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NAVIGATING THE TECHNOLOGY SECURITY DILEMMA IN US-CHINA RELATIONS: AN INDONESIAN PERSPECTIVE

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Abstract

This paper studies the technology security dilemma in the context of the strategic rivalry between the United States and China and its effects on Indonesia. Using a qualitative methodology and analyzing documents and reports from government, international agencies, and other third parties, this paper shows that advanced technologies such as semiconductors and artificial intelligence have become critical to economic development and national security; major powers increasingly implement restrictive policies to protect their technological progress. These measures frequently generate mutual suspicion and escalation, creating a spiral of reactions similar to the security dilemma that goes beyond major powers and affects middle powers like Indonesia. Using a neorealist framework, this study argues that the competition over technology is shaped by the structure of the international system, especially the unequal distribution of material capabilities. At the same time, the dual-use nature of emerging technologies increases uncertainty, as technological development can serve both civilian and military purposes. This condition encourages states to adopt precautionary and sometimes restrictive policies, such as export

controls and technological decoupling. As a middle power, Indonesia faces strategic vulnerability because of its dependence on foreign technology and limited domestic industrial capacity. This paper highlights how Indonesia is affected by major powers' policies and, therefore, must actively navigate between them to secure its national interests. In response, this research recommends several strategic approaches for Indonesia, including integrating technology issues into wider economic diplomacy and trade negotiations, diversifying international partnerships, actively engaging in international cooperation frameworks, and using its strategic assets as bargaining leverage. This paper contributes by extending the security dilemma framework to critical technology competition and providing an Indonesia-focused analysis of how a middle power should manage the technology rivalry while protecting its strategic autonomy.

Keywords:

Technology Security Dilemma, Neorealism, US–China Rivalry, Semiconductors, Artificial Intelligence, Strategic Autonomy

1. Introduction

Advanced technologies have moved beyond drivers of economic growth to become critical components of national defense, global influence, and strategic competition. Many countries increasingly view control over these technologies as essential to protecting their sovereignty and securing their geopolitical position. The technology security dilemma arises from this context, describing a situation in which a nation's efforts to enhance its technological security inadvertently threaten others, prompting countermeasures that lead to an escalating cycle of competition.

This spiral of action and reaction is present in the ongoing US-China technology race. Both countries have adopted policies to secure their superiority, especially in key technological areas; meanwhile, they are also trying to restrict their rival's access to these technological advances. They have adopted measures such as export controls, sanctions, and investment in domestic industries as their strategies to protect national interests. However, these policies also have significant consequences for the global technological ecosystem, likely affecting global economic growth, disrupting global supply chains - particularly in semiconductors- and limiting

third-party nations' access to cutting-edge technologies. Such policies also create uncertainty and mistrust between major powers.

The US-China technology race has a severe impact, particularly for countries with moderate capabilities like Indonesia, because they usually lack the resources and capabilities to develop their own technologies, rely heavily on foreign technology, and have limited access to critical technologies. Furthermore, fragmented global technology standards and supply chains create more barriers for these countries, widening the technological gap between them and more advanced economies.

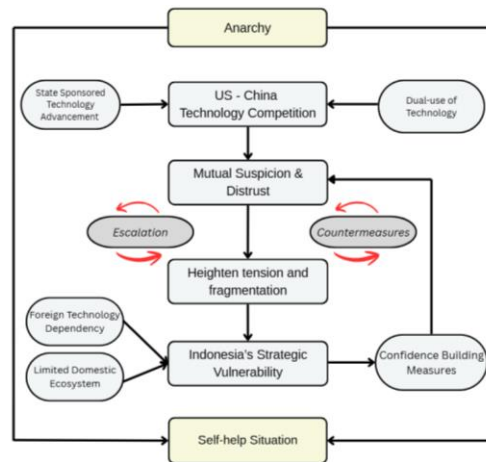
Despite the growing importance of access to technology, existing research on the US-China technology race has focused on the two major powers' policy responses and strategic interests. Less attention has been given to how this rivalry affects other countries, which face increasing marginalization in the global technological field. This research gap accentuates the need to examine the implications of the technology security dilemma for middle powers, and to explore strategies to reduce these effects.

