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TECHNOLOGY AS AN INSTRUMENT IN GREAT POWER POLITICS: AN OVERVIEW OF THE US-CHINA TECH WAR

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Abstract

Technology competition between the United States (US) and China started to growth significantly at the international level. The United States has implemented highly restrictive policies toward Chinese technology accomplishments. In retaliation, China has responded to US sanctions and limited its access to advanced semiconductors by emphasizing independence and making investments in its own semiconductor manufacturing sector. With both countries imposing tariffs and restrictions on technology companies, the dispute has escalated into a full-fledged technology war. A series of policies have pushed the two countries further apart and towards a technology war. By using power analysis as the main conceptual framework, this research focuses on examining why technology is a fundamental aspect of the US-China great power rivalry. As a concept of power growth, technology accomplishment should not only be positioned as a medium to increase economic interests but also a tool to improve military capabilities and national security. The shifting from technological competition to technological supremacy for the purpose of political domination and influence is inevitable. Thus, technological war and power struggle also have the potential consequences of prolonged conflict and could transform the global economic and political landscape.

Keywords: Technological War, Great Power Politics, US-China Rivalry

INTRODUCTION

In recent decades, China's power has gained attention, as result of the rapid development of the nation from developing state, to one of the most considered powers in the world. It allows China to start shifting the dominance of United States (US) power both in the Asia-Pacific region and globally. Consequently, this policy triggered the US to initiate Free and Open Indo Pacific Region initiative as its national security strategy in 2017. The shifting pronunciation of the Asia-Pacific region to the Indo-Pacific, is seen as an effort to alienate China and an attempt to contain its global ambitions. (Hudaya et al., 2022; Tillerson, 2017). Sahide (2021) also mention China is

gradually establishing its dominance in the global economy, which the US perceives as a threat. The picture of the situation also explained by Sebayang (2024) which mention China is trying to set up a modified structure, while the US seeks to establish hegemonic stability. Furthermore, the US and China's dispute on the economic front also evolved into a trade war that erupted in 2018 as the consequence of the United States' trade deficit with China, for which President Donald Trump charged China with unfair trade practices against the United States. Albeit both countries are experiencing economic dispute, US and China are also having a close economic relationship (Ali Akbar et al., 2024).

China's strength in the military and technology sector is also taken into account by US. In the maritime arena, China managed to grow into the country with the largest naval fleet in the world in terms of quantity since 2020 (Arshad, 2023). China's navy remains behind the US in quality, yet it is rapidly catching up, possibly to continue her trajectory as a major hotspot. Interestingly, former high-ranking US naval officer Joe Sestak (2021) argued that the US has lost its maritime superiority at least in the waters of the Pacific Ocean. This statement is supported by Rand (2024) which stated China has shifted the dominance of the US in the Indo-Pacific region. Chinese fleet has surpassed the US in numbers (Stashwick, 2021), in terms of quality, the Chinese Navy is gradually catching up with the US, especially in construction of new high-tech fleets (Rising, 2022). This situation has escalated tensions, especially by the activation of the Quad and AUKUS military alliances that routinely conduct joint exercises around the waters of the South China Sea. Moreover, the debate over developing nuclear submarines with the newest technology, such as the Virginia Class SSN and AUKUS SSN in 2020 is another source of tension. Even the construction of the two classes of nuclear submarines is identified as an attempt to benefited the US and UK, where the technology and specifications used are exactly the same as teir most advanced nuclear submarines (Detsch et al., 2023;Australian Government, 2024). In retaliation, China was strongly disapproved the movement, and stated that the AUKUS would be going down

into the wrong and dangerous path. This condition is in accordance with to Johnston (1995) and Wang (2017) whom stated that coercive strategies and military confrontation by all the means are being avoided by China, yet considering the attitude of the US and its allies as rival powers in the region, the development of advanced technology in military forces remains a priority for the Chinese's government policy.

