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The Geo-Political Implications of the US-China AI and Tech Rivalry

Abstract

The emerging US-China rivalry over Artificial Intelligence (AI) and cutting-edge technologies has become a fundamental aspect of contemporary global politics. This research explores how the mission for technological dominance between these two major powers is redesigning the geopolitical landscape, transforming long-standing coalitions, and introducing new frontiers of competition such as innovation, data manipulation, and semiconductor supply chains. The research explores critical developments such as the rise of strategic tech-driven coalitions like QUAD and AUKUS in setting global narratives around AI governance. This research applies the theoretical lens of Defensive Realism, which argues that states act to preserve their security in an anarchic international system by countering potential threats. This qualitative study examines how AI leadership and control over innovative technologies are becoming strategic instruments in the restructuring of geopolitical power dynamics.

Keywords: US-China, Artificial Intelligence, Tech Rivalry, Geopolitical Implications

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Title

The Geo-Political Implications of the US-China AI and Tech Rivalry

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Contents

Abstract

The emerging US-China rivalry over Artificial Intelligence (AI) and cutting-edge technologies has become a fundamental aspect of contemporary global politics. This research explores how the mission for technological dominance between these two major powers is redesigning the geopolitical landscape, transforming long-standing coalitions, and introducing new frontiers of competition such as innovation, data manipulation, and semiconductor supply chains. The research explores critical developments such as the rise of strategic tech-driven coalitions like QUAD and AUKUS in setting global narratives around AI governance. This research applies the theoretical lens of Defensive Realism, which argues that states act to preserve their security in an anarchic international system by countering potential threats. This qualitative study examines how AI leadership and control over innovative technologies are becoming strategic instruments in the restructuring of geopolitical power dynamics.

Keywords:

US-China, Artificial Intelligence, Tech Rivalry, Geopolitical Implications

Introduction

The ongoing competition between the United States and China over technological dominance illustrates a new geopolitical struggle, termed the Tech Cold War. Unlike the ideological divide of the 20th century, this rivalry is driven by control over emerging technologies, crucial tech infrastructures, and innovation ecosystems that determine future economic and military power. The United States, as the incumbent world leader in cutting-edge AI technology, views China's rapid AI developments as a strategic challenge to its state security, economic interests, and liberal democratic values. On the other hand, China perceives the US containment strategies, including export restrictions and alliance-building in the Indo-Pacific region, as a barrier to its rise as a global technology superpower. This competition is based on AI

development, dominance in semiconductor high-end chip production, regulation of global supply chains, and the capability to define international tech norms. This paper examines the research problem: How is the US-China AI rivalry, framed as a Tech Cold War, redesigning global power dynamics, discussing the crucial role of Taiwan's semiconductor industry (TMSC), altering international alliances, and the impact of LLM models like Chat GPT and DeepSeek?

Theoretical Framework

This research employs Defensive Realism as the theoretical framework to understand the US-China rivalry in AI and technology. Defensive Realism suggests that states primarily act to preserve their security and balance power in an anarchic international system. Kenneth Waltz asserts that anarchy compels states to fend for their own security in order to safeguard their survival. According to Defensive Realism, these actions are driven by the need to secure their positions in the global order (Waltz, 1979).

In this context, both the US and China are focusing on technological supremacy as a means of preserving their economic, military, and geopolitical interests in an increasingly competitive world. This framework highlights the rivalry as a strategic competition where both powers seek to mitigate vulnerabilities and ensure their survival by controlling emerging technologies that define future global power dynamics. Additionally, efforts to mobilize tech partnerships, control supply chains and set global tech standards are reshaping the global geopolitical landscape, reviving rivalries, and fostering a new era of great power competition.

