



Coalition Building and Sino–US Competition in the Digital Era

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Abstract

Digital coalitions are the primary tool of the USA to compete with China in the digital age and differ markedly from traditional alliances and military coalitions. It is necessary to go beyond the vision of pure great power rivalry and probe Sino–US digital competition through the lens of coalitions and the relationship between the dominant state and coalition members. A digital coalition is a state consortium with an organisational nature, confrontational targets, common goals, and the capability to take collective action, formed to deal with the digital strategy, norms, standards, industry, and products. The two main determinants of the building and maintenance of the digital coalition are the security dependency of allies on the USA and the technological stranglehold in the digital relationship. Security dependency determines the likelihood of coalition construction; the higher the dependency, the more willing allies will be to respond to the dominant state's digital security narrative and mobilisation. There is potential for the construction of simple digital coalitions centred on conceptions and governance initiatives. However, building and maintaining a complex digital coalition depends on the presence of a technological stranglehold as well as security dependencies. A technological stranglehold involves controlling the supply of key technologies critical to the survival of the industry, and compels allies to sacrifice market interests and participate in a digital coalition to ensure the integrity of their industries. The Chip 4 Alliance and Trade and Technology Council are typical examples of US-led digital coalitions.

Introduction

The strategic rivalry between China and the USA in the digital era has become the focus of academic attention. The first representative view is that Sino–US digital competition will create a bipolar world unseen in the Cold War era. According to Yan, the weight of an ideology in decision-making declines when the ideology is not closely intertwined with economic or security goals. Digital technology is increasingly at stake in national security and wealth. In a bipolar landscape, one of the focal points of strategic competition among great powers is digital dominance. Leaders with historical memories of the Cold War are influenced by two major mindsets in the digital age: the Cold War mindset and the digital mindset. The

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digital competition between China and the USA will lead to the formation of a “two-centre” world.¹ Digital technology competition, rather than ideological competition, has become the focus of the rivalry between the two states.²

The second view asserts that the pattern of Sino–US digital competition is reflected in the structural adjustments of traditional alliances. Sun and others argue that the USA aggregates the power of its allies to jointly contain China’s digital capabilities and that allied responses to the US containment of China’s digital technologies (e.g., 5G) depend on the allies’ perceptions of whether the security of the regime is threatened.³ The Biden administration’s policy instruments differ significantly from those of the Trump administration, with the former keen to mobilise allies and the latter insisting on employing the USA’s own forces. Biden’s approach extends the East Asian security system to the digital space at both the multilateral and bilateral levels.⁴ Fischer holds that the current technology supply chains differ from those during the Cold War, with corporations leading the development of cutting-edge technologies and supply chains becoming highly globalised. Notably, the USA has been unable to maintain its overwhelming technological dominance. In addition, the existing multilateral regulatory regime is powerless to cope with the challenges faced by the USA, which must, therefore, consider the resistance of its allies and tailor its foreign policy to the specifics of each set of alliances.⁵

The third view is that the digital competition between the USA and China will trigger a new landscape change and the potential emergence of the “digital non-aligned movement” (DNAM). Reddy and Soni assert that digital competition has led many countries, such as India, to desire strategic autonomy and not have to choose between the USA and China. Similar to the creation of the traditional Non-Aligned Movement (NAM), some states have begun to refocus on the concept of non-alignment and advocate for DNAM. The European Union (EU) and NAM could create new 5G initiatives to remove the constraints posed by Sino–US competition.⁶

It is inadequate to depict the silhouettes of the Sino–US rivalry merely in terms of military deployment,⁷ if digital competition in the entirely new era is not taken into account. The main modes of Sino–US digital competition and other states involved in competitive relationships are deeply affected by US-led coalitions. DNAM cannot be isolated from grand competition. It is important to go beyond the vision of a pure Sino–US rivalry and policy differentiation within US-dominated alliances and develop a framework to understand digital coalitions. How do digital coalitions differ from traditional or military coalitions? What

¹ Yan Xuetong, “Bipolar Rivalry in the Early Digital Age,” *Chinese Journal of International Politics*, Vol. 13, No. 3 (2020), pp. 317, 335.

² Yan Xuetong, “Shuzi shidai de zhongmei zhanlue jingzheng” (“US-China Strategic Competition in the Digital Age”), *Shijie zhengzhi yanjiu* (*World Politics Studies*), Vol. 4, No. 2 (2019), pp. 13–7.

³ Sun Xuefeng, “Shuzi jishu chuanguan yu guoji zhanlue jingzheng” (“Digital Technology Innovation and International Strategic Competition”), *Waijiao pinglun* (*Foreign Affairs Review*), Vol. 40, No. 1 (2023), pp. 65–6; Chen Genfeng and Sun Xuefeng, “Meiguo mengguo dui Zhongguo zhineng jiankong jishu de zhengce xuanze” (“The Policy Choices of US Allies Regarding Chinese Intelligent Video Surveillance Technology”), in Sun Xuefeng and Li Bin, eds., *Shuzi shidai de anquan jingzheng yu guoji zhixu* (*Security Competition and International Order in the Digital Age*) (Beijing: Qinghua daxue chubanshe, 2023), pp. 243–78.

⁴ Sun Xuefeng, “Shuzi jishu jingzheng yu dongya anquan zhixu” (“Digital Technology Competition and East Asian Security Order”), *Guoji anquan yanjiu* (*Journal of International Security Studies*), Vol. 40, No. 4 (2022), pp. 73–6.

⁵ Sophie-Charlotte Fischer, “Silicon Curtain: America’s Quest for Allied Export Controls against China,” in Brian G. Carlson and Oliver Thränert, eds., *Strategic Trends 2023: Key Developments in Global Affairs* (Zurich: ETH Zurich, 2023), pp. 39–61.

⁶ Latha Reddy and Anoushka Soni, “Is There Space for a Digital Non-Aligned Movement?” *Cyberstability Paper Series* (Hague: The Hague Centre for Strategic Studies and the Global Commission on the Stability of Cyberspace, 2021), pp. 2–3, 8–10.

⁷ See, for example, Peter Harris and Iren Marinova, “American Primacy and US-China Relations: The Cold War Analytical Reversed,” *Chinese Journal of International Politics*, Vol. 15, No. 4 (2022), pp. 335–51.

Table 1. US-led Digital Coalitions in Competition with China

US-led coalitions in the digital age	Year of establishment	Organisational base	Policy objectives related to digital agendas
Five Eyes Alliance	1946	Partial alliances	Digital intelligence gathering and surveillance
Digital Connectivity and Cybersecurity Partnership (DCCP)	2018	Partial alliances	Digital transformation, digital infrastructure, and cybersecurity
Clean Network	2020	Alliances and partnerships	Telecommunications and digital infrastructure security
Global Partnership on Artificial Intelligence (GPAI)	2020	G7	Artificial intelligence and governance standards
Declaration for the Future of the Internet	2022	Alliances and partnerships	Internet freedom
Indo-Pacific Economic Framework	2022	Partial alliances	Digital economy and supply chains of chips and batteries
Global Partnership for Infrastructure and Investment	2022	G7	Digital infrastructure and digital finance
Chip 4	2023	Partial alliances	Semiconductor supply chains

are the core mechanisms through which the USA builds and employs digital coalitions to compete with China? These are the main questions this study seeks to answer.

This article advocates that alliance-based security dependency and technological strangleholds in digital relationships are determinants of the building of digital coalitions, with the strength of the former determining the likelihood of coalition building and the strength of the latter determining the firmness and coerciveness of the demanding coalitions. Chip 4 and the US–EU Trade and Technology Council (TTC) are typical cases in which the core mechanisms of digital coalition-building can be clarified.

Alliances, Military Coalitions, and Digital Coalitions

A digital coalition can be defined as a state consortium with an organisational nature, confrontational targets, common goals, and the capability to take collective action, formed to deal with the digital strategy, norms, standards, industry, and products. However, the concept of coalition has been unduly expanded. A coalition in world politics should be considered as a collaborative entity with a confrontational target led mainly by state actors and should meet four criteria. First, there should be a clear target (i.e., a specific state or threat). If a group of states comes together with the purpose of speaking out in unison regarding a particular interest, it is more appropriate to define them as an international joint movement or network of initiatives rather than as a coalition. Second, a coalition should have an institutionalised vehicle such as organisations, agreements, declarations, and initiatives. Third, a coalition should also undertake collective action or policy coordination; agreements that are not followed up on with routine collective actions should not be called coalitions. Fourth, a coalition should be a consortium in which the states are its main members. Although some coalitions may include corporations, international organisations, non-governmental organisations, and local entities, the leaders and targets should be states.

As digital competition between China and the USA has become an important new battleground, various US-led digital coalitions have emerged (see [Table 1](#)). As for coalitions in

different arenas, military coalitions are common and representative, with clear and easily recognisable boundaries; however, very few economic coalitions meet the strict definition of a coalition. Examples of economic coalitions include the Council for Mutual Economic Assistance, which countered the Western camp during the Cold War, and the Indo-Pacific Economic Framework (IPEF) proposed by the Biden administration to counter China's economic influence. The IPEF is a complex initiative that includes a US-led digital coalition. Ad hoc groups or industry-specific blocs in the global trade negotiation process that aim to make a common voice heard, such as the Cairns Group formed by agricultural exporting states, should be treated as international movements rather than coalitions. The Global Partnership on Artificial Intelligence (GPAI) is a good example of the confrontational nature of digital coalitions. The US government has suggested that the growth of China's artificial intelligence (AI) power and its applications threaten Western values and has joined GPAI and offered to work with "like-minded democracies" to preserve "technological democracy." This is neither simply a cooperative mechanism, nor is it a visionary declaration.

Digital coalitions differ markedly from coalitions in other domains such as the military. First, a digital coalition centres on digital technology that will be upgraded, reorganised, or disbanded as the power distribution of digital technology changes. For instance, the USA mobilised whole-government forces against high-tech Chinese companies and launched a siege attack on Huawei's 5G technology. Additionally, the Digital Connectivity and Cybersecurity Partnership (DCCP) targeted the Digital Silk Road to prevent China from gaining power to dominate the science and technology ecosystem.⁸ Second, digital coalitions have prominent global connectivity involving the domestic digital economy, security, and global digital development. They incorporate alliances, governments, multinational digital companies, and other forces that profoundly influence coalition participants, target states, and even the entire digital world. Third, digital coalitions are not a marginal auxiliary tool but a frontier of great power competition that shapes the power distribution structure among these powers. Finally, digital coalitions have obvious functional volatility; breakthroughs in digital technology and the vicissitudes of digital dominance change the functional objectives of a coalition, imbuing it with new joint hubs or depriving it of value.