The arms race between the United States and its allies versus China has been expanded, includes in the realms of artificial intelligence (AI). It decreased human intervention in targeting, operation, and decision-making in attacking targets on the battlefield AI would most potentially be applied to warplanes, submarines, drones, and other combat vehicles (Lague, 2023). Pramudia (2022) stated that China has indeed shown an ambiguous attitude towards international agreements that prohibit the development of Autonomous Weapon Systems (AWS). However, this could be interpreted in two different ways. First, China's ambiguous attitude is seen as an attempt to stay consistent with the narrative of the peaceful rise of power that has always been released by the government. Secondly, if the agreement had been rejected, China would have to contain the consequences, especially when the peaceful rise narrative is diminished and might threaten global stability and disadvantaged the trust from China's allied state and businesses partner. Thus, China intention to develop AWS still constrained by technological limitations and increased the possibility of technology war with the United States. This logic offered more relevant explanation for China's non-supportive position towards the agreement (Pramudia 2022). The increased technology contestation indicates that the technology is the key to power accumulation in the rivalry between the US and China. Through technological development, advantage in other fields such as military and economy could be achieved. The latest technological innovations have changed the power structure driven by the application of advanced technology in military capabilities.

China's ambition is supported by government's statement which prioritize the policy to be the leader in AI technology globally by 2030 (Koetse,

2024). Even tough, the plan was not specifically disclosed by the Chinese government or military, the US and its allies released intelligence data which stated that China is developing advanced AWS systems and weapons that are claimed to have significantly outperformed the capabilities of the AUKUS countries, which consist of 19 out of 23 areas that are strategic to the AUKUS (Bajak, 2024; Detsch et al., 2023). The claim is also supported by the rapid competition between China and the US in cloud storage technology. Cloud storage technology, which is provided openly by major companies including Google, Microsoft, Amazon, and others, considered a strategic commodity as it could be useful for training and developing AI. Based on data from these providers, cloud storage technology is not only utilized by US clients but also by Chinese companies to develop AI. In response, President Joe Biden announced a "special measure" policy which requires cloud storage providers to confirm the identity of their customers, to restrict access to the cloud for AI training outside the United States', to minimize potential risk particularly from China. (Shrivastava, 2024). The China-US technology war shifts into on the strategic realm. Many researchers such as Ding & Dafoe (2021), Schindler et al., (2023), dan Wu (2020) consider the arms race wrapped in technological warfare marked as a milestone for China-the US second Cold War contestation. Although there is no fundamental ideological differences, with the technology arm race between two countries, has the potential to add significant impact on the stabilization of international order. The prediction based on several factors, : (i) First, China power has significant accumulation especially in economic power compared to USSR on it peak era. Second, the second Cold War geopolitically would be different since US-China conflict would take place in the Indo-Pacific region with a more complicated geopolitical structure. Moreover, the rivalry will be focused of the economy, technology, and armaments than it is to ideology, which will create bigger impact. It will alter the geopolitical landscape and the balance of power on a worldwide scale.

Additionally, if there is no control mechanism that could stop China and the United States from developing weapons, and there is a good chance

that both countries will eventually use force against one another. Due to the lack of discussions and agreements between the two parties on the limitations of weapon development, compared to US and USSR agreement through SALT (Akita, 2022). Previously, during the Cold War, weapons technology and advances in nuclear science played an important role in influencing the global power structure. In recent decades, the important role of technology cannot be separated from the power structure, especially in the context of the United States' technology war with China. Therefore, this paper seeks to analyze how the Technology War between the US and China is able to cause changes in the distribution of power in the international system and help the US and China achieve their goals. This article uses power analysis to examine the extent of technology's influence on great power rivalry which significantly affects the power structure in the global environment. The analysis of technological warfare provides an understanding of how technology become significant instrument of power accumulation in global politics in the future.

DISCUSSION

Power Analysis

Robert A. Dahl (1957) Dahl explains that power is a relational relationship between actors where “A has a power over B to the extent that he can get B to do something that B would not otherwise do”. Dahl's definition refers to the relational approach that is the mainstream and the basis for the development and analysis of power. In line with this approach, Barnett dan Dhuval (2005) defined that power is a type of social relationship that initiated power relations and produced an impact on actor capacity. In the study of International Relations (IR), power is generally related to power relations between states, and a how power is distributed, accumulated, and used in managing foreign relations. The concept of power according to Holsti (1964) could be understood as a tool to achieve national interest. Furthermore, Holsti emphasizes the complex interaction between material capabilities and capacities to influence perceptions and structures in the international system. The two concepts is related to each other especially when power is

considered as state capability in utilizing resources to influence the desired outcome. (Pustovitovskij & Kremer, 2011).