Research Methodology

This study uses qualitative research to explore the US-China AI rivalry and the impact of technological dominance on geopolitics. The study involves a comprehensive analysis of publicly available materials including analysis of key documents, government policies, think tank reports, working papers, and investigative news articles. Triangulation of these sources is carried out to understand the US and Chinese perspectives and strategies with respect to the use of AI and emerging technologies. Case studies on Taiwan's semiconductor industry and rising coalitions like QUAD, AUKUS, and BRI highlight strategic dynamics. The research also examines export controls in China and compares the AI innovation ecosystems of the US and China, focusing on public-private partnerships and state strategies.

Technology and AI Domination in the Tech Cold War

In the 21st century, the contest for global supremacy has transformed from nuclear weapons to algorithms. The first Cold War, fundamentally between the Soviet Union and the United States, was based on ideological differences between Capitalism and Communism (Powaski, 1997, p.11). This led to an extended period of turbulence and competition. However, the incumbent US-China competition, often called the "Tech Cold War," has shifted into a tech-powered competition (Horowitz et al., 2022, p. 5). It's not about traditional military strength but about who has authority over cutting-edge technology (Wu, 2020). Unlike the Cold War's ideological warfare, this competition is based on concrete supremacy in economic and military capabilities (Takach, 2023, p. 39).

It demonstrates a transition in the global power hierarchy where the technology ecosystem, rather than political principles, determines power and dominance (Takach, 2023, p. 46). Both states recognize the critical role of AI and other cutting-edge technologies in transforming global frameworks, ensuring national security, and manipulating the international order of the 21st century (Brands, 2020). In this new competition, China and the US have dedicated themselves entirely to a decisive, decade-long race to ensure competitive advantages in AI and other emerging technologies like semiconductors and quantum computing (Campbell & Sullivan, 2019). With Artificial Intelligence innovations, quantum computing, and semiconductor advancements, this time has shaped an age of geopolitical influence (Lewis, 2022). The United States leads in the tech development race by utilizing its tech ecosystem, strategic collations like the Quad and AUKUS, and initiatives such as the CHIPS Act to enhance semiconductor manufacturing and R&D (He, 2018). Its influence in AI, quantum computing, and military technologies, integrated with strong geopolitical dominance through framework developments and ensuring its edge because of its

influential alliances connections and joint strategic efforts leverages its lead in tech supremacy competition (Allison et al., 2021). The rivalry extends across the quest for economic or military influence, elevating the role of strategic partnerships, policy consolidation, and transnational cooperation to create centers for political influence (Hu, 2021).

This competition has global prominence, innovating trade linkages, partnerships, and the international technology ecosystem while pushing for the potential decoupling or splitting of global supply networks (Wang & Sun, 2021). States across the globe are driven to align with either the US or China, shaping emerging trends of alliance and rivalry in international affairs (Kirton & Wang, 2023). East Asian states and entities, including Japan, South Korea, and Taiwan, are critical players in this new pattern of competition. They balance collaboration with the US while ensuring economic coordination with China (Shah, 2023). Their strategic significance as centers of innovation and manufacturing hotspots enhances their roles in this race of technological dominance as they navigate the intricate requirements from both sides (Pekkanen, et al., 2007). As the global order transforms, this race of technological dominance mirrors the strategic competitions of history but redesigns them through a lens of economic mutual dependency and leading-edge innovation (Kennedy & Lim, 2018). Advanced technological capabilities, comprising everything from semiconductors to military applications of AI, are now the foundation of twenty-first-century leadership dynamics, prompting dominant states to realign their policies and strategic initiatives to ensure a competitive edge in a fast-paced world (Liu & Liu, 2019).