A digital coalition is not simply a technology or industry alliance. Strange argues that, through firm-to-firm diplomacy, multinational corporations can form temporary or permanent alliances to increase their world market share. These firms may belong to the same industry or be spread across different industries.⁹ Newell attempts to step away from structural accounts by taking the perspective of interests of national groups. He analyses world affairs with the transnational managerial class as the main body of interest, turning his research attention to entities that serve as representatives of transnational coalitions of interest such as the Global Industry Coalition (GIC). The GIC comprises companies from relevant industrial sectors worldwide.¹⁰ In addition, Klincewicz examined strategic alliances linking companies in the high-tech industry from a global value chain perspective and identified three value chain roles: leaders, complementors, and contractors.¹¹ These studies consider the global commercial implications of transnational and domestic industrial alliances. In a global political sense, a digital coalition is formed by major powers to engage in digital competition, with the collaboration of states as the kernel mechanism. Multinational corporations may be involved, but only as supplementary actors.

⁸ Robert Greene and Paul Triolo, "Will China Control the Global Internet Via its Digital Silk Road?" *Carnegie Endowment for International Peace*, 8 May, 2020, <https://carnegieendowment.org/posts/2020/05/will-china-control-the-global-internet-via-its-digital-silk-road?lang=en>.

⁹ Susan Strange, "States, Firms and Diplomacy," *International Affairs*, Vol. 68, No. 1 (1992), p. 7.

¹⁰ Peter Newell, *Globalization and the Environment: Capitalism, Ecology and Power* (Cambridge: Polity Press, 2012), pp. 43–9.

¹¹ Krzysztof Klincewicz, *Strategic Alliances in the High-tech Industry* (Berlin: Logos, 2005).

Table 2. Comparing Military Alliances, Military Coalitions, and Digital Coalitions

Forms of alignment	Linkage basis	Environmental conditions	Strategic objectives
Military alliances	Collective security treaties and commitments	Wars, common threats, survival, and security fears	Balance of power, deterrence
Military coalitions	Nexus of interest in the use of military force and specific security issues	Political pressure created by the lead state, burden of military operational expenditures, expected consequent benefit	Effective conducting of selected joint military operations
Digital coalitions	Distribution of technological capabilities and globalised digital networks (inter-state, inter-corporation, and industrial networks)	Platforms of alliances or partnerships, threat perceptions and overlapping values, shared digital agendas, feature of digital technology (globalisation, strategisation, and securitisation)	Liquidity security (e.g., supply chain security), technological leadership, and competitive global coalition advantage

Comparisons of military alliances, military coalitions, and digital coalitions, as presented in Table 2, are conducive to comprehending the connotations of these concepts. Alliances rely on collective security treaties and agreements, based on which inter-state linkages occur. Alliances imply the existence of a commitment to military assistance between sovereign states; however, loose cooperation agreements are also sometimes called “alliances,” as in the case of the Alliance for Progress established by the USA in Latin America. In such cases, the term “alliance” may be used for propaganda purposes, although this use of the concept blurs the strict conditions of an alliance; that is, the commitment to work with others against a common enemy, as stipulated in military agreements.¹² Military coalitions are based on the correlation between military positions and security interests. While alliances are treaty-based formal arrangements aimed at strategic defence, military coalitions are security partnerships formed by states on an ad hoc basis to carry out war operations.¹³ As such, military coalitions have more pronounced informality than alliances and are based on ad hoc agreements.¹⁴

Digital coalitions are based on the distribution of technical capabilities and digital linkages. Inter-state relationships are also important. For example, the USA has a technological advantage in chip design and digital platform incubation, whereas the EU sculpts digital norms and standard settings. The relationship among digital multinationals is a special bond for digital coalitions. Samsung and SK hynix are leaders in the DRAM and NOT AND (NAND) flash memory markets. Samsung also has advantages in advanced RISC machine (ARM) chip design and manufacturing. US digital companies dominate chip design, and chip manufacturing is passed on to foundries. Moreover, US companies occupy a significant market share in the semiconductor-related software and tools industries.¹⁵ As of January 2022, Advanced Semiconductor Materials Lithography’s (ASML) top two shareholders, Capital Research and Management Company and BlackRock, were from the USA. The sink

¹² Arnold Wolfers, “Alliances,” in David L. Sills, ed., *International Encyclopedia of Social Sciences* (New York: Macmillan, 1968), pp. 268–9.

¹³ Adeela Ashraf, *The Politics of Coalition Burden-Sharing: The Case of the War in Afghanistan*, Ph.D. dissertation, University of Pittsburgh, 2011, p. 1.

¹⁴ Terry J. Pudas, “Preparing Future Coalition Commanders,” *JFQ: Joint Forces Quarterly*, Vol. 3 (1993–1994), p. 41.

¹⁵ Jacob Stokes, Alexander Sullivan, and Joshua Fitt, *Digital Allies: Deepening U.S.-South Korea Cooperation on Technology and Innovation* (Washington, DC: Center for a New American Security, 2022), p. 5.

or swim of the semiconductor industry in some economies is closely tied to the USA, which has suppressed the Japanese semiconductor industry, putting the corresponding industries in South Korea, the Netherlands, and Taiwan on an upward trajectory.¹⁶

The environmental conditions that give rise to alliances include war, common threats, and fears of survival and security. States opt for collective defence mechanisms in response to security threats posed by an enemy, which may be another state or a group of states. Collective security mechanisms imply that states believe that they cannot effectively defend themselves against external threats on their own and that they need to engage in mutual assistance to reduce the cost of maintaining national security.¹⁷ States have two main options when facing threats: balancing, which involves joining forces with other states to address challenges; and bandwagoning, which involves siding with a danger maker. Balancing is a common choice among states. The key idea behind the balance-of-power theory is to avoid being dominated by the strongest through alliances. There are two primary reasons for choosing an alliance. First, states face an existential crisis if they fail to prevent a potential hegemon from growing into a true hegemon before this situation develops. If they choose to follow the hegemon, it means choosing to believe that the hegemon is a benevolent state. A safer option for states is to maintain autonomy from domination and ally with those whose power is limited. Another reason joining the weaker side results in a higher status is that the weaker side needs to take advantage of new members to expand the power of the alliance, whereas the stronger side does not have a great need for new members, who would gain no key positions by allying with them.¹⁸

The conditions for forming military coalitions include political pressure from the dominant state and the burden of expenditure on military operations. By proposing the concept of the “American tribute system,” Khong suggested that the USA expects other states to acknowledge its supreme position of power, give up the idea of competing with it, facilitate the establishment of military bases, follow its economic rules, and emulate it in terms of philosophy and behaviour. Secondary states derive economic and security rewards from this tributary system. They are willing to become US allies or strategic partners, join the US-led rule-based trading system and international financial institutions, and endorse the US dollar’s dominance.¹⁹

The environmental conditions for the creation of digital coalitions should be noted. US-led digital coalitions tend to be organised on the basis of traditional alliances as it is cheaper and more likely to be successful if traditional allies are brought in to form “small clubs” that are then gradually expanded by attracting new members. It is theoretically possible that organisational structures in trade and investment could also serve as the basis for a digital coalition. The perceptions of digital threats and consensus on values are the ideational foundations of a digital coalition. For example, US politicians, academics, and journalists tend to portray China as a digital threat. Imbrie and others have argued that the convergence of digital and physical environments provides an opportunity for the proliferation of authoritarianism, which erodes the values that underpin free and open societies, and that democracies should uphold the rules. They have believed that the USA should unite its allies and partners to defend these values.²⁰ Carlson claims that cooperation among liberal democracies is the cornerstone of ensuring the survival of a liberal international order and

¹⁶ Li Li and Liu Hongsong, “Meihan bandaoti tongmeng jiqi hezuo kunjing tanxi” (“Analysis of the U.S.-South Korea Semiconductor Alliance and Its Dilemma”), *Taipingyang xuebao (Pacific Journal)*, Vol. 31, No. 5 (2023), p. 44.

¹⁷ Arnold Wolfers, *Discord and Collaboration: Essays on International Politics* (Baltimore: Johns Hopkins Press, 1962), p. 183.

¹⁸ Stephen M. Walt, *The Origins of Alliances* (Ithaca: Cornell University Press, 1990), pp. 5, 17–9.

¹⁹ Yuen Foong Khong, “The American Tributary System,” *Chinese Journal of International Politics*, Vol. 6, No. 1 (2013), pp. 38–41.

²⁰ Andrew Imbrie, et al., *Agile Alliances: How the United States and Its Allies Can Deliver a Democratic Way of AI* (Washington, DC: Center for Security and Emerging Technology, 2020), pp. iii–iv.

that China and Russia's resistance to the values of democracy and human rights is a major challenge to that order.²¹ Viewing the Digital Silk Road as an initiative to promote political illiberalism, Cheney proposed that the USA and other democracies develop new models for the protection of democracy and human rights as alternatives to the Digital Silk Road, that China's control of large amounts of data raises privacy concerns, and that China's tendency to collaborate with other authoritarian states to establish data centres promotes digital authoritarianism.²² The USA joined its allies in Europe and Asia to reshape the GPAI, declaring that the development and use of AI should be consistent with the values of liberal democracy and human rights.²³

Digital coalitions, whether in semiconductors, AI, or cybersecurity, emerge with threat perception and overlapping values. In other words, digital coalition members share the belief that they face external threats to digital development and share common values, viewing these values as a bond that fosters unity. Another contextual condition is when coalition members share agendas demanding negotiation, consultation, and collaboration. These shared agendas frame the scope of the coalition's deliberations, the focus of its bargaining, and the direction of its actions. Globalisation, strategisation, and securitisation of digital technology are critical environmental conditions under which digital coalitions emerge. In the digital era, digital technologies that are rapidly innovating and spreading globally are highly permeable to both domestic and international economic structures, with the digital landscape affecting the world landscape. Digital technology has been strategised by states as it is crucial to a state's comprehensive national power and international status. States generally attach importance to the strategic layout of digital technology; great powers value digital technology as a gaming tool. Digital technology has become a tool for implicating power, interests, and values and has increasingly been given a security-oriented connotation by the state. This has affected the evolutionary trend of various security issues, ranging from personal to global, such as digital privacy, cross-border data flow security, chip supply chain security, AI risks, and technological dominance. These global megatrends cannot be managed by individual national forces or bilateral cooperation. Moreover, given that the digital agenda is not a military issue that can be solved by traditional alliances, the USA prefers to build digital coalitions through an organisational network of alliances.

The strategic objectives of an alliance include maintaining the balance of power and deterring external challenges. Alliances also allow adversaries to recognise the extent of non-interference territories; for example, when the USA, through the North Atlantic Treaty Organisation (NATO), declared to the Soviet Union the areas in which the USA had vital security interests.²⁴ Alliances are a means of extending deterrence to scare off potential attacks on allies representing an expansion of geopolitical capital that has been described as the "umbrella" or "shield" effect.²⁵ Extended deterrence can be strengthened only if the provocateur believes that a distant defender will respond firmly to provocations based on domestic law.²⁶ A military coalition is organised to contribute to the effective conduct

²¹ Brian G. Carlson, "China, Russia, and the Future of World Order," in Brian G. Carlson and Oliver Thränert, eds., *Trends 2023: Key Developments in Global Affairs* (Zurich: ETH Zurich, 2023), pp. 11–21.