In IR studies, the discourse of power has developed through two approaches, which include realism and liberalism. Realism offers an understanding of power as a central concept to shape competitive state behavior in international politics. The Realism approach explains power as an inseparable entity in international politics. Morgenthau (1997) power is a direct goal to achieve interests. This definition is related to the concept of struggle of power, which explains how states seek power to protect their interests. In addition, balance of power is often used by realists to explain how power is allocated among states to achieve balance. States are seen as logical actors that carry out their interests by allocating power to ensure security and maintain their existence. An understanding of power dynamics is essential in explaining the relationship between states and the efforts made to achieve desired outcomes. The concept of power has evolved to operate beyond the conventional state-centric perspective by exploring more complex functions of power. Nye and Keohane in their book Power and Interdependence provide an understanding of power analysis that relies on political resources that give actors the potential ability to gain power in dependence. Furthermore, traditionally the concept of military power has not been effective on certain specific issues in security (Keohane & Nye, 2011; Nye, 1990). Nye (1990) introduced the concept of soft power as the ability of states to attract and persuade other states. This approach is similar to Hart (1976) explanation of the control of resources approach with assumptions about how the use of resources is used for control over actors or desired events. Power is a relational approach that is not separated from the use of resources to the ability to obtain desired results.

The development of contemporary analysis brings a more comprehensive understanding than relational relationships. Power is not only seen as relational aspects between actors but also has dispositional and multidimensional function (Barnett & Duvall, 2005; Guzzini, 2009). Power is a dispositional concept in that it requires effects that depend on social

relationships (Guzzini, 2009). Susan Strange introduced the notion of 'structural power' to respond to changes in a more complex international world. Structural power is how things should be done, the power to shape the structure of relations between one another, societal relations, and corporate relations (Strange, 1994). In addition, Strange (1996) explain structural power outlines how the state has a major role in security, while on the other hand, non-state authorities play a role in determining who gets what. However, in Strange's view power is relational and its influence on structure, and conversely how structure is responded to results in structural power. However, Stefano Guzzini explains the concept of power based on the understanding of structures affecting actors. In his critique of the neo-realist approach, Guzzini (1993) explains that control of the international system is the result of a clash of power, which is formed from a hierarchy of states. Structural power is involuntary power, meaning that structures are formed by the interactions and actions of the hegemon, and structures indirectly support and facilitate the interests and preferences of the hegemon (Guzzini, 1993; Pustovitovskij & Kremer, 2011).

In accordance to Guzzini's work, Dale C Copeland also emphasized the significant challenge for neorealist approach in examining power by citing Alexander Wendt's work. Instead focused on previous logic challenged the core of neorealist premise on anarchy. The conflictual narratives of power and anarchy is produced by actors' shared culture created through discursive social practices (Guzzini & Leander, 2005). Thus, it can be concluded that, the process of structural power formation as highly dependent on the context of power competition between states. Perhaps unlike the classic relational argument that only focuses on A influencing B, the concept of power will be broader if there are significant and intense interactions between actors that affect changes in international structures. Baldwin (2016) explains when A attempts to influence B, but the effort to influence B is not entirely within A's control. In short, that states have certain decisions, policies and political preferences but on the one hand power works when there is an influence of international structures on these dynamics.

According to Baldwin (2016), multi-dimensional could be referred to as: Scope, domain, weight, power base, means, cost, time and place. Scope refers to the aspect of deep state capability to reach specific issues. Domain is the actor's ability to influence the scope or number of other actors, which can be measured by the probability of influence (weight). Power Base means the use of resources that serve as power assets in a situation, or in this context is perceived as techniques of influence used to activate the power base. Cost is into the what extent actors are able to influence others. Time and Place refers to when resources are used so that they can become strategic assets to achieve influence, as well as where geographical advantages affect the power advantage. By understanding this premises, we try to offer an approach that could be a benchmark for assessing power by placing technology as a power base that reviewed based on orientation, scope, domain, power base, and means. Orientation refers to the goals and outcomes to be achieved in technological improvement at the global scope, scope as the actor's ability to use technology to enlarge or reach certain issues or certain fields, power base as a resource that becomes an asset of technological power, means are the means or techniques of influence used to activate the technological power base.

Technology as Power in Great Power Politics

After the end of the Cold War, there have been significant shifts in the arena of technology and international politics. Some scholars observed fundamental changes in the international structure influenced by technological advancements (Herrera, 2006; Keohane & Nye, 1998; Rossenau & Singh, 2002; Waltz, 1993). Technological advancement has emerged as an indicator of power in the present political system, where there are two main components in the structural changes we examine: the increase in military power and military strategy, and the development of information technology, which is categorized as an instrument of power.