The Cold War between the US and the Soviet Union detached them from direct military engagements due to the doctrine of Mutually Assured Destruction (MAD), whereas the rise of artificial intelligence has intensified the uncertainties of confrontation in today's Tech Cold War (Takach, 2024). Unlike nuclear weapons, artificial intelligence in military operations can paralyze strategic infrastructure, sabotage research facilities, rig elections, or smartphone infiltration without leaving compelling evidence of their origin (Farrell & Newman, 2019). This invisibility complicates retaliation, as rivals like the US, China, Russia, and others work on continuous, undetected cyber infiltration. Unlike the Cold War's hyper-logical deterrence model, artificial intelligence warfare functions in ambiguity, undermining MAD's principles (Sparke, 1998). This fluctuation intensifies stress, pushing states to overstep limits with increasing frequency. As AI-enabled systems facilitate new "digital empires," the rising US-China competition for tech-driven influence determines the realities of the Tech Cold War. The United States, managing China's strategic development, is extensively engaged in sustaining its leading-edge technology through AI and quantum computing. As China upgrades its technological strengths, the US is taking a competitive approach by protecting its technology infrastructure expansion, securing intellectual property, and enhancing cooperation with allies to counter China's dominance. With initiatives like the US National AI Strategy and investments in cutting-edge technologies, the US aims to assert influence in AI and cyber security (Lin & Meng, 2023). This rivalry is not just a mutual contestation; it extends globally, as both states race to lead in domains that will shape the future of military power, economic preeminence, and geopolitical power (Govella, 2021). The rivalry between the US and China is rethinking global power dynamics, determining the framework of the Tech Cold War, where technology and AI are at the core of the conflict (Ding & Dafoe, 2021).

US Dominance in AI and Strategic Supply Chains

The United States excels in all primary AI domains through innovative research, high-capacity technological production, a dynamic tech ecosystem, and strategic investments. This leads to innovating AI systems and scaling up machine learning and deep learning models (Horowitz et al., 2022). Companies like Open AI and Google AI have initiated leading-edge technologies, large language models (GPT, BERT), and generative AI (Wamba et al., 2023). Domain-specific applications further highlight US leadership. AI-integrated solutions are transforming medical diagnostics with substantial contributions from IBM Watson Health, Tempus, and groundbreaking startups (Russo-Spena et al., 2019). In self-driving vehicles, companies like Tesla, Waymo, and Cruise are taking the lead in integrating AI-powered navigation systems (Torres

& George, 2023). Military and security applications rely on AI for unmanned aerial systems for defense, AI-driven maintenance prediction, and geospatial analytics, anchored by defense industry companies and DARPA initiatives (Ding & Dafoe, 2021). American companies like IBM, Google, and Microsoft are also making breakthrough innovations in quantum computing by leveraging AI in quantum systems to drive optimization improvements, cryptographic code, and sustainable material research issues (Ferràs-Hernández et al., 2023). The influence of US-developed guidelines like TensorFlow by Google and PyTorch by Meta stresses its dominance on global AI eco-system growth, providing cutting-edge tools for researchers and global app developers (Osborne et al., 2024). Advanced tech Companies like NVIDIA fuel innovation in AI hardware with advanced-level GPUs and specific chips, facilitating broad-scale AI model training and execution. Industry and educational leadership further cement US dominance, with tech startups like Google, Microsoft, Amazon, and Meta investing considerably in AI research and collaboration with primary institutions like MIT, Stanford, and Carnegie Mellon (Coutinet & Flacher, 2024). These institutions produce prime talent and leading-edge research, driving current progress. State initiatives also play a primary role. Investing in AI research through DARPA and NSF fuels innovation, while the coordination between public and private domains coordinates integration with national concerns and government economic initiatives (Daniels & Chang, 2021). The US forms cross-border AI guidelines and regulations through its leadership in organizations like the OECD (Organization for Economic Co-operation and Development) and its dominance in ethical AI frameworks. By capitalizing on its tech-driven influence, the US exports AI-based solutions across regions, ensuring its geopolitical advantage and sustained governance in all sectors of AI (Perskaya & Krasavina, 2019).