²² Clayton Cheney, "China's Digital Silk Road: Strategic Technological Competition and Exporting Political Illiberalism," *Pacific Forum Working Paper*, Vol. 19 (2019), pp. 1–17.

²³ U.S. Department of State, "Joint Statement from Founding Members of the Global Partnership on Artificial Intelligence," 15 June, 2020, <https://www.state.gov/joint-statement-from-foundingmembers-of-the-global-partnership-on-artificial-intelligence/>.

²⁴ John W. Spanier, "The Reasons for Alliances," in William C. Olson, David S. McLellan, and Fred A. Sondermann, eds., *The Theory and Practice of International Relations*, sixth edition, (Englewood Cliffs: Prentice-Hall, 1983), pp. 225–6.

²⁵ Justin V. Anderson, Jeffrey A. Larsen, and Polly M. Holdorf, *Extended Deterrence and Allied Assurance: Key Concepts and Current Challenges for U.S. Policy* (Colorado Spring: USAF Institute for National Security Studies, 2013), p. 22.

²⁶ Michael J. Mazarr, *Understanding Deterrence* (Santa Monica: RAND Corporation, 2018), p. 3.

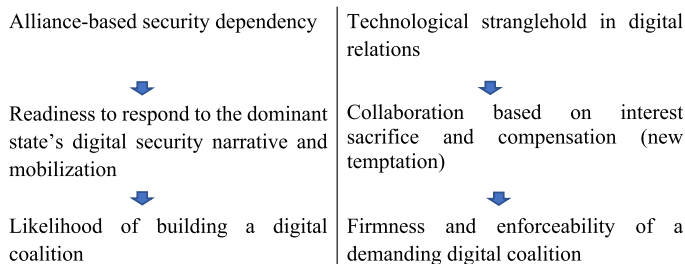


Fig. 1. Mechanisms of Digital-Coalition Building

of military operations. In order to fight alongside each other, the USA wants to ensure that coalition members take on meaningful roles, assign military tasks, and promote interoperability within the coalition.²⁷ A coalition should be designed such that the threat is clearly perceived by the participants. Unlike an alliance's focus on political effectiveness, a military coalition is concerned with operational effectiveness and has greater flexibility and adaptability.²⁸ Military coalitions serve as channels to reduce USA's expenditures, with participants sharing costs and reaping benefits after the end of the war.

The strategic objectives of the US-led digital coalitions are to maintain mobility security (e.g., supply chain security), technological leadership, and a competitive advantage in global coalition-building campaigns. Viewing the rise of China's digital technology as a challenge to the existing order, the USA and its relevant allies intend to safeguard the security of data flow, digital infrastructure, and supply chains.²⁹ Some scholars claim that technological democracies should cooperate to preserve digital dominance and superiority.³⁰ Scholars such as Kliman argue that the two major frameworks for enhancing technological research and development (R&D) capabilities between the USA and its allies—the Technical Cooperation Program and the National Technology and Industrial Base—do not yet have good compatibility and extensibility. Consequently, there is a need to build communities for technological innovation and protection.³¹ In addition to establishing a global technological competitive advantage, another derivative goal is to maintain a global coalition-building advantage. Unlike a military coalition, which is typically dissolved at the end of a military operation, a digital coalition is not a one-time, temporary coalition arrangement. For example, although China is not contemplating antagonistic coalitions, digital coalitions and the various global initiatives based on them are US response to the global initiatives China has proposed. The Digital Silk Road is part of the Belt and Road Initiative, which aims to promote the development of the digital economy and infrastructure. Some US digital coalitions have undoubtedly targeted the Digital Silk Road.

Security Dependency, Technological Strangleholds, and Digital Coalition-Building

It is necessary to elaborate on the mechanisms of digital-coalition building (See Figure 1). Alliance-based security dependency determines the possibility of building a digital coalition. Owing to security dependency, allies are ready to respond to the USA's digital security

²⁷ Pudas, "Preparing Future Coalition Commanders," p. 44.

²⁸ Patricia A. Weitsman, "Wartime Alliances versus Coalition Warfare: How Institutional Structure Matters in the Multilateral Prosecution of Wars," *Strategic Studies Quarterly*, Vol. 4, No. 2 (2010), p. 48.

²⁹ Mireya Solís, "Toward a US–Japan Digital Alliance," *IINA Working Paper*, Vol. 1 (2021), p. 1.

³⁰ Jared Cohen and Richard Fontaine, "Uniting the Techno-Democracies: How to Build Digital Cooperation," *Foreign Affairs*, Vol. 99, No. 6 (2020), pp. 112–3.

³¹ Daniel Kliman, et al., *Forging an Alliance Innovation Base* (Washington, DC: Center for a New American Security, 2020), p. 15.

narratives and mobilisation measures. Such dependencies can directly lead to simple digital coalitions, with the creation of conceptions and governance initiatives as their main tasks. Alliances are not a panacea and cannot easily change policies involving complex interests. For example, the Obama administration failed to prevent South Korea from joining the Asian Infrastructure Investment Bank. The creation of complex digital coalitions relies on the presence of a technological stranglehold in digital relationships in addition to the need for an alliance-based security attachment. A technological stranglehold means that the advanced technologies possessed by one state have a “valve” of control over the technologies and industries of other states, which can determine their survival and progress. In a digital relationship where there is a significant technological stranglehold, even in the face of potential costs and losses, members are forced to make market and trade sacrifices and join the digital coalition to protect the potential for technological competitiveness and future prospects for industrial development in their own states.

The dominant state translates its members’ security attachment to the alliance into appeal and persuasive power in forming a digital coalition. Meanwhile, allies are more likely to accept the corresponding dominant state’s security narratives and mobilisation based on their previous experience of alliance cooperation. In traditional military alliances, the dominant state leads collaborative war operations and military exercises and implements policies to maintain alliance solidity. Led by the USA, NATO has conducted various war operations that have impelled its allies to continually recognise the protective functions of the alliance. Alliance-based security dependency means that allies automatically extend the value of security cooperation and the sense of being protected from traditional military security to the digital realm and are willing to respond to the call for digital collaboration. The USA, Japan, and South Korea regard North Korea as their main hypothetical enemy. Bilateral and trilateral joint military exercises to enhance joint anti-missile and anti-submarine capabilities demonstrate the USA’s determination to help Japan and South Korea defend themselves. Kishida noted the importance of strengthening the strategic collaboration between the USA, Japan, and South Korea, particularly in ensuring technology and supply chain security.³² When facing digital issues, security recognition and public opinion shaped by the dominant state motivate allies to respond to security narratives and mobilisation initiatives proposed by the dominant state.

Within alliances, members’ policy choices depend on the effectiveness of security commitments and the authority of the coalition regime, as well as members’ feelings of abandonment or entanglement in the face of a crisis, which comprise the allies’ main considerations regarding a digital coalition-building proposal. The stronger the alliance-based security attachment, the more prominent the impact of commitment effectiveness and institutional authority, and the greater the incentive to respond to the dominant state’s security narratives and mobilisation. Domestic politics profoundly affect the effectiveness of state commitments to multilateral regimes such as the transparency of electoral systems, governance institutions, and political systems. Although the separation of powers in the USA, where multiple branches shape the outcome of policymaking, makes it difficult to produce new commitments, it is easier to sustain established ones.³³ Gaubatz has asserted that liberal democracies can strengthen the effectiveness of international commitments by integrating

³² The White House, “Remarks by President Biden, President Yoon Suk Yeol of the Republic of Korea, and Prime Minister Kishida Fumio of Japan Before Trilateral Meeting,” 18 August, 2023, <https://www.whitehouse.gov/briefing-room/speeches-remarks/2023/08/18/remarks-by-president-biden-president-yoon-suk-yeol-of-the-republic-of-korea-and-prime-minister-kishida-fumio-of-japan-before-trilateral-meeting-camp-david-md/>.

³³ Peter Cowhey, “Domestic Institutions and the Credibility of International Commitments: Japan and the United States,” *International Organization*, Vol. 47, No. 2 (1993), pp. 306–26.

external and internal commitments and shaping shared preferences among interdependent states.³⁴

A high degree of institutionalisation brings authority to the alliance. Different alliances have widely varying levels of institutionalisation. Alliances are not simply the accumulation of national capabilities and capital but also social mechanisms with internal interactive properties. As a highly institutionalised alliance with a tight decision-making process and bureaucracy, NATO is bound to generate elite networks and affiliation agreements that influence its members' policy positions. The higher the level of institutionalisation, the better an alliance can meet challenges and be maintained. Institutionalisation refers to the existence of organisations that carry out specific tasks (e.g., weapons procurement) and establish a set of rules for collective decision-making.³⁵ These alliances create security dependencies. Norway has relied on its alliance with the USA since it became its protector in the middle of the last century. As a marginal state in Europe, Norway is heavily dependent on the USA for its defence commitments and NATO's collective security provisions. Developing relations with Norway is also of great importance to the USA due to Norway's proximity to Russia and the Arctic.³⁶

When approaching the issue of alliance relationships, members also consider the possibility of abandonment. Abandonment creates a sense of deprivation of benefits, status, and security, which makes members reluctant to break away from alignment with the dominant state. On the digital agenda, the USA has been creating the strategic narrative of "China's digital threat" for years, mobilising its allies to adopt an embargo policy against China. NATO and the alliances in the Asia-Pacific region are the main platforms for the US to promote these narratives and policies. Breaking away from a scaled-up digital coalition would seriously impact allies' security dependencies; thus, the allies largely accept the USA's security narrative on China and follow its mobilisation directives.

Power in interdependent relationships is important. Asymmetric dependencies can be a tool for the strongest party to force the vulnerable party to change its policies if the strongest party threatens to end the relationship.³⁷ For instance, the USA has threatened South Korea and Germany with ending information-sharing and reducing security protection, in order to demand them stay away from Huawei.³⁸ The UK government's attitude towards Huawei's 5G technology, which has gone from hesitation to a firm ban, is inextricably linked to the US use of persuasive pressure.

A technological stranglehold in the digital nexus has dual effects. In a technological stranglehold, the dominant state possesses specific technological advantages that can influence the direction of technological development and the pattern of the industrial chain, although such advantages are not reflected in all areas of digital technology. Key technologies in subfields would have global impacts. In a digital relationship, a technological stranglehold allows a dominant state to provide its allies with opportunities for technological leapfrogging or participation in cutting-edge industrial and supply chains. This satisfies allies' expectations of enhancing their technological competitiveness. The technological stranglehold also gives the dominant state the technological power of "making or breaking," and the imposition of sanctions or blockades on allies in key technologies will cause their digital industries to suffer serious impacts and even face existential crises.

³⁴ Kurt Taylor Gaubatz, "Democratic States and Commitment in International Relations," *International Organization*, Vol. 50, No. 1 (1996), pp. 110–36.