Before rapid development of internet, technology increased the state ability to maximize their power and controlling society behavior. Currently, states face significant threats as advanced technologies provide opportunities

for groups that threaten them to manage power effectively. Based on these assumptions, power relationship between actors, technology and structure is explained in the following relational relationship. In this assumption, technology is viewed as a variable that influences the improvement of a country's military capacity and strength. At the same time, states use technology as a tool to achieve their interests and influence desired outcomes. Some technologies seem to have definitive political effects that enable certain social and political actions. The main argument is found in Headrick's (1981) concludes that technology helps and motivates political actors to achieve goals prior to changes in the material environment, for example the creation of nuclear weapons seems to provide significant changes in international politics. Technological advances can be applied in various military devices including weapons systems, surveillance technology, or even replace the role of humans in warfare.

The application of technology enhances in order to increase military capabilities, thereby influencing possible interaction patterns. Military technology remains a strategic component in measuring state power such as: weapons strength, intercontinental ballistic missile development, Iron Dome and Terminal High Altitude Area Defense (THAAD) defense forces, nuclear technology submarine development, and the use of drones in aerial warfare. Moreover, Technologies and military advancement, tends to outdated existing military capability, thus provides opportunities for the development of new and more effective military capabilities. Military capabilities increase the development of chemical and biological engineering, the Internet of Things, artificial intelligence, autonomous drones and even three-dimensional printing. The military services in developing countries are no exception, thus without sufficient resources to fully utilize all these advances, any types of militaries should adapt more to gain advantage. Moreover, the advanced technology in armed conflict, for example drones equipped with advanced sensors, and even linked to wireless command.

In modern warfare, the US has relied on the use of drones, which differs from conventional warfare and relies on risk-free warfare (Varin, 2017). Not

only the United States, several countries also rely on the use of 'unmanned aircraft' to reduce the risks in war. In the Ukraine war, drones have been used extensively in long-range strike missions, bomb carriers, intelligence gathering and ammunition delivery by both Russia and Ukraine (Kunertova, 2023). Several of such drones could be remotely overseen by a single soldier using improved man-machine interfaces which utilize helmet integrated brainwave detection. This military technology could away with manual controls like keyboards or remote control. Together with advanced data analytics which prioritize the most urgent two or three encountered scenarios at any moment for the operator to oversee. It would allow the military unit to coordinate a squad or section's worth of manpower in the field.

However, military technology does not solely indicate military development, it is also driven by the shifting development from nuclear weapon into technology and information as a political tool (Herrera, 2006). Currently, the growth of information technology shapes political distribution of power. Countries which had advance development in information and technology are able to expand their countries images significantly. For example, integration of advanced sensors, machine learning, artificial intelligence, robotics, and advanced technology generated autonomous combat drones available in the military. By enabling smaller militaries in future, states are able to overcome manpower limitations and deploy more forces. Advancing the instrument of power has tremendous impact technological and advance of power remains to be turning point of military modernization, for instance drone utilization to protect state's border, had been implemented in modern warfare.

This development affects the dispositional relationship between structure and technology, especially when ICT and other advanced technologies drives changes in the structure of international system. For example, such as military technology, ICT, AI, Chip-semiconductors, or drones become a means of developing the contestation of countries in the international structure. Technology is not just an instrument; technology has the capability to construct modern war mechanisms. Technological advances

have opened up possibilities for the progressive mechanization of warfare, which will ultimately make humans unnecessary and far from combatants (Varin, 2017). But in the same time, states should formulate regulation to circulate traffic flows of information exchange. Consequently, sufficient regulation is a basic need for state to limit threats from others.

A competitive system was encouraged by the observation that a number of nations, including China, Russia, India, and Japan, were able to develop into an adversary to the power of the United States. Technology is a key independent variable in explaining social change that constitutes social change (Herrera, 2006). The use of technology as a tool to enhance the nation's image is another aspect of this structural shift. China has developed military, industrial, and communication technology; Japan and India have developed industrial technology; and the United States has developed military and space technology. Japan and India with industrial technology. In this relational power relationship, there are two possibilities, which include competition or cooperation. Cooperation refers to the condition of similar outcomes achieved by countries to achieve a more sophisticated level of technology in military power, as well as cyber security. The more advanced the technology, the more likely the country is to collaborate in technological development. Nevertheless, technological advances do not always result in conditions of cooperation, if there are differences and disputes in foreign policy goals, then the tendency of countries to compete will be higher. This competition arises as a result of changes in the international structure, especially in terms of the nature of war, which leads to the struggle for military technological power.