While the U.S. leads in chip design, it is primarily reliant on Taiwan Semiconductor Manufacturing Company (TSMC), 2020 for its leading-edge chips. TSMC's supply chain production expertise customizes the manufacturing of NVIDIA's and AMD's advanced processors (Jeong & Robertson, 2023). However, this dependence also highlights a main geopolitical dilemma, as Taiwan's strategic advantage in global semiconductor production and distribution has become a primary focus of US-China cold-war 2.0 dynamics (Lee & Johnson, 2011). The US has activated efforts like the CHIPS and Science Act to consolidate national production capacity and reduce reliance on foreign entities (Ernst, 2021). American cloud giants such as AWS, Google Cloud, and Microsoft Azure provide the technology infrastructure for global AI-integrated applications. While expanding US global economic influence, they also play a fundamental role in forming the geostrategic competition with China over technology and AI-powered supply chain optimization (Luitse, 2024). The United States maintains global market dominance in AI innovation, mainly powered by private-sector investments, which influence the tech investment landscape. The US government plays a defining role, extensively through military-related investment via agencies like DARPA, which grants billions annually to AI-driven projects targeted at national security, robotic warfare weapons, and digital infrastructure security (Sayler, 2020). Additionally, university-industry research initiatives enhance AI development, with top universities like MIT, Stanford, and Carnegie Mellon working together with tech industry pioneers Google, Microsoft, and Amazon (Christie et al., 2021). These research collaborations ensure that AI research breakthroughs are extensively scientific and economically sustainable, expanding reinforcement of the US as a leading global hub for AI innovation centers.

US Strategic Concerns over China's Accelerating AI Advancements

The United States views the accelerated growth of AI in China as a major obstacle to its tech-driven leadership and geostrategic dominance (Scobell, 2020). Chinese AI Company Deep Seek has recently emerged as an important player in the global AI contest. DeepSeek-R1, delivers performance comparable to leading models like Open AI's GPT-4, despite being developed at a low cost—approximately $6 million compared to GPT-4's estimated $100 million advancement cost. This productivity is achieved using less advanced hardware, mitigating risks US export controls on advanced chips pose (*Nature*, 2025). Deep Seeks'

rise is a direct threat to US AI dominance because its open-source, cost-efficient models have attracted global attention. Deep Seek highlights China's capacity to innovate despite US chip restrictions. The US is answering with stricter tech export controls, AI governance with allies, and increased local investments to maintain its AI dominance. However, DeepSeek's success signals China's increasing AI resilience, escalating the US-China high-tech competition. The US government has also highlighted issues over DeepSeek's potential national security risks, including data privacy issues and the possibility of intellectual property theft due to its open-source nature (Computerworld, 2025). After the launch of DeepSeek, the shares of the US high-tech firm Nvidia dropped by 17%, decreasing the company's market value by approximately $600 billion. Similarly, Google's parent company Alphabet suffered a loss of $100 billion, while Microsoft faced a loss of $7 billion. Overall, the combined loss of these three major companies has exceeded $1 trillion. Additionally, DeepSeek's success has led to sharp declines in US tech stocks and impacted global markets, reflecting the growing competitiveness of Chinese AI. These innovations underscore the amplifying high-tech competition between the US and China, as both nations vie for AI supremacy (McCartney et al., 2025).

The US perceives China's state-controlled funding in AI, its extensive plans for autonomous monitoring systems, and AI-powered defense systems as an ongoing threat to its digital and military interests (Layton, 2020). Moreover, unmanned aerial systems, data-driven predictions, and tech competencies are substantial barriers to US defense superiority (Grossman & Goldman, 2024). China's funding of AI-integrated military technologies, like robotic warfare technologies and combat intelligence processing, intensifies concerns that Beijing could accomplish military equality or beat the US in targeted zones (Bächle & Bareis, 2022). The growing potential of China's AI-powered reconnaissance system also alerts the US to its possibilities to influence global AI standards, particularly in autocratic regimes (Al-Hasnawi, 2021). The US restrictions on Chinese high-tech companies, such as Huawei, and sanctions on access to critical technologies like semiconductors, are seen as an organized initiative to reduce the speed of China's technological developments (Lundvall & Rikap, 2022). As China gradually turns into a leader in major technological industries, the US fears its tech-based influence and national security could be compromised (Yu, 2020).