The Lowy Institute's Asia Power Index categorized Indonesia as a middle power based on its comprehensive power score across economic capacity, military strength, diplomatic influence, resilience, and future resources (Lowy Institute, 2025). Ranked 9th of 27 countries in comprehensive power, Indonesia shows its growing regional influence, particularly in diplomacy and future resource development, while also highlighting constraints in military capability and defense networks. This rank reflects Indonesia's position in the world order, which indicates that it acquires some material capabilities and has regional influence but not enough to utilize its position to dominate and shape the international order like those of major powers, such as the US and China, which ranked 1 and 2, respectively, in the Asia Power Index (Lowy Institute, 2025).

Using neorealism as a framework for analysis and focusing on the semiconductor industry and artificial intelligence development, this paper analyzes the dynamics of the technology security dilemma between the United States and China and its implications for Indonesia. This paper seeks to answer why technology competition between the US and China becomes a security dilemma, how this technology security dilemma affects Indonesia, and what strategies Indonesia can adopt to mitigate the negative impact.

2. Conceptual Framework

Neorealism explains the structural logic behind great power competition, particularly the security-driven motivations that shape policies such as export controls, decoupling strategies, and technological containment. With its dual-use nature, technology creates a more complex situation in which cooperation for advancing human life through technology is interwoven with political and security interests. This dynamic is explained in the following conceptual framework.



3. Methodology and Source

This paper applied qualitative analysis by examining primary government policy documents from the US, China, and Indonesia from 2018 — 2026. These documents give information about each country's official position and strategies on technology and security. In addition, it uses secondary documents such as reports from international organizations like WIPO and the OECD to provide an external perspective on the technology environment and its geopolitical implications. The analysis also includes insights from academic journals and think tank publications, which offer in-depth analysis and expert opinions on the subject.

The collected data are organized according to the conceptual framework to illustrate conditions of anarchy and self-help, government-sponsored critical technology development, power accumulation, mutual distrust, spirals of action and reaction, and fragmentation in global technology governance. Additionally, the data are analyzed to identify Indonesia's strengths and weaknesses within the global technology landscape. By examining the implications of the technology race, the study offers policy recommendations for Indonesia to mitigate the negative effects of the US-China technology security dilemma.

However, this study relies on publicly available information, while some aspects of critical technology are confidential; therefore, it focuses on observable policies and official actions

rather than internal decision-making processes that reflect the real intention behind the policies. This limitation does not reduce the overall validity of the findings, since other countries treat public information as signals and base their responses on it. Another limitation is that the study focuses on specific sectors and may not be fully applicable to other areas of technology.

4. Analysis

a. Technology Security Dilemma

China's progress began during the era of Deng Xiaoping, who laid the foundation for a market economy within China's socialist system while keeping China's low profile in the international political arena. This policy has successfully transformed China into a fast-growing economy without being seen as a threat to Western countries. However, Lewis (2019) underscores that Deng introduced policies and programs related to trade, education, research, and investment, as well as espionage, after taking office and realizing that China was lagging. Thus, the effort to acquire new technology, especially Western technology, by means both licit and illicit, has been part of China's economic and security policies since that time (Lewis, 2019).

His successor, Xi Jinping, implemented a more aggressive policy using China's growing global influence. Xi wants China to be seen as an equal player by participating in international affairs. Many countries have perceived China's growing influence differently depending on their interest. For the US, it is a threat to its hegemony, as manifested in the US Indo-Pacific Strategy Paper issued by the White House (February 2022). China is seen as a competitor and threat to the Indo-Pacific region vis-à-vis US interests and its allies because it is trying to become the world's superpower by combining its economic, diplomatic, military, and technological forces. In response, the US is willing to invest in the foundation of its domestic strength, align its approach with allies and partners, and compete with China to defend its interests and those of others (US Indo-Pacific Strategy Paper, 2022).

The US's view of China as a threat is consistent with Mearsheimer's explanation of great power competition: the more power a state accumulates, the more fear it generates among its rivals (p. 43, 2001). China has two elements of potential power, as identified by Mearsheimer (2001), i.e., population and wealth (p. 43), that could be transformed into military forces as actual power. In this context of power competition, technology plays a key role in US-China relations. With its dual-use function, technology can advance a country's actual power when used in various forms

of warfare. At the same time, it also determines a nation's wealth by revolutionizing the economy and other sectors.

Power competition in technology corresponds to the characteristics of the security dilemma. Jervis (in Tang, 2009) described seven attributes of a security dilemma: 1) the security dilemma is structural in origin; (2) states' uncertainty and fears about each other's present and future intentions are vital to forming and maintaining the security dilemma; (3) it is caused by defensive actions, thus unintentional; (4) it tends to produce unintended and self-defeating results—that is, decreases in one's own security; (5) it tends to produce unintended and tragic results—that is, war; (6) the security dilemma can cause war, but is not the cause of all wars; and (7) the dynamic of the security dilemma is self-reinforcing and resembles a spiral. Furthermore, Tang (2009) emphasized three essential aspects of the security dilemma: anarchy, a lack of malign intentions on both sides, and some accumulation of power.