Implementing modern technology in improving military capabilities is the main goal of competing countries to dominate global technological power. The nature of war in modern warfare has been formed where the trend shifts into race of technological power. These strategies include the implementation of robots, IA, unmanned vehicles, semiconductors, and communication technology, to support state’s military efficiency and effectiveness during the war. Thus, in this context, technology changes the nature of war and,

continuously technological power triggers the accumulation of state superiority. For example, the changes in technological superiority can be observed from the motor implemented in troop-carrying vehicles and bombs which developed by US in the World War II. Even tough in the aftermath this condition led the US and USSR entering the period of nuclear weapons and technology arm race. Based on this explanation, it can be concluded that military's dependence on technology significantly changed the nature of war. Moreover, technological advances have the potential to drastically change the balance of military power. The presence of advanced technology is a major component that determines how actors act in contemporary international politics. Superiority in technology became be a major source of sovereignty protection, acquisition of military capabilities, and economic interests in the following decades. Power and technology have a significant correlation in the relationship between states and their international structures, especially as the underlying drivers of major changes in world politics and economics.

Later, we argued that technology do not only facilitates the capacity and capability of a state's military and national power, but also provides a great framework for states to play significant roles and even challenges technological superiority. According Shaffer (2015) future conflicts require higher technological capabilities. AI technology, robotics, automation, 5G connections and quantum computer technology are the foundation of the transformation of the international structure (Gilli, 2021). It increased state competition and the race for dominant technological power. Thus, state always in constant need to pursue the latest technological capabilities to accumulate its power. State’s ability to access technological advancement could provide a significant advantage to outmatch potential threat from enemy. Technology could produce the same relationship as arm race, competition in technological improvement and achievement contributes to the accumulation of power.

Technological supremacy is undoubtedly important for state with great power trajectory, especially when nature of technology is being considered multidimensional, and significantly affects economic and military power vice

versa. For example, the utilization of drone not only affects state power through increasing military capability, but also influence states preference (behavior, foreign policies orientation, etc) and thus determining their accumulation of power. Moreover, technology also enlarges the domains of state's influence, including new military technologies such as unmanned aerial vehicles and hypersonic technology or continental ballistic missiles. It also increased the number of probabilities of actors are being influenced through networks, especially in controlling and gathering intelligence information. Technology relates to the use of resources that serve as power assets in a situation that gives actors room to explore in depth to activate the power base. Consideration of the costs involved in building economic and military power is also a long-term investment and a strategic asset to expand influence and geographic advantage.

Searching for Technological Superiority in the US-China Great Power Competition

In the past decade, there has been a dramatic increase in geopolitical escalation against the backdrop of a shifting global political map concentrated in the Asia Pacific. Post-cold war, Asia Pacific has gradually grown into a region home to 60 percent of the world's population that includes the world's fastest growing economies. The United States sees this geopolitical potential as an opportunity to maintain access, power and influence in the Asia Pacific region (Denmark, 2015). The policy of unilateralism and full engagement in the war on terror is the most important part of the change in security focus for the United States. The United States' involvement in the Iraq and Afghanistan wars was the most important part of maintaining the status quo by strengthening its position in global politics. However, amidst the United States' efforts to maintain its existence by spending financial and human resources on wars and conflicts in the Middle East, geopolitical power began to shift in eastern Asia. While the United States took a major role in the security context in the Middle East, China managed to achieve economic acceleration and modernization of its country for the purpose of China's rise

(Zhou, 2022). China's rise marks a shift in the locus of political territory towards a more dynamic East Asia.

