crucial for safeguarding national security and maintaining industrial chain stability. By increasing investment in technological R&D, the Netherlands can continuously strengthen the core competitiveness of its high-tech products, thereby playing a more prominent role in the global industrial chain and enhancing its bargaining power in international markets. In practical terms, the Netherlands could incentivise innovation in core technologies by offering R&D tax breaks or government subsidies, and should foster collaboration between universities, research institutions and enterprises. This would promote the integration of industry, academia and research, further boosting technological innovation and reducing reliance on external supply chains.

Third, promote supply chain diversification and resilience building. In response to the deep restructuring of globalisation and the overlap of geopolitical risks, the Netherlands must actively promote supply chain diversification and resilience building to enhance supply chain stability and security. This includes strengthening technological and trade cooperation with multiple countries, advancing diversified supply chain layouts, and supporting domestic enterprises in the development of alternative technological routes and backup supply channels. The Netherlands should reduce its dependency on a single country or a few countries for critical raw materials, core components and advanced technologies. It should build a more resilient, decentralised and

self-repairing distributed supply chain network, thereby effectively mitigating potential external risks and ensuring the continued stability and security of the national industrial system. For instance, the Netherlands could form strategic partnerships with countries like Japan and South Korea to create complementary technological and supply chain systems.

Fourth, strengthen coordination and unity within the European Union. The Netherlands needs to shift from being a passive adapter to an active shaper, playing the role of a pragmatic leader within the European Union. It should convert multilateral agendas into a unified EU stance, leveraging its technological advantages, open trade traditions and geopolitical influence to propose a "Dutch solution", and to actively guide the formation of EU regulations. Specifically, the Netherlands should push for the EU to adopt clear, consistent and binding export control and security review principles in critical technologies and raw materials. This will ensure that EU regulations can protect internal security without stifling innovation or global cooperation. Fundamentally, this approach would avoid a fragmentation of policies among member states and instead unify the "European collective power", enhance the EU's bargaining power in global technological competition, and ensure consistency in the EU's mechanisms for controlling tech exports.

Finally, intensify international cooperation and promulgate norms. From a broader perspective, the Netherlands should advocate for the establishment of non-discriminatory and transparent international export control rules and an international technology trade system through multilateral platforms such as the WTO and the G7. Additionally, the Netherlands should engage in constructive dialogue with major countries like China and the United States, conducting high-level consultations and negotiations on export control policies for semiconductor and other related technologies, based on a clear understanding of the nature and goals of each country. The Netherlands should explore common interests in areas such as export controls, data flow and technology standards, aiming to avoid strategic miscalculations and the emergence of confrontational policies. This approach will stabilise bilateral and multifaceted trade relations, safeguard market access for Dutch enterprises, ensure certainty in global supply chains, and actively prevent the fragmentation and polarisation of the global technology system. Lastly, the Netherlands must avoid being forced to choose sides in the process of U.S.-China technological decoupling.