These three essential aspects can explain the logic of US-China behavior. First, anarchy is a system in which there is no authority above the states; under such conditions, the states depend on their ability to self-help (Waltz, p. 111, 1979). Anarchy is also a central cause of security dilemmas, since there is always a possibility that the other state will be aggressive and hostile in the future, and there is no guarantee of peace; they must acquire and accumulate as much power as they can. In the context of anarchy, China is in a self-help mode to reduce its vulnerability to AI development and its reliance on the global semiconductor supply chain. Failing to do so, China will lose its independence and potentially be undermined, lose its sovereignty, and lose the ability to defend itself once attacked by other countries.

In the semiconductor industry, the US and its allies dominate the upstream and midstream sectors, more specifically in design and fabrication, while China is more focused on downstream activities, especially manufacturing products using the chips. A study by Ji et al. (2023) showed that the integrated circuits (ICs) or chips industry is concentrated among the 10 largest companies, which hold 50% of the market share, including Samsung Electronics (South Korea), Intel (the US), SK Hynix (South Korea), Qualcomm (the US), and Micron Technology (the US). Taiwan and South Korea alone account for 45% of the world's chip fabrication capacity (Yeung, 2022). China also faces a huge supply-demand gap. With only 3.2% of the global market share in semiconductor equipment supply but a whopping 34.4% demand (Power, 28 April 2025), China remains vulnerable to supply chain disruptions.

China's 14th Five-Year Plan (2021-2025) for National Economic and Social Development and Vision 2035 clearly stated the vision of building a modern socialist country, among other goals, by developing a digital economy, acquiring advanced technology, and promoting industrial modernization. It set a target of a 7% increase in R&D spending annually to support building innovation systems for the strategic needs of the country and work faster to boost its strategic scientific and technological capability, among others, in new generation of artificial intelligence; quantum information; integrated circuits; brain science and brain-like intelligence; genes and biotechnology; clinical medicine and health; deepspace, deep earth, deep sea and polar explorations (Outline of the 14th Five-Year Plan (2021-2025) for National Economic and Social Development and Vision 2035 of the People's Republic of China _New Initiatives_ Foreign Affairs Office of the Fujian Provincial People's Government, n.d.).

Following this strategy, China has tripled the number of AI patent applications compared to the US. AI Index Report (2024) shows China's granted AI Patents reached 35.31 thousand, or 44%, out of 80.46 AI patent applications in 2022. This figure was almost triple the US's granted AI patents, at 12.08 thousand. With that number, China holds 61.1% of the world's granted AI Patents, followed by the US (20.90%), EU and UK (2.03%), and India (0.23%), while the remaining 15.71% is distributed to the rest of the world (AI Index Report, 2024).

The US is still leading in AI investment, largely driven by the private sector, while China's approach is more government-oriented. From 2019–2023, the US led AI investment with USD 328,548 million. China followed with USD 132,665 million within the same period, around 60% less than the US. In third place is the United Kingdom, with USD 25,541 million, which is 13 times smaller than the US (AIPRM, 2024). However, if China invested US\$ 94,237 million, it could potentially catch up with the US by 2030 (AIPRM, 2024).

China's behavior towards self-sufficiency in technology is explained by Waltz (p. 106, 1979), who argues that a heavily dependent or closely interdependent state worries about securing that on which they depend and seeks control of what they rely on or to lessen the extent of its dependency. Waltz also sees that in the self-help system, considerations of security subordinate economic gain to political interests (p. 107, 1979). In this case, the financial damage caused by decoupling, despite its significant impact, is subordinate to the political interests of security and survival in maintaining its autonomy. Therefore, anarchy provides strong incentives to build unilateral technological capacities.