With the shifting geopolitical forces in Asia, the policy of unilateralism was revisited. During the Obama administration, the United States' foreign policy began to shift to the Far East region, through the Pivot to Asia policy strategy. This pivot policy aims to balance power in Asian countries and promote peaceful regional stability. This shift in concentration is important not to let go of the emergence of patterns of imbalance in the Asia Pacific because when China reaches the momentum of its rise, there is a drastic shift in global power in the Asia Pacific (Beckley & Brands, 2021). The fundamental change in the US view of China has undergone an intense shift in the era of the Donald Trump administration. Basically, the US places China as a strategic rival or 'rival great power' that challenges the existence of US influence, power and interests (Hu, 2020). With a competitive national security strategy approach, the relationship between the two countries has entered a new phase with the start of the trade war, thus triggering a long competition for the two countries. A shift in power is evident after China's economic rise followed by military modernization, attracting the attention of the United States along with other western countries. This shift marks the beginning of the rivalry between China and the United States, bringing a political constellation that is far from safe for countries in the Asia Pacific region.

China's presence in technological advancement poses a challenge to the United States technology giant, especially in the use of technology in managing security. In the concept of power, technological supremacy is not just a contested item for both countries, but a strategic area to determine and measure the capabilities of the state. Therefore, the United States has taken a tough stance against China by developing various strategies, especially in initiating technological competition, which opened with the shift in American political concentration towards strategic competition under Donald Trump. The US and China trade war in 2018 was an introduction to this great power competition. Trump began imposing import tariffs on Chinese products,

prompting China to retaliate by increasing gradual import tariffs on US products. The trade war and the friction triggered by the tariff increases caused losses to the economies of both countries, further pushing the US and China into a total separation of the two countries (Y. Sun, 2019). Tensions between the two countries have increased along with rivalry in influence, complex strategic competition in political, economic, security and social relations. The United States' concerns continue to rise, even after the election of Biden who entered a new chapter in the technology war and competition. The Biden administration emphasizes that China has reached a point of progress that challenges US power to gain leadership in high-tech industries, which are the foundation for US military and economic dominance (Sutter, 2022).

The economic separation between the two countries is growing with the shift from tariff war to technology competition. The playing field between the two countries has shifted further with the emergence of the term 'technology war'. The Tech War is an extension of the concept that developed when the escalation of the United States' trade war with China has culminated in a technological rivalry. In 2019, the United States continued to implement technology sanctions against Chinese companies, starting with limiting imports of Chinese products, capital investment, access of Chinese companies to the US stock market, and interaction between research centres (Danilin, 2021). The China-US Tech War refers to the two countries' competition for technological supremacy, and maximizing the distance of each other's technological capabilities by subsidizing national technology products.

The technology war between the US and China does not only refer to the discourse of military technology supremacy, but a technology war that refers to a larger technological competition involving communication and information technology instruments specifically for 5G technology, semiconductors, and artificial intelligence. According to a report from the Council on Foreign Relations (Economy et al., 2020), There has been a significant escalation in the US-China rivalry, with the United States imposing strict surveillance on Huawei, cutting off telecom manufacturers from

semiconductor suppliers, and banning Chinese apps on national security grounds. Rogers & Ranking Member of C.A (2012) mentioned that Huawei and ZTE provide many opportunities for Chinese intelligence agencies to insert malicious hardware or software implants into critical telecommunications components and systems. In response, the US Department of Commerce has created an 'entity list' of blacklisted foreign companies including 669 Chinese companies from 2018 to 2023(Sheng & Geng, 2023). The United States considers Huawei to be a Chinese government spying tool that allows it to gather intelligence on vital infrastructure abroad (Christie et al., 2023). Trump's decision to ban Huawei had a significant impact on US-China bilateral relations (Chuanying & Huppernbauer, 2019). To describe the technology power comparison between the two countries, we explain it simply in the following table:

Table 1. Power Indicator US and China

Indicators	US	China
Orientation	Strategic Competition	Technological Independence
Scope	Economic and Military	Economic and Military
Power Base	Private sector led Innovations	State Led Initiations
Means	1. Pressure China Technology Interest 2. Tech Alliance	1. Challenging the Technology Leader 2. Domestic research and innovation

Source: Data Analysis, 2024

The US has been at the forefront of developing cutting-edge technologies that support technological superiority, creating an environment conducive to its economy, politics and military. The United States has long been a leader in technological innovation, with Silicon Valley serving as a global hub for technology and innovation companies. To support military might, the US has invested in superiority in armed conflict, and ensuring national security. In this technological mastery, the US has emerged in private sector-driven technological development that drives innovation in commercial and military. It should be noted that the interest of the United States is to build national

strength, resilience based on values, diversity and democratic institutions. These interests lead the US to strategically suppress China's strengthening in the Pacific region. The United States emphasizes the formation of technological alliances to deter aggression and provide cooperation that strengthens the technology trade, and security network (US White House, 2022).