³⁵ Stephen Walt, "Why Alliances Endure or Collapse," *Survival*, Vol. 39, No. 1 (1997), pp. 157, 166.

³⁶ Mats Berdal and Astri Suhrke, "A Good Ally-Norway and International Statebuilding in Afghanistan, 2001-2014," *Journal of Strategic Studies*, Vol. 41, No. 1–2 (2018), pp. 78–9.

³⁷ Helen Milner, "The Assumption of Anarchy in International Relations Theory: A Critique," *Review of International Studies*, Vol. 17, No. 1 (1991), p. 83.

³⁸ Hiddai Segev, Doron Ella, and Assaf Orion, "My Way or the Huawei? The United States-China Race for 5G Dominance," *INSS Insight*, No. 1193 (2019), p. 2.

The USA has used its dominant position in digital technology to implement imperial control.³⁹ Participants in the digital coalition are concerned with trade-offs in bilateral relationships and the scope for enhancing digital competitiveness. Once exploited by a dominant state, the technological stranglehold in a digital relationship leads to building a coalition with scale effects. With US allies such as Denmark, Sweden, and the UK banning Huawei 5G equipment in line with US demands, one-third of EU member states have already blocked this equipment, although the scale of this blockade is insufficient in the EU's view.⁴⁰ US allies have been fearing that the USA will take advantage of its technology supremacy to combat their digital industries, and hoping to utilise advanced technology to upgrade their rank in the global technological system and, ultimately, to catch up to and eliminate the stranglehold. Joining digital coalitions has caused allies' interest sacrifice (e.g., loss of market share and export profit), which is extremely tormenting for some allies.

Raw materials and equipment in the digital industry also have a certain degree of stranglehold force; however, the market volume is limited, the difficulty of identification is obvious, and substitutability is strong. When Japan banned the export of hydrogen fluoride to South Korea, it quickly launched the construction of a localised production capacity and sought alternative channels. Eventually, Japan resumed exports to South Korea but lost its hydrogen fluoride monopoly in the South Korean market. The stranglehold force of key strategic technologies is prominent, highly recognisable, and difficult to remove. It is a matter of life and death for industries.

To build and sustain complex digital coalitions, the dominant state offers compensation and induces new benefits for members. The first is the externalised concession of domestic law. Through domestic law, the dominant state provides financial or technological support to advance the construction of the coalition at the international level and enhance the benefits to coalition participants. The Innovation and Competition Act of 2021 authorises the Department of State to issue grants to US companies to support the construction of digital connectivity and cybersecurity partnerships related to China's global supply chain.⁴¹ The second approach is a competitive compromise. Generally, there is a competitive relationship between the dominant state and the members of the coalition. To maintain the coalition, the dominant state makes certain compromises, particularly regarding issues related to digital market access, digital regulations, digital taxes, digital subsidies, data localisation, and digital privacy. It is appropriate to make various concessions to allies while maintaining a competitive relationship, take the initiative to move closer to some of the allies' actions, and allow some of the allies' demands to be implemented to sustain their participation in the coalition. The Platform Accountability and Transparency Act proposed by the US Senate is similar in content to the Digital Services Act of the EU.⁴² Since the introduction of the General Data Protection Regulation (GDPR), the EU has developed a series of important digital norms such as the Digital Services Act and Digital Markets Act. In fact, the USA has compromised with the EU on digital regulation, even though these norms primarily regulate US digital platforms.

Autonomy should not be neglected. Allies have their own security concerns, normative cognitions, bilateral and multilateral considerations, understanding of relevant agendas, and institutional or moral influences. For instance, strategic autonomy signifies the maintenance

³⁹ Michael Kwet, "Digital Colonialism: The US Empire and the New Imperialism in the Global South," *Race & Class*, Vol. 60, No. 4 (2019), pp. 3–26.

⁴⁰ Javier Espinoza, "EU Considers Mandatory Ban on Using Huawei to Build 5G," *Financial Times*, 7 June, 2023, <https://www.ft.com/content/a6900b0f-08d5-433d-bfb0-f57b6041e381>.

⁴¹ "S.1260 -United States Innovation and Competition Act of 2021, 117th Congress (2021-2022)," *117th Congress*, <https://www.congress.gov/bill/117th-congress/senate-bill/1260/text>.

⁴² Alex Engler, "The EU and U.S. are Starting to Align on AI Regulation," *Brookings Institution*, 1 February, 2022, <https://www.brookings.edu/articles/the-eu-and-u-s-are-starting-to-align-on-ai-regulation/>.

of internal unity, holistic interests, and international status.⁴³ In 2021, the USA envisioned the creation of an Alliance for the Future of the Internet. However, the EU objected to the idea of dividing the Internet into different camps and the US initiative was eventually downgraded to the Declaration on the Future of the Internet.

Security dependency is the basis for the formation of digital coalitions, and almost all major digital coalitions use alliances as their organisational basis. For simple digital coalitions, such as ideology-oriented coalitions, security dependency can be a sufficient element. However, security dependency is insufficient for demanding digital coalitions with high standards and high levels of coordination and execution. For such digital coalitions, a technological stranglehold is the second-most important element. Some compensation may be given in the form of additional security promises or incentives. Nevertheless, without security dependency, the use of a technological stranglehold will not lead to digital coalitions but may instead lead to intense conflicts.

Chip 4 and the TTC: US Digital Coalition-Building in a Competitive Sino-US Landscape

To engage in a digital rivalry with China, the USA has led the formation and strengthening of diverse digital coalitions. Five Eyes was established as an intelligence mechanism at the end of the Second World War and has now been given new digital confrontation functions. The USA also joined the GPAI and transformed it into a digital coalition targeting to China. Other comprehensive initiatives include the Global Partnership for Infrastructure and Investment and the IPEF, in which digital coalitions play important roles. Chip 4 and the TTC are demanding digital coalitions that require stringent coordination and implementation and were formed under US leadership in response to China's rising digital power. These two cases comprehensively demonstrate the formation mechanism of US-led digital coalitions. The USA and EU announced the creation of the TTC in June 2021. In March 2022, the USA proposed the idea of a Chip 4 alliance to Japan, South Korea, and Taiwan. The first meeting of this alliance, which focused on the semiconductor trade and ecosystem, was held in September 2023 after South Korea finally agreed to join the coalition. Chip 4 has almost monopolised the global high-end chip market in terms of design, production, and exports, isolating China from advanced chip products and technologies, forcibly creating a technological divide, and delaying China's technological catch-up. It represents the most lethal digital coalition to contain China. The USA, China, and the EU are the world's three largest digital economies. Given the "de-risking" consensus, transatlantic allies have employed the TTC to pursue policy coordination on technology export control, formulation of global technical norms and standards, and advancement of technological leadership. They set China as the target of the joint containment policy, which squeezed its space to explore the global digital market and enhanced its discourse power concerning digital agendas. Chip 4 and the TTC form a vast network covering both Europe and the Asia-Pacific region to implement a confrontation policy toward China and serve as the cornerstones of the US digital coalition architecture.

Chip 4: Intense Security Dependency and Dominant Technological Strangleholds

The US-Japan and US-South Korea alliances are the bedrock of Japan and South Korea's foreign policies, respectively, and both are in the grip of intense security dependency on the USA. North Korea, equipped with nuclear, missile, and conventional forces, is seen as an

⁴³ Na Yang, "How China Perceives European Strategic Autonomy: Asymmetric Expectations and Pragmatic Engagement," *Chinese Journal of International Politics*, Vol. 16, No. 4 (2023), pp. 482-3.

existential threat to South Korea and a challenge to the US–South Korea alliance.⁴⁴ The USA began annual joint military exercises with South Korea and Japan in 1975 and 1985, respectively. The year 2019 saw the first US–Japan–South Korea–Australia joint military exercises. Thereafter, the US–Japan–South Korea summit in August 2023 released a joint statement named the “Spirit of Camp David,” which stresses the significance of trilateral collaboration in the face of geopolitical competition and security risks. The three states confirmed their “duty to consult” security commitments and their responsibility to make a joint trilateral response to external threats. Additionally, the statement criticised China for its South China Sea policy and called for enforcing supply chain resilience in important sectors, including semiconductors, and inhibiting cutting-edge technologies from being attained through illegal exports.⁴⁵ In October 2023, the three states held joint military exercises with the aim of improving deterrence and countermeasures against North Korea and demonstrating their ability to collaborate on security. While ostensibly continuing to use the North Korean threat as a pretext, the alliance is targeting China. Notably, South Korea alone or the US–South Korea alliance is sufficient to deal with the North Korean threat, and trilateral security cooperation is not required. In a rare move, South Korea adjusted its strategy in tandem with those of the USA and Japan.⁴⁶

In addition to Japan, which closely follows the USA’s digital policy, South Korea is willing to respond to the USA’s digital security initiative. The USA and South Korea have proposed preparing for the 21st century by expanding their alliance cooperation from traditional security matters to cybersecurity and key technologies. The two states continue to strengthen their digital and space cooperation, seeking to establish a “new cyber-strategic framework,” launch a new interagency dialogue, and build partnerships in key areas such as semiconductors and quantum technology.⁴⁷

The digital threat narratives and value consensus were among the conditions under which Chip 4 was formed. The USA views China’s digital technologies, such as Huawei’s 5G, as supporting digital authoritarianism.⁴⁸ This narrative of “China’s digital threats” is spreading globally. A report by the Australian Strategic Policy Institute claims that Chinese companies provide technical support for public security in China and other developing countries and that China is seeking to expand its model of digital authoritarianism globally.⁴⁹ Teo argues that if the Quad Dialogue is viewed as emphasising Asian democracy, Chip 4 should be viewed as promoting the democratisation of chips.⁵⁰

The import and export of chips are considered important matters for the security of mobility in the digital age. Chip 4 is used to create a digital ecosystem that can be internally recycled to ensure the security of mobility in US-led coalitions. The USA seeks to maintain its global technological leadership and advantage in its coalition-building campaign.

⁴⁴ Klingner Bruce, “What Are the Military Options Available to the ROK-U.S. Alliance for North Korea’s Nuclear Threats: Potentials and Limits,” *KRINS Quarterly*, Vol. 3, No. 1 (2018), pp. 287–326.

⁴⁵ The White House, “The Spirit of Camp David: Joint Statement of Japan, the Republic of Korea, and the United States,” 18 August, 2023, <https://www.whitehouse.gov/briefing-room/statements-releases/2023/08/18/the-spirit-of-camp-david-joint-statement-of-japan-the-republic-of-korea-and-the-united-states/>.

⁴⁶ Jun Jaewoo, “Underlying Dynamics for US-Japan-South Korea Trilateral Security Cooperation,” *Italian Institute for International Political Studies*, 8 April, 2024, <https://www.ispionline.it/en/publication/underlying-dynamics-for-us-japan-south-korea-trilateral-security-cooperation-169126>.