Second, regarding the lack of intent, China's 14th Five-Year Plan reaffirmed its commitment to defending the principles of peace, development, cooperation, and mutual benefit (Outline of the 14th Five-Year Plan (2021-2025) for National Economic and Social Development and Vision 2035 of the People's Republic of China_New Initiatives_Foreign Affairs Office of the Fujian Provincial People's Government, n.d.). It showed China's willingness to play an active role in creating a more just and reasonable global governance system. President Xi Jinping repeatedly calls upon China's domestic industry to pursue innovation to achieve technology self-sufficiency (Zhang, 2022; Yuan, 2022; Woo & Zhang, 2023). It can be seen as a signal that China's efforts to overcome its vulnerability are in its own interest and that it will use any means possible. However, several countries view this as a threat and accuse China of employing 'economic aggression': industrial policies, including multibillion-dollar funds for developing integrated circuits, foreign acquisitions, and, allegedly, industrial espionage (Lim & Ferguson, 2020). Another source of the technology security dilemma is the linkage between China's government and its technology companies, because strong government support provokes concerns that the government will use those companies to spy on other countries by using their technical capabilities.

The US sees these actions as threats to its national interest, as stated in the US-China Economic and Security Review Commission's report (2019) that Chinese companies – in many cases with the backing of the Chinese government—use a variety of methods to acquire valuable technology, intellectual property (IP), and know-how from US firms. The report also stated that some of these tactics are legal; however, others involve coercive or covert means and frequently target cutting-edge technologies such as artificial intelligence (AI), biotechnology, and virtual reality, which are still in the early stages of development but could provide dual military and civilian capabilities in the future (US – China Economic and Security Review Commission. 2019). The US has taken measures, including prohibiting the sale of semiconductor manufacturing equipment to Chinese firms; restricting export licenses; adding Chinese individuals, organizations, and companies to the Entity List; and lobbying and pushing its allies to impose similar restrictions. The policies were implemented through a series of regulations from 2020 to 2024, resulting in a significant increase in the number of individuals/organizations/companies included in the Entity List related to the semiconductor industry. In 2020, the US added Huawei to its entity list, and at the end of December 2024, there were an additional 140 entities through a package of rules. These rules included new controls on 24 types of semiconductor manufacturing equipment and 3 types

of software tools for developing or producing semiconductors; new controls on high-bandwidth memory (HBM); new red flag guidance to address compliance and diversion concerns; 140 Entity List additions and 14 modifications spanning PRC tool manufacturers, semiconductor fabs, and investment companies involved in advancing the PRC government's military modernization; and a number of critical regulatory changes to enhance the effectiveness of our previous controls (US Bureau of Industry and Security, 2 December 2024).

Third is the element of power accumulation. China has surely raised its level and ability to challenge US hegemony worldwide. It has the resources, materials, and strategy to do so. The rise of China's economy has increased its global influence and made it a threat to the US's unipolarity. It also shifts the balance of power in global politics, long dominated by the US. The US and its allies have been trying to prevent China's advancement and accumulation of power by blocking its access to high technology through policies such as export controls, which have led to technology decoupling between the two countries. In the area of AI and semiconductor industry, for example, under the CHIPS Act, that President Biden signed on 9 August 2022, the US Government has allocated US\$ 278.2 billion for semiconductor incentive with main goals are to establish a US presence in leading-edge semiconductors; fortify the supply of mature node chips; spur research and development in semiconductor sector and create thousands of domestic jobs (Benson et al, 30 May 2023). Within this allocated budget, US\$52.7 billion will be used to enhance domestic facilities for semiconductor fabrication, assembly, testing, packaging, and R&D (Benson et al., 30 May 2023). The CHIPS Act clearly mandates that companies that receive funds must withhold any significant transaction related to the material expansion of semiconductor manufacturing capacity in China; prevent the company from receiving funding from other countries; and limit joint research or technology licensing efforts with foreign entities that raise national security concerns (Benson et al, 30 May 2023).

Evolving mutual hostility and insecurity between the US and China are underlying causes of technology decoupling (Vertinsky et al., 2023; Lim & Ferguson, 2020; Kuik, 2021). Technology decoupling is also a logical consequence of state behavior aimed at maximizing its power and security relative to other states (relative gain) rather than simply its own benefit (absolute gain). The US believes that continued cooperation will benefit China more; therefore, despite the collaboration in these areas being beneficial to the US, it has to take preemptive measures. The spiral of tit-for-tat reactions prompted by mutual insecurity in the technology

domain, which deems it necessary and legitimate to secure national security, is identical to the security dilemma (Lim & Ferguson, 2020). The security dilemma arises from mistrust between states, which comes from a lack of information and leads to misinterpretation of intentions.