The US Deputy Secretary of State, Wendy Sherman identifies in relation to technology development including the protection of fundamental freedoms online, particularly for often targets human rights defenders, resilience building against digital authoritarians who use technology to further their agendas, reaching an agreement on regulations intended to restrict the abuse of emerging technologies, and extending digital inclusion are among the priorities (Walla, 2023). Cordesman and Hwang (2020) mentioned two speeches from US National Security Advisor Robert O'Brien and FBI Director Cristopher Wray that highlighted the competition between the two countries that has reached information warfare, cyber, economic espionage, threats to academia, dan research activities. The US policy makers seek to harness the potential of technology for positive change while safeguarding democratic principles, human rights, and inclusive growth.

By 2022, the US has implemented the CHIPS and Science Act policies that aim to prevent and restrict China's access to US technology products (APDR, 2023). Technological competition orientation is an integral part of maintaining power in great power rivalry. A key component of US military strategy is technological superiority, which gives the Armed Forces the advantage over possible opponents, prevents aggression, and safeguards national interests in a changing security landscape. The US will continue to maintain the competition with China strategy to face future security challenges and maintain supremacy. The United States has putting pressure on China through its restrictive policies and protectionism to maintain a balance pattern both in the regional and global scope. Therefore, to maintain technological dominance, the United States seeks to build tech-leading democracies including strengthening economic and technological cooperation

and aligning strategic perspectives with respect to China (Goldenberg & Rasser, 2021).

Furthermore, US may utilize several measures to address China challenge by organizing their partner and allies to create a technology alliance especially in development of military capability. Yang (2013) expressed that the US presence in the East Asian region prevents China from becoming a potential hegemon, thereby calming China's behavior. The US has strategic partnerships with various security frameworks such as NATO, the AUKUS security cooperation framework with Australia, and the United Kingdom, and The Quadrilateral Security Dialog (US White House, 2022). The tech alliance also expands into bilateral with South Korean to fostering the opportunities to counteract the China position in Far East. As Yoon Suk Yeol mention the cooperation between US aim to deal with 'competition for technological hegemony' and "evolve into a supply chain and future-oriented, innovative-technology alliance" to reducing the China goods and materials dependence (Lawder et al., 2023). These initiatives are essential for improving US strategic positioning and addressing the many opportunities and difficulties brought about by China threat that is disadvantage to allies position in Indo-Pacific.

China seems to have sought to upgrade its military and economy through technological secure their interest against the US' growing role on a global scale. The US has clearly restricted China in the use of advance technology, science and research resources, as they believe technological innovation is part of China's military development. (H. Sun, 2019). China has emerged as a formidable challenger to US technological dominance. The Chinese government has gained great attention to technological advancement through its "Made in China 2025" policy mainly to comfort in international politics. China could become a major player in manufacturing and a hub for innovation and knowledge, while Xi Jinping highlighted the significance of developing strategic industries. (Glaser, 2019). This policy is a turning point for China to strengthened its dominance, especially starting to move from an economy based on the manufacturing industry to an advanced technology center. China's ambition is part of gaining independence, especially in

obtaining increased production that does not depend on foreign suppliers, with semiconductors as the center of its industrialization plan. China aims to ensure domestic stability and economic growth, and to become a regional power that does not directly challenge China (Zhou, 2022).

However, concerns about the process of developing technology for industrial needs with the implementation of technology is not the main goal. According to a report from Cordesman, Burke, dan Molot (2019) there are efforts to develop mechanisms and information, and accelerate the advancement of intelligent military capabilities through national defense and military development policies in the new era. Through this policy, China aims to build military strength and capabilities through the modernization of weapons, foreign technology acquisition, and espionage activities (Cordesman et al., 2019). Although China seems to view the US as a non-rival, some dominance rivalry is evident in China's efforts to counter the pressure exerted by the US. The strategy outlines specific goals, whereby China actively participates in developing, pioneering, and setting global technology standards, rather than just being a consumer of the most advanced technologies (Levine, 2020).