⁴⁷ The White House, “Fact Sheet: Republic of Korea State Visit to the United States,” 26 April, 2023, <https://www.whitehouse.gov/briefing-room/statements-releases/2023/04/26/fact-sheet-republic-of-korea-state-visit-to-the-united-states/>.

⁴⁸ Steven Feldstein, “When It Comes to Digital Authoritarianism, China Is a Challenge-But not the Only Challenge,” *War on the Rocks*, 12 February, 2020, <https://warontherocks.com/2020/02/when-it-comes-to-digital-authoritarianism-china-is-a-challenge-but-not-the-only-challenge/>.

⁴⁹ Danielle Cave, et al., “Mapping China’s Technology Giants,” *Australian Strategic Policy Institute Issues Paper*, No. 15 (2019), pp. 4–11.

⁵⁰ Sarah Teo, “ASEAN and Multilateralism in the Indo-Pacific: Past, Present, and Future,” in Samir Saran and Vinia Mukherjee, eds., *Adrift at Sea: Lighthouse in the Tempest?* (New Delhi: Observer Research Foundation, 2023), p. 111.

Therefore, Chip 4 was designed to prevent China from becoming a semiconductor leader and gaining strong capacity for chip production. This reflects US anxiety in the face of the rise of China's semiconductor industry and its attempts to secure control over the supply chain.⁵¹ Chip 4 is intertwined with the IPEF; however, while the IPEF is working with the Build Back Better World (B3W) initiative to counter the Belt and Road Initiative, Chip 4 has taken on the function of contending with China in the area of high-tech and sensitive technology products. As a result, the IPEF will be able to shape the global digital economy according to the "US model"; maintaining US digital leadership, it will build a US-led global digital economy and regulation system and dilute China's influence.⁵² Chip 4 controls advanced semiconductor processes, equipment, and software, making it impossible for China to obtain advanced chips, widen its technology gap, or decentralise advanced manufacturing processes.⁵³

Chip 4 is built on the global distribution of semiconductor digital capacity and digital correlations. The USA is at the top of the semiconductor industry and trade pyramid, with Japan, South Korea, and Taiwan holding significant positions. Thus, this alliance could boost US chip production capacity and form a global club of chip R&D, production, and exports.

According to a report on national technology levels released by the Korea Planning and Evaluation Institute of Industrial Technology, if the USA's semiconductor technology level is considered 100%, compared to that of South Korea is 86%, showing a downward trend, whereas that of China is 81.5%.⁵⁴ With regard to semiconductor production, the global share of the USA is not high at only 10%. However, in the semiconductor value chain, the USA occupies an exclusive share of up to 39%. The USA is in the upper reaches of the industry and a global leader in integrated circuit designs.⁵⁵ Currently, it has the primary economic goals of reviving the domestic manufacturing industry and reducing its overreliance on external supply chains.⁵⁶ The global challenge facing the US semiconductor industry is primarily production capacity deficit rather than technical incompetence. There are three pillars of semiconductor technology and production: the equipment industry, system-level design and architecture planning, and the end-use market. The USA is strong in both design and equipment, and home to Applied Materials, Lam Research, and KLA. Nevertheless, these companies lack the capacity to produce semiconductors in the end-use market. In the earliest days, the USA had a near-monopoly on chip production. However, in the 1960s, it began to outsource its electronics industry to Asia, including Japan, which is one reason for its current lack of capacity. Taiwan Semiconductor Manufacturing Company Limited (TSMC) is currently the world's largest chip producer, accounting for 80–90% of the global share of high-end chip production.⁵⁷

Fischer argues that export controls have become a key agenda for mechanisms like Chip 4 and that the USA must use carrot-and-stick policies to ensure that its allies work closely

⁵¹ Jae Chang, "The United States Looks to Form Semiconductor Alliance with Indo-Pacific Partners," *East-West Center*, 1 June, 2022, <https://asiamattersforamerica.org/articles/the-united-states-looks-to-form-semiconductor-alliance-with-indo-pacific-partners>.

⁵² Lin Qin and Wang Li, "Power Transition, Hegemonic Maintenance and the Indo-Pacific Economic Framework," *Irish Studies in International Affairs*, Vol. 33, No. 1 (2022), p. 12.

⁵³ Jiann-Chyuan Wang and Yu-Chun Ma, "The Impact of Semiconductor's Technology Regulations from the US, Japan, and the Netherlands on China's Economy," *Taiwan Strategists*, No. 18 (2023), p. 7.

⁵⁴ "KEIT Reports 'Korean Semiconductor Competitiveness Has Fallen for Four Consecutive Years'," *BusinessKorea*, 14 May, 2024, <https://www.businesskorea.co.kr/news/articleView.html?idxno=217036>.

⁵⁵ Frank Umbach, "The Escalating Chip War between China and the West," *Geopolitical Intelligence Services*, 29 April, 2024, <https://www.gisreportsonline.com/r/escalating-chip-war/>.

⁵⁶ Nurullah Gur and Serif Dilek, "US-China Economic Rivalry and the Reshoring of Global Supply Chains," *Chinese Journal of International Politics*, Vol. 16, No. 1 (2023), p. 62.

⁵⁷ Richard Elkus Jr., "A Strategy for The United States to Regain its Position in Semiconductor Manufacturing," *Center for Strategic & International Studies*, 13 February, 2024, <https://www.csis.org/analysis/strategy-united-states-regain-its-position-semiconductor-manufacturing>.

with it.⁵⁸ Japan is particularly influential in the semiconductor raw-material market and occupies a critical position in the supply of photoresists and other coalition-end semiconductor materials. Both TSMC and Samsung have the capacity for 3 nm chip production. The technological stranglehold is an important mechanism driving the formation of the Chip 4 coalition. The USA has a technological advantage in chip design and algorithms, which means that it controls technological valves, especially in the cutting-edge semiconductor industry.

For Japan and South Korea, failure to participate in Chip 4 will result in US sanctions or restrictive policies towards their companies, making normal chip production impossible. Cutting-edge electronic design automation (EDA) software and chip design technology are dominated by Synopsys and Cadence in the USA. FinFet technology for mainstream high-performance chips is dominated by Intel, and extreme ultraviolet (EUV) lithography is controlled by ASML, with the USA behind the scenes. Thus, China attempted to bypass the EUV and FinFet chip technologies to develop new technology paths for high-performance chips such as the quantum chips developed by Huawei. Chip design technology can be called the “source of chips”: it is the foundation of the chip industry chain and determines the performance level and mass production of chips. Without EDA software, the chip industry will stop running. China already has EDA software but mainly uses it for 28 nm chip design. Japan and South Korea are greatly constrained by US digital technology hegemony. Samsung’s cutting-edge chip processes are based on many Synopsys key intellectual properties (IP) such as 8LPU, SF5, SF4, and SF3. Synopsys helps Samsung design cutting-edge multichip systems in 2.5D and 3D. Multichip systems are built on Synopsys EDA platforms, including the 3DIC Compiler, which is based on integrated circuit (IC) design data models, and UCle IP, which improves capacity and performance through the use of 3DIC architectures and enhances IC package reliability based on features such as 3D views. Both Samsung’s 3 nm chips and TSMC’s 2 nm chips will use Gate-all-around Field Effect Transistor (GAAFET) technology instead of the mainstream FinFet technology; however, the chip design software for GAAFET technology remains in the hands of the USA. If the USA restricts the export of related EDA software to Japan and South Korea, it will stifle their efforts to pursue the capability to manufacture high-end chips. The USA has already targeted China and implemented export controls on EDA software.

The USA has tried to offer compensation or new economic temptations to ensure the stability of Chip 4. It first succeeded in convincing Japan to accept the idea of a chip coalition and then pressured South Korea to join it. TSMC’s capabilities in high-end chip production have received significant attention in the USA. To effectively coordinate interests, US Treasury Secretary Yellen proposed a “flexible supply chain” and “friend-shoring” to lure South Korea. The Creating Helpful Incentives to Promote Semiconductors (CHIPS) Act repeatedly mentioned China’s threat to the USA’s scientific and technological status and provided subsidies to attract the cutting-edge chip production capacities of TSMC and Samsung to the USA. Employing conditional subsidies, this act seeks to prohibit new investments in mainland China to produce chips below 28 nm. To attract related semiconductor companies to invest in factories, the USA launched an externalisation of concessions based on domestic laws. The CHIPS Act allocated 500 million dollars to sponsor collaboration with foreign governments and partners in the construction of safe semiconductor supply chain. South Korea and the USA have reached an understanding on semiconductor export controls to clear the way for the construction of Chip 4.⁵⁹ After Huawei was banned from obtaining high-end chips, the USA became the most important source of orders for the TSMC. The

⁵⁸ Fischer, “Silicon Curtain,” pp. 56–7.

⁵⁹ Gary Clyde Hufbauer and Megan Hogan, *CHIPS Act Will Spur US Production but Not Foreclose China* (Washington, DC: Peterson Institute for International Economics, 2022), p. 18.

TSMC then decided to move its 5 nm chip production line to Arizona. In addition to providing subsidies, the USA made concessions to South Korea by acceding to its request not to explicitly limit chip exports to China. In October 2023, the US government announced that it would indefinitely allow Samsung and SK hynix to send semiconductor equipment to factories in China.

Business forces and business–state relations are important variables in the rivalry of great powers.⁶⁰ Chip 4 members engage in close industrial collaborations and complex digital competition. The Biden administration’s stringent export controls on China were risky. Despite its strengths in the semiconductor industry, the USA cannot manipulate the entire supply chain on its own, and controls are ineffective without the support of key exporting economies. Allies’ domestic digital companies could take advantage of this situation to capture portions of the Chinese market that would otherwise be occupied by US companies. In addition, controls may cause a decrease of US digital companies’ revenue, thereby undermining their R&D capabilities and global competitiveness.⁶¹ Subsidies in the domestic semiconductor industry erode trust and solidarity among coalition members and reduce the cohesion of the digital coalition. Consequently, the USA must move away from the defensive economic state if it hopes to sustain this digital coalition.⁶² To expand the reach of the digital coalition, South Korea and the USA, in cooperation with the private sector, are providing joint training on 5G in the Indo-Pacific region and partnering with states concerned to enhance cyber capacity.⁶³

Japan provides specific raw materials and equipment for the US-led semiconductor industry. Japan is in an advantageous position to supply high-purity hydrogen fluoride and photoresists. After joining Chip 4, Japan announced that it would implement export controls on certain commodities, including semiconductor manufacturing equipment, resulting in a rapid decline in semiconductor exports to China. Japan’s submissive accession to Chip 4 avoids losses incurred by the possible exertion of a USA’s technological stranglehold. At the same time, it could join the US campaign to curb China’s technological progress, reduce its reliance on the Chinese market, make a full-scale foray into the markets of the USA and its allies, and enhance the international competitiveness of the Japanese semiconductor industry. The Chinese market is critical for Japanese and South Korean enterprises; however, technological strangleholds have a greater impact. Japan and South Korea must rely on the USA to expand the market and obtain US subsidies to compensate for the loss of a part of the Chinese market.