b. Potential Impact on Indonesia

In terms of technology infrastructure, Indonesia is still lagging, with disparities in telecommunications and internet access across the country because of geographical challenges caused by thousands of islands separated by vast bodies of water, remote areas, and mountains. In the semiconductor industry, Indonesia is still in its early stages, after losing momentum when a chip manufacturing company, Fairchild Semiconductors and National Semiconductors, established in 1973 through a joint investment between US companies, moved to Malaysia in 1985 due to labor issues (Rachman, 5 August 2024). Nowadays, there are several companies related to semiconductor supply chains, with the oldest and biggest being PT Infineon Technologies Batam. This company is a backend manufacturing site of Infineon Technologies AG that focuses on assembly and testing (Rodehueser, 12 April 2022). Since semiconductors are the foundation of technology development, without the ability to produce them, Indonesia will struggle to compete and further develop AI, which requires advanced computing and strong hardware for data processing. Moreover, there's a critical shortage of talent. Indonesia ranks 46th in the IMD World Talent Ranking, showing a low number of STEM graduates (IMD, 2023). Finally, Indonesia is also weak in cybersecurity and data management, with scattered data systems causing inefficiencies and bureaucratic hindrances.

Although faced with these challenges, Indonesia has vast reserves of materials like silica, bauxite, zinc, and coal fly ash that are vital to the semiconductor industry. Considering this potential, the government has given priority to building its downstream industries through measures such as requirements for companies to build refinement facilities in Indonesia and bans on raw material exports. Based on Government Regulation Number 1 of 2014 concerning the Second Amendment to PP 23 of 2010 about the Implementation of Mineral and Coal Mining Business Activities, companies are allowed to export raw materials in very limited quantities, with the requirement of having a set of management or refining facilities inside the country (Setiani et al, 2024). In 2019, the government issued a regulation banning nickel ore exports through Minister of Energy and Mineral Resources Regulation Number 11 Year 2019 as an effort to protect its

natural resources (Setiani et al, 2024). Continuing this policy, Indonesia added silica sand, other mineral resources, and rare earth minerals to the export ban list through Minister of Trade Regulation Number 6 Year 2026 regarding the Fourth Amendment of Minister of Trade Regulation Number 22 Year 2023 regarding Prohibited Export Goods (Wijaya & Wijaya, 2026). However, production costs in Indonesia remain high, and the funding needed for silica downstreaming is staggering—over 46 billion US dollars by 2030 (Ministry of Investment and Downstream Industry, 2023).

Considering Indonesia's potential and challenges, the dynamic relations between the US and China in technology competition affect Indonesia for several reasons. First, the power and influence that the US and China have on the rest of the world. As a major power, the US can influence a country's or region's stability and instability. However, China has risen as a challenger to US domination, mainly through its economy. China's progress clearly shows a shift in material capabilities that, as neorealists explain, alters the structure of international politics. China's Belt and Road Initiative (BRI) has become a source of development for many countries and an effective instrument for China's influence. A shift in the balance of power could disrupt peace and stability in the Southeast Asia, directly affecting Indonesia's development. These situations, combined with the rivalry between the US and China in the technology sector, add to the complexity of Indonesia's efforts to continue upholding its independence and active foreign policy. Leaning toward China could affect Indonesia's relations with the US and vice versa. With limited players in the technology sector, the options for countries like Indonesia are also limited. Access to technology could become a pressure point in exchange for strategic support or an alliance on political and security issues.

Another strategic issue is Taiwan unification. President Xi Jinping has mentioned the unification of Taiwan as a key objective for the great rejuvenation of China during his speech at the 19th National Congress (Lam, 16 September 2016). While this speech did not specify a timeline, the great rejuvenation of China was targeted for the centenary of the establishment of the People's Republic of China in 2049 (Lam, 16 September 2016). Taiwan has a critical position in the global semiconductor industry supply chain as the world's top exporter. It is home to TSMC, the world's largest semiconductor manufacturer, which supplies chips globally. With this strategic value, should China decide to take military action on Taiwan, the economic cost to the world would be far higher than the Russia – Ukraine conflict or the COVID-19 pandemic, which Bloomberg

Economics estimated at \$10 trillion, or approximately 10% of global GDP (Campbell, 23 October 2025).

Second, concentrated supply chains increase exposure to external disruption. A halt in chip production in one country can cause global shortages and drive up prices, affecting the production of electronics, mobile phones, and other semiconductor-related products worldwide. Interconnectedness can also be seen in technology development, which often involves cooperation among researchers and scientists worldwide. Fragmentation and restricted access could limit Indonesian researchers' opportunities to participate in the global development of the semiconductor industry and AI. According to the World Intellectual Property Organization (WIPO), Indonesia ranked 54th in the 2024 Global Innovation Index (GII) (WIPO, 2023). Across seven GII 2024 areas, Indonesia ranks lowest in Human capital and research (90th), Business sophistication (78th), and Knowledge and technology outputs (73rd) (WIPO, 2023). In this regard, Indonesia must enhance its ecosystem to support innovation and invention through research and development, education, and public-private partnerships.