China's ambition is to maintain its overall technology at a more advanced level in the world and relinquish dependence on foreign technology by acquiring cutting-edge technology independently. Another important initiative related to the Made in China 2025 is the defence science and technology industry plan in 2025, which calls for an increase in the capacity of defence science and technology bases that can supply military capabilities (Cordesman, 2018). Cordesman (2018) mentioned that China has been able to produce advanced drones, aircraft carriers, new-generation intercontinental ballistic missiles, fighter aircraft, and other advanced platforms. When China catches up with the US, there is an effort to balance technological capabilities.

China reshapes its strategic approach to counter US protectionism by creating significant innovation and cooperation within the technology ecosystem in region. Businesses can improve China’s competitiveness,

technology advancement and support its ambitions as global leader in technology by employing talent, building foundries, replacing proprietary data, and stockpiling equipment (Evers, 2024). Thus, China business sector achieve breakthroughs achievement in robots, quantum computer, high speed trains, unmanned watercraft, 5G, and Chip technology (Si, 2024; Zhe, 2023). In the battle of technology China create opportunity to challenge the US technological leader at same time pushing global technology policy orientation by encouraging technological reliance.

Both countries compete for dominance of the global technology market, which provides the power to control the direction of technological innovation. Technology plays a critical role in national security, and both countries seek to leverage technological advances for military purposes and strategic influence. The United States and China's competition for technological superiority is an important aspect of their broader great power rivalry. Both countries are competing in enhancing technological capabilities to dominate various fields, especially the military and economy. The moves toward technological supremacy reflect broader efforts to protect national interests and maintain a strategic advantage in technology. The United States has long mastered the development of the latest technologies, having to contend with China's technological upgrades including AI, 5G telecommunications, robotics, and Semiconductors. There are significant differences in technological supremacy based on goals, technology development basis, foreign policy, orientation and preference. Countries that are able to dominate strategic technology fields have the opportunity to influence the economy, and global security in the future.

The power of the two countries may not have reached a balance, where China is not yet a potential hegemon (Yang, 2013). Xuetong (2006) stated that China's comprehensive power is still ranked second compared to the power status of the United States. US involvement in various international conflicts, especially in the fight against terrorism, NATO's presence in the Middle East, and other forms of existence in the global sphere are part of the evidence that the US still remains a great power. The US shows its ability as a global military

power that achieves expansion, while China remains in a regional context (Yang, 2013). China is slowly building its existence through various platforms such as the Belt and Road Initiative, foreign aid, and the existence of military forces in the South China Sea. Meanwhile, China on the one hand still places the US as a source of instability, such as the Taiwan crisis, which clearly avoids direct confrontation with the US. However, China's existence as a major power in the region remains a threat to the US amid the unfolding of its ambitions that encourage the transition of power through technological power missions. As Reeves (2014) mentions global power penetration", that the competition between the two countries creates endogenous conflicts or threats that extend not only in the region. The China-US technology war is a boomerang for the creation of geopolitical competition conditions caused by strategic competition starting from trade wars, technology sanctions, and investment barriers that make the two countries more distant from each other politically and cause tensions that extend to the global scope.

CONCLUSION

In recent years the US has started to approach technology competition with China, from banning company activities to competition in semiconductors and AI, these are the main instruments of this technology war. In contrast, China is strengthening its technology independently with the orientation of state led technological innovation. We understand that economics is not the only determinant affecting US-China technology competition. However, the changing nature of war and the dependence of military capabilities on technological developments are the main determinants that trigger US-China competition. The competition between the US and China goes beyond economic competition and has significant geopolitical implications. According to (Christensen, 2020) If the US and China lead conflicting alliance blocs, strategic conflict can spread rapidly along the political trajectories of both countries in the Asia Pacific. Under these conditions, China has the opportunity to provide and share technological advancement especially for military tech for their allied to maintain power over US pressure.

The US and China have different preferences in responding to these changes, although both seem to create an atmosphere of state-controlled technological power. The US has a preference for protectionism or strengthening technology through the control of technological inflammation and even seeks China to gain technological independence. China has a policy of full intervention in domestic technological innovation while still controlling strategic resources that can support resilience technology policies. The need for the latest technology is a projection made by both countries in welcoming future threats and conflict scenarios. On the other hand, the competition between the two countries in the field of technology is a serious problem that can encourage the widening of great power rivalry not only in the Asia Pacific region but even globally. The US-China relationship is a power relationship that drives the two countries to be in a technological race or competition that has significant implications for global political structure.

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