South Korea was the most reluctant to join the coalition as a key stakeholder in the construction of Chip 4. According to Cha, although Chip 4 can protect supply chains, a complete decoupling from one of the world’s largest economies is unrealistic.⁶⁴ The USA is asking South Korea to take sides in a great power rivalry, which is certainly a challenge for a state that is highly dependent on trade and raw-material imports as it could lead to strained relations with China.⁶⁵ Given that more than 60% of South Korea’s chips were exported to China, South Korea was wary of the Chip 4’s goal of confronting China. Before signing the agreement, South Korea carefully organised its wording to state that the coalition was

⁶⁰ Ling S. Chen and Miles M. Evers, “‘Wars without Gun Smoke’: Global Supply Chains, Power Transitions, and Economic Statecraft,” *International Security*, Vol. 48, No. 2 (2023), pp. 166, 176.

⁶¹ Fischer, “Silicon Curtain,” p. 52.

⁶² Solís, “Toward a US–Japan Digital Alliance,” p. 1.

⁶³ U.S. Embassy & Consulate in the Republic of Korea, “U.S. & ROK Issue a Joint Factsheet on Their Regional Cooperation Efforts,” 2 November, 2019, <https://kr.usembassy.gov/110219-joint-fact-sheet-by-the-united-states-and-the-republic-of-korea-on-cooperation-between-the-new-southern-policy-and-the-indo-pacific-strategy/>.

⁶⁴ Victor D. Cha, “Collective Resilience: Detering China’s Weaponisation of Economic Interdependence,” *International Security*, Vol. 48, No. 1 (2023), p. 105.

⁶⁵ Choi Hyeonjung, “International Cooperation in the Post-COVID-19 Era,” *Asan International Institute for Policy Studies Issue Brief*, December 2023, pp. 10–11.

not intended to target or restrict China.⁶⁶ South Korea also placed special emphasis on its support for the “One China” principle.

The USA has used its technological advantage to pressure South Korea to join a chip alliance that excludes China, causing the loss of a large Chinese market share.⁶⁷ To go against the USA would deprive South Korea of key US semiconductor technology and access to the US market, damaging the US–South Korea alliance.⁶⁸ South Korea also needed to consider the damage it would suffer as a result of isolation from the US-led digital coalition and how to minimise the impact on China–South Korea’s digital trade. It would be difficult for major global chip companies to move their factories out of China or rebuild them.⁶⁹ South Korea was concerned about China’s retaliation in joining the chip coalition, which would seriously damage its economy. South Korea was also concerned that China would use its influence over North Korea and its status as a permanent member of the UN Security Council to place South Korea in a passive position without Chinese support for the North Korean nuclear issue. The Yoon Suk Yeol administration attached great importance to China’s significant influence on the Korean Peninsula.⁷⁰

Nevertheless, joining Chip 4 has the potential to enhance South Korea’s voice.⁷¹ South Korea is not a member of NATO or an important US-led mechanism such as QUAD, AUKUS, or the Five Eyes. There is strategic anxiety in South Korea that it may lag behind the pace of building US-led transnational mechanisms.⁷² Overall, South Korea prefers to side with the USA. As Lieber argues, US presidents’ foreign policy exhibits significant volatility. Allies are unsure about the continuity of US policy and are concerned about a rift in their relationship with the USA.⁷³ The USA employed security protections to persuade South Korea to join the coalition. At the 2021 US–South Korea Summit, the USA required South Korea to support its global supply chain resilience policy by reaffirming the goal of denuclearising the Korean Peninsula and reinforcing the synergy of the US Indo-Pacific Strategy and the South Korea’s New South Strategy. These two states announced the establishment of the South Korean–US (KORUS) Global Vaccine Partnership.⁷⁴ South Korea joined the chip coalition, in exchange, the USA pledged to provide security guarantees based on extended deterrence.⁷⁵

If South Korea had not joined Chip 4, the South Korean chip industry would likely have been sanctioned by the USA. The USA has a technological stranglehold on South Korea. Once sanctioned, South Korea’s semiconductor industry would quickly be replaced by its competitors. Research by Bloomberg Intelligence shows that the chip industry and supply chains have the most US components. Half of the 10 stages, such as etching and plasma

⁶⁶ Mason Richey and Rob York, “US-Korea Relations: Split Images,” *Comparative Connections*, Vol. 24, No. 2 (2022), pp. 43–62.

⁶⁷ Wang Yi, “Eliminating U.S. Coercion is Crucial for South Korean Semiconductor Expansion,” *Global Times*, 20 January, 2024, <https://www.globaltimes.cn/page/202401/1305745.shtml>.

⁶⁸ Korea Pro, “US Reportedly Presses South Korea to Tighten Chip Export Controls on China,” 4 April, 2024, <https://koreapro.org/2024/04/us-reportedly-presses-south-korea-to-tighten-chip-export-controls-on-china/>.

⁶⁹ Binglei Zhou, “The Impact of the U.S. Chip Act and the Chip4 Alliance, and China How to Respond It,” *Transactions on Social Science, Education and Humanities Research*, Vol. 1 (2023), p. 409.

⁷⁰ Sojeong Lee and Krista E. Wiegand, “Costs of South Korea’s Shifts in Foreign Policy in the Increasing U.S.-China Rivalry,” *JPI Peace Net*, June 2022, p. 5.

⁷¹ Ramon Pacheco Pardo, “From Shrimp to Middle Power to Something More? South Korea as a Global Pivotal State,” in KEI, ed., *Korea Policy 2023* (Washington, DC: Korea Economic Institute of America, 2023), p. 147.

⁷² Bo Ram Kwon, “South Korea’s Pivotal Aspirations in the Indo-Pacific Region,” *RSIS Commentaries*, No. 003–9 (2023), p. 4.

⁷³ Robert J. Lieber, “Biden Foreign Policy: Sobered by Reality or Condemned to Repetition,” *Israel Journal of Foreign Affairs*, Vol. 15, No. 2 (2021), p. 221.

⁷⁴ The White House, “U.S.-ROK Leaders’ Joint Statement,” 21 May, 2021, <https://www.whitehouse.gov/briefing-room/statements-releases/2021/05/21/u-s-rok-leaders-joint-statement/>.

⁷⁵ Rajiv Kumar, “The US-China Chip War and Prospects for South Korea-India Semiconductor Cooperation,” *The Journal of Indian and Asian Studies*, Vol. 4, No. 2 (2023), p. 12.

deposition, which are critical for the South Korean semiconductor industry, are controlled by the USA.⁷⁶ US digital giants such as Advanced Micro Devices (AMD), NVIDIA, and Qualcomm control the chip design process and have implemented a “fabless” business model, whereby design solutions are handed over to companies specialising in the manufacture of semiconductors and “pure-play semiconductor foundries.” Samsung also partially assumes the role of foundry for US chip companies.⁷⁷ Although US capital and markets affect the South Korean semiconductor industry, the most important aspect is that in the core technology sector, Samsung cannot find a way to replace US elements.

Both the Moon Jae-in and Yoon Suk Yeol administrations attempted to resist Chip 4. However, owing to increasing pressure and the fact that it is technologically constrained by the USA, South Korea eventually leaned toward the USA. The mainstream opinion in South Korea recognises the potential for technological upgrading offered by joining a US-led technology circle. Yoon Suk Yeol’s pro-US policy accelerated South Korea’s accession to the USA, although this was not a decisive factor.

South Korea is attempting to upgrade its technological capabilities and position to weaken the constraints of the USA’s technological stranglehold. However, this intention is challenging. The market is shrinking due to the US technological blockade of China. The chip self-reliance movement in China is increasing, and the country is expected to rapidly achieve significant advancements in chip technology. This has weakened South Korea’s competitive advantage and status.⁷⁸ In March 2023, South Korea proposed \$220 billion in funding to promote the “localisation” and “systematisation” of the digital supply chain and create the world’s largest semiconductor cluster. This cluster covers almost all segments (e.g., raw materials, components, equipment, R&D, and design) to ensure a globally leading position and to push Samsung to catch up with TSMC in response to the worldwide chip subsidy race. TSMC initiated the establishment of the 3D Fabric Alliance with the aim of improving its technological competitiveness in the field of chip packaging technology, which can further improve chip performance when there is limited room for chip process upgrades.

Japan is planning to emasculate the USA’s technological stranglehold and upgrade its position in the industry chain. Japan enacted the Semiconductor and Digital Industry Strategy in 2021 and decided to offer a special financial subsidy to Rapidus, which was established in 2022 by Toyota, Sony, and several other Japanese companies. Japan also introduced the EUV photolithography machine to produce advanced chips and hoped that Rapidus would have a 2 nm chip production capability. In negotiations with the US government, Japan was allowed to introduce the IBM-designed GAAFET architecture, and IBM was responsible for implementing technical training for Rapidus. However, the IBM 2 nm chip technology is risky and not supported by the CHIPS Act.

TTC: Moderate Security Dependency and Technological Malposition

The TTC is a digital coalition built on the bedrock of a transatlantic alliance, and security dependency is an important condition for its emergence. Close alliances and digital relationships have facilitated the need for cooperation in digital governance. Digital networks have removed the barriers of transatlantic geographic boundaries and interconnectivity has

⁷⁶ Martin Fritz, “South Korea Invests Big in Becoming a Global Chip Leader,” *Deutsche Welle*, 24 January, 2024, <https://www.dw.com/en/south-korea-invests-big-in-becoming-a-global-chip-leader/a-68073870>.

⁷⁷ The White House, *Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-based Growth: 100-Day Reviews under Executive Order 14017* (Washington, DC: The White House, 2021), p. 34.

⁷⁸ Makoto Abe, “ROK’s New Yoon Suk-yeol Administration Rushes to Strengthen Semiconductor Industry amid Intensifying US-China Confrontation,” *Japan Institute of International Affairs*, 3 February, 2023, <https://www.jiia.or.jp/en/column/2023/02/korean-peninsula-fy2022-04.html>.

enabled digital sharing between the EU and the USA.⁷⁹ The crisis in the Ukraine exposed Europe's vulnerability and intensified its security dependency on the USA. However, progress in strengthening Germany's military capacity has been slow. European elites are skeptical of Europe's capability to act in concert without US leadership. Poland and the Baltic states believe that Europe can only weaken or defeat Russia if it receives US security backing and that the EU will find it difficult to achieve strategic autonomy.⁸⁰ Russia's military action brought NATO's value to the EU to its peak in the post-cold war era. Today, through NATO, the USA provides Europe with strategic support (e.g., reconnaissance and satellite communications, nuclear security guarantees, and nuclear deterrence) and thus can lead Europe to fight together against Russia.⁸¹ More than half of the equipment expenditures of European states were spent on importing US weaponry, totalling up to 95% in the Netherlands.⁸²

However, for years, France has called for European countries to maintain their strategic autonomy, implement an independent European security policy, and avoid becoming subordinate entities to the USA or victims of Sino-US competition. France and Italy do not explicitly support the TTC's anti-China inclinations. The security dependency of European states on the USA is partial and confined, and European states have greater independence and a stronger voice regarding the defence agenda than do Japan and South Korea.