Third, Indonesia's dependence on foreign technology, especially from the US or China, creates reliance on foreign tools and standards. This dependency makes it vulnerable to intellectual property, costs, and geopolitical influences. Growing inequalities, such as differences in AI development capabilities or data processing, could further marginalize Indonesia in global technology decision-making. Fourth, ethical and governance gaps, especially in AI development. Without its own frameworks, Indonesia may adopt AI systems that lack cultural relevance or create unnecessary biases. For example, the global race for AI is framed as “value competition” by the National Security Commission on Artificial Intelligence (NSCAI), formed in 2018 (Morieson, N., 5 August 2025). Thus, the US and most Western countries promote a model based on open internet principles, data privacy, and democratic values. Although they share the basic principles, European countries are also cautious about interpreting American values and are developing their own standards. In contrast, China is moving towards a vision of cyber sovereignty and state-led digital governance through initiatives like the Digital Silk Road. It is, among other things, reflected in the regulation that developers must register algorithms with authorities, undergo security reviews, and filter politically sensitive content (Morieson, N., 5 August 2025).

Fragmented frameworks could put Indonesia in a difficult position to maintain its free and active foreign policy, since adopting either set of norms may affect its relations with the US

or China. Moreover, the fragmentation risks creating incompatible regulatory regimes that complicate Indonesia's efforts to integrate into global technology value chains and add complexity and compliance requirements for companies developing AI systems.

Fifth, export controls and technological restrictions imposed by major powers can limit Indonesia's ability to innovate by reducing access to critical technologies and making regulatory compliance more challenging. These restrictions may also increase the costs of technological adaptation and development. Over time, unequal access to advanced technologies could widen the digital divide, as developed countries are better positioned to benefit from automation and technological innovation. As a result, existing inequalities between developed and developing countries may become even more pronounced.

5. Strategic Approaches and Recommendations

Within a neorealist framework, which views the international system as anarchic, competitive, and defined by uncertainty of intentions, Indonesia should adopt strategies to safeguard its survival and autonomy in critical technologies. The semiconductor industry and AI are not just neutral tools of development but are increasingly treated as material capabilities for power and strategic influence. Therefore, competition between major powers in critical technologies increases Indonesia's strategic vulnerability. Its approach and policy in building critical technology, although mainly driven by economic development, may be interpreted by major powers as geopolitical signals. The analysis shows that Indonesia lacks the material capability to influence the systemic rivalry between major powers. Therefore, Indonesia should seek to influence the regional order through diplomacy and international cooperation rather than directly challenging the distribution of power, which could provoke major powers.

The strategic reassurance approach could help moderate the technology security dilemma. Stein (1991) explained four strategies of reassurance: exercising self-restraint, norm-setting, making irrevocable commitments, and regime building. By combining these strategies, Indonesia can reduce misperceptions, stabilize expectations, and preserve strategic autonomy. Although they overlap with constructivist and neoliberal theories, norm-setting and regime building can serve as a tool for signaling benign intent and establishing an information-sharing mechanism, therefore increasing transparency and reducing uncertainty and misinterpretation that drive the security dilemma.

- Exercise of Self-Restraint

Self-restraint means intentionally limiting aggressive or threatening behavior to reduce tensions and increase trust. Here, self-restraint functions as reassurance by signaling that the state does not seek an offensive advantage. In the current US-China technology rivalry, self-restraint is notably absent. The lack of restraint between the two powers creates an uncertain environment for Indonesia as it seeks to expand its technological infrastructure.

In this regard, Indonesia has a strong interest in advocating greater self-restraint among major powers in several areas, such as limiting the scope of securitizing technology and implementing countermeasures, avoiding extreme technological decoupling, and avoiding indiscriminate restrictions. Through diplomatic engagement in ASEAN, bilateral, regional, and multilateral platforms, Indonesia can call for transparency in technology governance.