As a digital coalition established by the USA and Europe, the TTC is based on digital and industrial linkages, reflecting the distribution of technological capabilities. The EU and the USA must manage dependencies and reduce the risks posed by the fragmentation of standards.⁸³ The TTC can strengthen US-EU policy coordination and interoperability. The two sides are particularly concerned with the online distribution of illegal content.⁸⁴ The TTC addresses the semiconductor supply chain, which is an important convergence of US and EU interests. The EU is dependent on the USA for semiconductor design, and both sides are dependent on Asia for advanced semiconductor production. In niche areas, such as the production of discrete semiconductors and analogue integrated circuits, the EU has certain advantages.⁸⁵

The Biden administration has inherited Trump's security discourse toward China,⁸⁶ portraying China as a strategic competitor among allies to construct a shared cognition⁸⁷ and creating the narrative of "China's digital threat" and a consensus of values between itself and Europe. Europe has responded to this US narrative and wants the TTC to achieve a "values-based digital transformation."⁸⁸ Although Europe is internally divided, there

⁷⁹ Daniel R. Russel and Blake H. Berger, "Weaponising the Belt and Road Initiative," *Asia Society*, 8 September, 2020, <https://asiasociety.org/policy-institute/weaponising-belt-and-road-initiative>.

⁸⁰ Anatol Lieven, "The Future of European Security," *Quincy Institute for Responsible Statecraft*, 11 July, 2023, <https://quincyinst.org/research/the-future-of-european-security/#executive-summary>.

⁸¹ Jana Puglierin, "For NATO to Thrive, Europe Needs to Wake Up," *Internationale Politik Quarterly*, 30 April, 2024, <https://ip-quarterly.com/en/nato-thrive-europe-needs-wake>.

⁸² Matthew Karnitschnig, "America's European Burden: How the Continent Still Leans on the US for Security," *Politico*, 14 June, 2023, <https://www.politico.eu/article/america-europe-burden-continent-leans-security-defense-military-industry/>.

⁸³ Dimitrios Anagnostaki, "The European Union-United States Cybersecurity Relationship: A Transatlantic Functional Cooperation," *Journal of Cyber Policy*, Vol. 6, No. 2 (2021), p. 247.

⁸⁴ Marcin Szczepański, *EU-US Trade and Technology Council: Impact of the War in Ukraine and the Way Forward* (Brussels: European Parliamentary Research Service, 2022), p. 5.

⁸⁵ Marcin Szczepański, *EU-US Trade and Technology Council: New Forum for Transatlantic Cooperation* (Brussels: European Parliamentary Research Service, 2021), p. 7.

⁸⁶ Jun Yan Chang, "Of Risk and Threat: How the United States Perceives China's Rise," *Chinese Journal of International Politics*, Vol. 16, No. 3 (2023), p. 380.

⁸⁷ Stephanie Christine Winkler, "Strategic Competition and US-China Relations: A Conceptual Analysis," *Chinese Journal of International Politics*, Vol. 16, No. 3 (2023), p. 352.

⁸⁸ Annegret Bendiek and Isabella Stürzer, "Advancing European Internal and External Digital Sovereignty," *Stiftung Wissenschaft und Politik*, 3 November, 2022, <https://www.swp-berlin.org/10.18449/2022C20>.

is some consensus with the USA on the concept of the “China trade risk.” The internal divisions imply diverse European actions against China.⁸⁹ The USA has long combined democratic values with standard settings to weaken China’s influence.⁹⁰ Some claim that the Digital Silk Road is involved in the collection of military data.⁹¹ Others argue that China is a threat in the cyberspace realm and that it is advancing its military expansion.⁹²

Europe makes a more moderate assessment of China but views Russia as a far greater security threat.⁹³ Europe is sceptical about the future prospects of Sino—Russian relations, accusing China of providing insufficient humanitarian aid to the Ukraine and failing to use its strategic partnership to put pressure on Russia. Sino—European relations have faced challenges. Europe has become more inclined to fall back on the USA, defining China as a “systemic challenge,” following US technology policy towards China, and implementing sanctions. Nevertheless, Sino—European cooperation is valued in Europe.

After the Trump administration blocked Huawei’s 5G technology, it lobbied for and pressured European states. There was resistance to US pressure in 2018; however, security dependency was utilised to put more pressure on Europe. For example, in March 2019, the USA threatened Germany with cuts in defence and counterterrorism intelligence sharing if it did not ban Huawei 5G. Security dependency on the USA and the EU’s concerns about its own security produced synergistic effects. The European Commission endorsed 5G cybersecurity toolbox measures in early 2020, requiring member states to ban devices from “high-risk suppliers,” with Huawei and Zhongxing Telecommunications Equipment Corporation (ZTE) as the main targets, to mitigate 5G cybersecurity anxiety and reliance risks.

Due to malpositioning, technological strangleholds seem to have limited effects within the US—European digital relationship. ASML’s technology is constrained by the USA, and Europe does not have cutting-edge technological capabilities in either AI or semiconductor fabrication. There is a huge gap between both Europe and the USA and between Europe and China. Thus, the USA lacks key technological points to force European companies to follow its policies in the vast majority of technology areas. More than half of Europe’s semiconductor capacity is used in the production of 180 nm chips, which are primarily used in automobiles, machine tools, sensors, etc.⁹⁴ Infineon, NXP, and STMicroelectronics mainly undertake automotive chip production and engage in intense competition. The EU is becoming increasingly aware that expanding the production of cutting-edge chips is impractical because no European company has the ability to produce leading-edge chips. Only ASML has an advantage; however, it is limited to lithography.⁹⁵ ASML produces two main types of representative lithography: deep ultraviolet (DUV) and EUV. The company occupies 60% and 100% market shares in these two types of lithography, respectively, which gives it an outstanding technological advantage. Several other processes are also involved

⁸⁹ Eric Meyers and William Alan Reinsch, “The Push for U.S.-EU Convergence on Economic Security Policy,” *Centre for Strategic and International Studies*, 7 July, 2023, <https://www.csis.org/analysis/push-us-eu-convergence-economic-security-policy>.

⁹⁰ Jeff Grove and Craig Updyke, *Considering the U.S.-EU TTC Working Group on Technology Standards* (Washington, DC: Transatlantic Leadership Network, 2021), https://www.transatlantic.org/wp-content/uploads/2021/12/11-30-2021-Grove_WGTransatlanticEconomy-v2.pdf.

⁹¹ Daniel Russel and Samuel Locklear, “China Is Weaponising the Belt and Road. What Can the U.S. Do about It?” *The Diplomat*, 22 October, 2020, <https://thediplomat.com/2020/10/china-is-weaponizing-the-belt-and-road-what-can-the-us-do-about-it/>.

⁹² Janka Oertel, “V. NATO’s China Challenge,” *Whitehall Papers*, Vol. 95, No. 1 (2019), p. 67.

⁹³ Fischer, “Silicon Curtain,” p. 54.

⁹⁴ Frédérique Carrier, “The Chip Industry’s Reshoring Revolution,” *RBC Wealth Management*, 14 November, 2023, <https://www.rbcwealthmanagement.com/en-asia/insights/the-chip-industrys-reshoring-revolution>.

⁹⁵ Ryan Browne, “Europe Approves Its \$47 Billion Answer to Biden’s CHIPS Act - Here’s Everything That’s in It,” *CNBC*, 19 April, 2023, <https://www.cnbc.com/2023/04/19/europe-approves-its-47-billion-answer-to-bidens-chips-act.html>.

in chip production in addition to lithography technology such as deposition, etching, cleaning, ion implantation, and testing. Among these technological fields, Europe relies on the USA and cannot complete its production by using only its own strengths.⁹⁶ Nearly 30% of ASML components come from US companies, which must abide by US regulations. The EU supports the US aim of preventing China from acquiring high-end chips. ASML ceased exporting EUV lithography to China in accordance with US directives, and DUV's lithography below 14 nm was restricted from being exported to China at the request of the USA. Thus, ASML has lost its market for high-end lithography in China. However, US companies have been developing chip production processes that bypass photolithography. Instead of putting the issue of ASML's lithography production and supply into the TTC framework for discussion and turning it into a bargaining issue for the USA and Europe, the Netherlands is willing to negotiate bilaterally with the USA to minimise the impact of US policy on ASML. Consequently, although the USA has a technological stranglehold over ASML, it has a relatively weak technological stranglehold over Europe.

Driven by the notion of "digital sovereignty," Europe also wants to elevate its position in the digital nexus and not be held hostage to US or Chinese technology. On 17 December 2020, member states of the EU issued a declaration on promoting semiconductor technologies, with the goal of achieving a 2 nm chip production capacity. In July 2023, the EU Chips Act was adopted, which aimed to increase the EU share of the semiconductor market from 10% to 20% and to build EU chip technology capabilities through the European Chip Initiative. To implement the chip program, the EU set up a public-private partnership network called the Chips Joint Undertaking to achieve breakthroughs in key chip technologies, including quantum chips, cutting-edge chips, and chip design technologies. However, the lack of venture capital in Europe and policy support from member states has made the progress of EU digital technology difficult.

European companies often face unfair market competition owing to asynchronous penalties. The US policy of sanctions and restrictions on China has led to restrictions on the exports of some European companies to China; however, the USA imposes exemptions on its own companies to the detriment of European companies' interests. As highlighted by the technology embargo on Huawei, European companies have been forced to comply with US sanction directives.

With the Digital Marketplace Act and Artificial Intelligence Act, Europe has an overly strict regulatory environment that constrains technological innovation. For example, several promising European AI companies have been acquired by the USA, which controls software, machine learning, and graphics processing unit (GPU) technology and is even more dominant in generative AI, as represented by ChatGPT. Despite the 2020 EU White Paper on Artificial Intelligence, in which the EU proposed the development of AI and quantum computing technologies to compete with the USA and China, Europe still lags far behind. Only one European company, Spotify, is listed as one of the 50 Internet companies with the highest market capitalisation in the world.

Technical standards and the coordination of resources are critical coalition agendas in relation to digital competition between the USA and China. According to McGeachy, technical standards were once considered an obstacle by China as Chinese companies were originally controlled by foreign companies, and the implementation of the Digital Silk Road led to the application of and support for technical standards.⁹⁷ The USA and the EU have established a working group to create a global centre for technical standards⁹⁸ and are taking the initiative through the TTC in the global competition for such standards.

⁹⁶ Jordan Bish, et al., "A New Dawn for European Chips," *Deloitte*, 3 November, 2022, <https://www2.deloitte.com/xe/en/insights/industry/technology/semiconductor-chip-shortage-supply-chain.html>.