Self-restraint also applies to Indonesia by avoiding technological cooperation exclusively with either the US or China. Indonesia should pursue bilateral technology partnerships with multiple countries such as Japan, South Korea, and the Netherlands, and with regional groups such as the EU. Through partnership diversification, Indonesia could reduce its dependency and preserve its strategic autonomy without provoking the major powers. Diversification and consistency reduce perceptions of sudden alignment shifts due to the dynamic relations among major powers. They can also protect Indonesia from overexposure to sanctions, export controls, or supply chain disruptions.

The Ministry of Foreign Affairs should take the lead in interagency coordination on technological diplomacy to ensure Indonesia does not become structurally tied to or focused on one geopolitical bloc. To strengthen its leadership, the Ministry of Foreign Affairs should establish a dedicated unit on strategic technology and digital diplomacy. This unit would monitor export control policies implemented by other countries, track developments in global semiconductor governance, assess geopolitical risk in technology agreements, and coordinate with domestic ministries on technology-related negotiations.

- Norm Setting

Norm setting involves establishing shared expectations and standards to guide state behavior. Although often associated with constructivism or neoliberalism, norm-setting could also serve in neorealism by reducing uncertainty and signaling benign intentions. Indonesia's active participation in technology norm-setting processes could help its national interests, even though it

has limited capacity for technology development. Like-minded countries have developed several international norms essential to AI governance and ensure that AI technologies are developed responsibly by addressing issues such as ethics, safety, data bias, and access. Some notable frameworks are the Organization for Economic Co-operation and Development (OECD) AI Principles, that was adopted in 2019 and as of May 2026 has 51 adherents (OECD, 2026); Recommendation on the Ethics of AI issued by United Nations Educational, Scientific and Cultural Organization (UNESCO) and adopted in 2021 (UNESCO, 2022); and the Principles for the Ethical Use of Artificial Intelligence in the United Nations System that was endorsed by United Nations System Chief Executives Board for Coordination in September 2022 (UNCEB, n.d.).

Indonesia should put initiatives in these frameworks rather than passively adopt norms advocated by major powers. Indonesia should continue aligning its domestic policies and strategy, such as its National Strategy for Artificial Intelligence 2020 – 2024 (BPPT, 2020) and Law Number 27 Year 2022 regarding Personal Data Protection, with internationally recognized standards, to enhance its credibility, reduce regulatory ambiguity, and signal technological behavior. Furthermore, it can exert its influence as a middle power by bridging and voicing the interests of other middle and small states, promoting interoperability and open standards, and emphasizing equitable access to emerging technologies.

In this context, Indonesia's foreign policy should aim for access to technology development by integrating technology issues into its economic diplomacy. Cooperation agreements should include research collaboration between Indonesian researchers and their counterparts in the partner countries, investment to build local data centers, and human capital development. At the multilateral level, Indonesia should promote open access to AI technologies for civilian purposes and resist rigid technological bloc formation. However, this does not mean Indonesia should take a neutral position on all issues, but rather should exercise strategic flexibility to maintain long-term autonomy.

- Making Irrevocable Commitments

Irrevocable commitments make it harder for states to reverse their policies, thereby reducing uncertainty about a state's intentions in a security dilemma. Although the rivalry between the United States and China has continued, communication between their leaders has remained open through regular meetings. The last meeting between President Biden and President Xi Jinping

on 16 November 2024, during the APEC Economic Leaders' Week in Lima, Peru, before President Joe Biden left office, sent a positive signal that both countries were committed to maintaining stable relations and cooperation. In their talks, the leaders emphasized the importance of preventing the use of artificial intelligence in nuclear decision-making (Renshaw & Hunnicutt, 17 November 2024).

After President Donald Trump took office in January 2025, some of his statements raised strong reactions from both US allies and rivals. On 2 April 2025, he signed an executive order on tariffs, which led to negative exchanges with Chinese officials. In response to China's announcement of export restrictions on rare earth minerals and the increase in US tariffs, the two leaders met on 30 October 2025 during APEC Leaders' Week in Busan. At this meeting, the United States agreed to reduce some tariffs, and China postponed its planned export restrictions on rare earth minerals (Melimopolus, 30 October 2025). This meeting between President Trump and President Xi Jinping helped to lower tensions because leaders' level commitment gives assurances and is less likely to experience future policy reversals in the future. This signals strong commitment even though long-term implementation remains uncertain.

For Indonesia, this uncertainty surrounding great-power commitments reinforces the need for credible and consistent positioning. Therefore, it is important to establish clear and consistent domestic regulations that signal Indonesia's technology strategy is development-oriented rather than militarized. Such regulation also assures its partners that cooperation will not be abruptly politicized, therefore strengthening Indonesia's credibility and reducing suspicion. Indonesia should also strengthen bargaining leverage through economic statecraft. Indonesia possesses strategic assets, including a large domestic market and control over critical minerals used in electronics production. These assets can increase Indonesia's bargaining position in negotiations with major powers. Therefore, the Ministry of Foreign Affairs should align its diplomatic efforts with Indonesia's national technology development strategy. For instance, negotiations on trade and investment agreements should include provisions for joint research, workforce training, and gradual technology upgrading. Indonesia's experience with mineral downstreaming policies is evidence that regulatory instruments can shift its bargaining dynamics with other countries. When combined with a coherent foreign policy, such instruments can enhance Indonesia's relative position without direct confrontation.

- Regime Building

Regime building refers to developing international institutions and rules that govern interdependence and reduce systemic risk. As mentioned earlier, although it is not a primary measure, neorealism, especially defensive realism, acknowledges that regimes can stabilize expectations when they align with state interests and serve as tools to insert power and influence. Major powers' participation in regime building can help moderate the security dilemma, but only under specific conditions — particularly when institutions serve the interests of powerful states and help manage competition. Realists generally reject the idea that institutions can create peace independently; instead, they argue that institutions work when they reflect the distribution of power and reduce uncertainty among rivals. Glaser (1994) argues that cooperation is possible under anarchy when states recognize that others seek security rather than expansion; institutions can facilitate this recognition by clarifying motives, though the impact is modest. Therefore, regime building by major powers can mitigate aspects of the security dilemma by improving information, signaling restraint, and reducing misperception —but only when institutions are supported by major powers and compatible with state interests. Institutions do not eliminate rivalry; they help manage it. For a middle power like Indonesia, regime building is valuable because it increases transparency and predictability by providing a mechanism for information sharing. However, with the technology security dilemma, regime building is fragmented. The United States promotes ad hoc coalitions such as the Quad Tech Network and initiatives within the G7. At the same time, China is pushing for new regimes under its leadership, including those within the Shanghai Cooperation Organization (SCO) and BRI digital platforms.

Given that this technology competition is costly for the US, China, and other countries, it is a rational choice for both the US and China to move toward cooperation by establishing an institutional order. A regime forms a set of rules and norms that provide transparency and predictability in state behavior. Historical examples, such as the Nuclear Non-Proliferation Treaty (NPT), demonstrate how regimes can mitigate security dilemmas by signaling restraint and enabling monitoring. ASEAN is another example of regime-building that helps prevent regional conflict and engage partners through the Treaty of Amity and Cooperation (TAC) and the Southeast Asia Nuclear Weapon-Free Zone (SEANWFZ).

As a member of the G20 and a leading voice within ASEAN, Indonesia has a strategic interest in inclusive regime-building efforts. It should take the initiative in building region-based frameworks, promoting South-South Cooperation, and enhancing multilateralism in technology

governance. Through its involvement in ASEAN digital integration efforts, including the ASEAN Digital Economy Framework Agreement (DEFA), and its participation in global forums, Indonesia could ensure the interests of developing economies are reflected in regime-building.

6. Conclusion

This paper shows that the impact of the technology security dilemma between the US and China is far beyond the major powers. The impact is also experienced by middle powers, like Indonesia, whose development strategies depend on global technological integration. From a neorealist perspective, Indonesia's behavior is shaped by structural constraints. In an anarchic system characterized by uncertainty and competition, survival and autonomy should remain primary objectives. Because Indonesia is a middle power with limited influence in the global arena, it cannot directly eliminate rivalry between major powers, but it can manage its exposure through calibrated positioning and institutional adaptation.

By connecting security dilemma theory to the US-China technological rivalry, this paper helps explain how technology competition by major powers, especially in semiconductors and AI, escalates into a technology security dilemma and how this situation alters the choices of countries like Indonesia. Neorealism provides a framework for analyzing technology governance, especially in AI and the semiconductor industry, as an increasingly important geopolitical issue intertwined with geoeconomics. Drawing on the technology competition and the security dilemma, neorealist scholarship, particularly works on reassurance and defensive realism, helps to identify conditions under which uncertainty, misperception, and escalation can be moderated. In a fragmented technological order, Indonesia's challenge is not to choose sides but to strengthen resilience while preserving flexibility. Therefore, in the era of the technology security dilemma, Indonesia should develop domestic technological capability and reduce dependence on foreign technology, diversify technology resources and supply-chain partnerships, and strengthen its participation in developing global technology governance.

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