⁹⁷ Hilary McGeachy, *US-China Technology Competition: Impacting a Rules-Based Order* (Sydney: The United States Studies Centre at the University of Sydney, 2019), pp. 6–12.

⁹⁸ Matthias Bauer, et al., "In Support of Market-Driven Standards," *ECIPE Occasional Paper*, No. 1 (2023), p. 3.

The two sides have strengthened their cooperation in areas such as Privacy Shield agreements, digital principles and standard development, export controls, and IP rights. They will also use NATO's Defence Innovation Accelerator for the North Atlantic to support the development of 6G technology.⁹⁹ DigitalEurope, an industry lobby organisation comprising technology companies and other commercial entities, proposed supporting the TTC in regulating government access to personal data, promoting cybersecurity certification systems, setting standards for the procurement of communications technologies, and strengthening the global convergence and mutual recognition of standards.¹⁰⁰ There are 10 working groups in the TTC that aim to harmonise export restriction policies, promote economic growth, upgrade the level of AI technology, encourage synergistic development through collaborative research, and avoid US–European conflict over subsidy policies.¹⁰¹

Maintaining mobility security and US–European technological leadership, as well as supporting competitiveness in the global coalition-building campaign, are the key objectives of the TTC. The TTC has proven instrumental in enhancing the US–European partnership, and the USA and Europe have used the platform to coordinate sanctions against Russia and jointly promote the free flow of data.¹⁰² The TTC is regarded as a cornerstone of broader US–European cooperation, reinforcing the US–European-led order.¹⁰³ The European Commission has recognised the TTC's role as a value-based link between the USA and Europe in shaping “people-based” digitalisation grounded in democratic values, emphasising the importance of open and competitive markets in the face of the risk of unfair competition and technological abuse, and safeguarding the US–European technology leadership.¹⁰⁴ It is argued that values such as individual rights and democracy make the USA and Europe natural digital partners.¹⁰⁵ The TTC aims to construct a “democratic digital governance model without compromising regulatory autonomy.” The coalition is the result of coordination and compromise between the USA and Europe.¹⁰⁶ The two sides have developed different approaches to finding alternatives to China with the aim of creating a “club of friends.”¹⁰⁷

The EU has not faced the same sacrifice of interests as have Japan and South Korea. In the construction of the TTC, the USA has made less use of alliance pressure and has instead tried to discover the intersection of the two sides' policy objectives. Despite identifying China as an increasingly assertive challenge, the EU does not share the US position on how to deal with China.¹⁰⁸ The USA has made concessions to Europe. US companies, such as Meta, have no choice but to adapt to the GDPR and demand that US law be brought in line with it. The TTC is not a platform for US–EU Privacy Shield 2.0 negotiations: the European Court of

⁹⁹ Daniel S. Hamilton, *Forging a Transatlantic Technology Alliance: Opportunities and Challenges Related to ICT and Cloud* (Washington, DC: Transatlantic Leadership Network's Trade and Technology Working Group, 2022), pp. 1–12, March, 2022, <https://www.transatlantic.org/wp-content/uploads/2022/03/TTC-ICT-and-Cloud-January-2022.pdf>.

¹⁰⁰ Szczepański, *EU-US Trade and Technology Council*, p. 8.

¹⁰¹ Stefan Fölster, *From Digital Protectionism to Digital Alliances: An Opportunity for Sweden as Chair of the Council of the EU* (Stockholm: Frivärld/Free World Forum, 2023), p. 17.

¹⁰² Fredrik Erixon, “Does Transatlantic Economic Leadership Have a Future?” in Katja Geršak, ed., *Secure and Digital Europe: Forging a Digitally Advanced Future with Deepened Transatlantic Cooperation* (Ljubljana: Centre for European Perspective, 2022), p. 18.

¹⁰³ The White House, “U.S.-EU Joint Statement of the Trade and Technology Council,” 31 May, 2023, <https://www.whitehouse.gov/briefing-room/statements-releases/2023/05/31/u-s-eu-joint-statement-of-the-trade-and-technology-council-2/>.

¹⁰⁴ European Commission, “EU-US Launch Trade and Technology Council to Lead Values-Based Global Digital Transformation,” 15 June, 2021, https://ec.europa.eu/commission/presscorner/detail/en/ip_21_2990.

¹⁰⁵ European Commission, “EU-US: A New Transatlantic Agenda for Global Change,” 2 December, 2020, https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2279.

¹⁰⁶ Szczepański, *EU-US Trade and Technology Council*, p. 6.

¹⁰⁷ Charles Lichfield and Georg Riekes, *How the EU and the US Should Overcome Their Trade and Supply Chain Disputes* (Brussels: European Policy Centre, 2022), p. 4.

¹⁰⁸ Chad P. Bown and Cecilia Malmström, “What Is the US-EU Trade and Technology Council? Five Things You Need to Know,” *The Peterson Institute for International Economics*, 24 September, 2021, <https://www.piie.com/blogs/trade-and-investment-policy-watch/what-us-eu-trade-and-technology-council-five-things-you-need>.

Justice has already ruled on the Privacy Shield (Schrems II), and the European Commission seeks lasting solutions regarding data flows.¹⁰⁹

The TTC allows the USA and Europe to avoid conflict. The USA has decided to avoid a vicious race for government subsidies to evolve a US–European semiconductor reciprocity system.¹¹⁰ For the USA, the TTC is used to contain China, whereas for Europe, it plays the dual role of holding both the USA and China at bay. TTC can weaken the tensions brought about by US digital hegemony and ensure the resilience of the supply chain while avoiding a direct confrontation with China.¹¹¹ During the Trump era, the USA withdrew from the Paris Agreement and imposed tariffs on some European products, complicating US–European relations.¹¹² US–European conflicts have caused damage to the OECD, the G7, and the World Trade Organisation, although the TTC has been able to resolve some of the US–European contradictions.¹¹³ In terms of digital competitiveness, both the USA and Europe value TTC, which is seen as a global standard builder in key and emerging technology areas¹¹⁴ and a facilitator of the digitisation of transatlantic transactions.¹¹⁵

Conclusion

Digital coalition is the primary tool used by the USA to compete with China in the digital age and differs markedly from traditional alliances and military coalitions. The USA's main objectives in building coalitions are to maintain its mobility security and that of coalition members (especially supply chain security), preserve or strengthen its technological leadership, and preserve its competitive advantage against global initiatives proposed by China. The two main determinants of building and maintaining digital coalitions are the security dependency of US allies and the technological stranglehold in the digital relationship. Security dependency determines the likelihood of coalition building; the higher the dependency, the more willing allies will be to respond to the dominant state's digital security narratives and mobilisation. Under these conditions, there is the potential for the construction of simple digital coalitions centred on conceptions and governance initiatives. However, the potential to build and maintain a complex and demanding digital coalition hinges on the presence of a technological stranglehold in the digital relationship. A technological stranglehold involves forceful control of the supply of key technologies that are critical for the survival of industry. A significant technological stranglehold owned by the dominant state means that allies may sacrifice market and trade interests, participate in digital coalitions to ensure the integrity of their industries, and realise future technological advances. Thus, the dominant state compensates for maintaining digital coalitions.

Chip 4 and TTC are representative digital coalitions formed by the USA against China. Japan and South Korea's security attachment to the USA has been significantly higher than that of the EU. Since Japan and South Korea are both leaders in the semiconductor industry,

¹⁰⁹ Tyson Barker, "TTC Lift-off: The Euro-Atlantic Tech Alliance Takes Shape," *Internationale Politik Quarterly*, 30 September, 2021, <https://ip-quarterly.com/en/ttc-lift-euro-atlantic-tech-alliance-takes-shape>.

¹¹⁰ The White House, "U.S.–EU Joint Statement of the Trade and Technology Council."

¹¹¹ Aleksandar Damjanovski, "Buffering' The US-China Tech Rivalry: The EU Strategy in The Era of Technological Competition," *Biblioteca della Libertà*, No. 233 (2022), p. 22.

¹¹² Emily Benson, William Alan Reinsch, and Andrea Leonard Palazzi, "The U.S.–EU Trade and Technology Council: Assessments and Recommendations," *Centre for Strategic & International Studies*, 16 November, 2022, <https://www.csis.org/analysis/us-eu-trade-and-technology-council-assessments-and-recommendations>.

¹¹³ Hosuk Lee-Makiyama, "TTC and Pre-empting the Next Transatlantic Tech War," *European Centre for International Political Economy*, May, 2022, <https://ecipe.org/blog/ttc-pre-empting-next-transatlantic-tech-war/>.

¹¹⁴ Daniel S. Hamilton, "Getting to Yes: Making the U.S.–EU Trade and Technology Council Effective (Summary Brief)," *Transatlantic Leadership Network*, 6 March, 2022, <https://www.transatlantic.org/wp-content/uploads/2022/03/TTC-summary-brief-final-March-6-2022.pdf>.

¹¹⁵ Marcin Szczepeński, *EU-US Trade and Technology Council: Political Alignment Yields Results* (Brussels: European Parliamentary Research Service, 2023), pp. 5–6.

the US stranglehold in key technologies is decisive for the two states with regard to cutting-edge semiconductor development; the EU, on the other hand, lag far behind the USA and China in both semiconductor and AI technology. The USA is unable to impose a strong technological stranglehold on Europe in the vast majority of digital technology fields, with the exception of ASML. Even in the face of significant sacrifices of interest, it was possible to construct the Chip 4. Chip 4 is a more coercive and stringent digital coalition, whereas TTC is looser. In both coalitions, Japan, South Korea, and the EU seek to make technological leaps to weaken the USA's technological stranglehold.

US-led digital coalitions fostered the division of the digital world. Simple digital coalitions based on security dependency have enabled the USA to launch ideology and value offensives against China and have become catalysts for a digital Cold War. The efficacy and vitality of such coalitions hinge on the US inclination toward ideological confrontation and the intensity of substantive joint actions. Demanding digital coalitions based on security dependency and technological strangleholds have been deployed at the cost of depleting alliance security trust and as a mandatory technological hierarchy system centred on US technological superiority. This sort of coalition has coercively reallocated digital resources in accordance with US political objectives and induced the split of the global free trade system. This has had a tremendous impact on the digital industries of China, the USA, and its allies. Once the US substitutionary temptation falls far short of compensating for the sacrifice of allies' interests, the coalition will face the risk of destabilisation. The loss of US technological superiority (either to China or its allies) may lead to the collapse of digital coalitions or they may be transformed into non-confrontational cooperative mechanisms. China has four counter-coalition options: strengthening the global digital partnership network sustained by the Digital Silk Road initiative, breaking through the technological blockade through autonomous critical technology advance, implementing a wedge strategy against US allies, and recruiting corresponding adversarial digital coalitions. Since China pursues a non-aligned policy, it has mainly utilised digital partnerships and technology development to cope with US-led digital coalitions.

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