Quad and AUKUS Influence Emerging Technologies

The Indo-Pacific has emerged as the focal point of geopolitics in the contemporary era. Mutual security agreements strengthening to counteract the Chinese ambition in this region and alliances like QUAD and AUKUS are profound examples of allied security efforts. Australia, the U.K., and the U.S.A. announced AUKUS in September 2021. The Quadrilateral Security Dialogue (Quad) between the United States, Australia, India, and Japan is essential in charting new directions for next-generation technologies and AI (Saran, 2024). The Quad is arranged strategically as an adjustment to China's tech-increasing dominance in the Indo-Pacific region because of the promotion of democratic values and creating the future landscape across AI and other innovative sectors (Glaser, 2024). The Quad countries lead international AI research and beating the EU and ASEAN also producing over 650,000 papers between 2010-2020. Each player of QUAD brings exclusive strengths (Center for Security and Emerging Technology, 2024). The US leads in **natural language processing** and machine learning, India leads in big data analytics and pattern detection, Japan leads in robotic technology and replicating systems, and Australia leads in computing and speech science foundations (Fedasiuk et al., 2021). However, intra-quad AI partnerships are minimal and produce only 4% of co-authored international AI research papers. While the US has significant AI connections, partnerships between the Quad nations remain limited, restraining top productivity and optimal performance of their collaborative power (Konaev & Dunham, 2020). China remains an important research partner of Quad countries as long as global political tensions persist and highlights the profundity of its international technological alliance (Global Times, 2024). The US is the largest foreign investor in AI companies of all Quad members India, Japan, and Australia for driving innovation, However, capital allocation is constrained in intra-Quad and with massive

Chinese funds posing a demanding scenario to the Quad's tech autonomy (The Economic Times, 2024). Economic dependencies on China curtail progress to lower dependence on its technology. However, the Quad can strengthen its competitive edge as an international leader in innovation focused on long-term growth through strategic partnerships and ensuring that AI advances follow democratic norms (Quad Investors Network, 2024).

Comparably, AUKUS, a trilateral security partnership between Australia, the UK, and the US is a transformative progress in Indo-Pacific geopolitics announced on 15 September 2021. It is committed to settling the balance of China's strengthening leverage and coordinating efforts for regional stability (Tahir, 2024). The collaboration mainly facilitates Australia in attaining nuclear-driven submarines and extending strategic coordination in emerging technologies such as technological innovation capacity, AI, quantum-enabled computing, and marine defense capabilities (Paul, 2023). The United Kingdom follows with its "Global Britain" vision by boosting its defense positioning in the Indo-Pacific amidst China's military expansion (Cheng, 2022). The AUKUS marks its largest defense commitment in the decade of advancement in enhancing its defense capabilities for Australia (Cox et al., 2023). AUKUS fosters innovations in AI, quantum computing, and digital infrastructure protection on the tech front. These investments strive to transform military alignments and gain a technological edge in defense to offset China's advancements in these domains (Trabucco & Maas, 2023). China perceives AUKUS and the Quad as top security threats to its strategic goals in the Indo-Pacific. US-led geopolitical alliances are structured to counter its growth and threat to its increasing authority (Zarrar & Gichki, 2022). Beijing has implemented counter-strategies like empowering its defense capabilities, extending its Belt and Road Initiative (BRI) to advance economic supremacy, and enhancing collaborations with Russia (Bisley, 2024). It has intensified its technology contest by backing with considerable capital in AI, quantum breakthroughs, and IT capabilities to ensure a leading position (Sumadinata, 2022). China points fingers at these collaborations for highlighting what it calls "Cold War mentality," (France 24, 2023). AUKUS and the Quad counteract these standpoints by boosting democratic values and commitment to a rules-driven international order to challenge the West's perceived China's autocratic state (Lowy Institute, 2024). These partnerships' purpose is to illustrate an alternative ideology to China's communism and territorial aggression and focus on the ideological divide in ongoing global politics by indicating values like advocacy of rights, digital autonomy, and responsible and sustainable AI tech development (Tellis, 2021). The rivalry's impact on middle powers for collective security and power dynamics is profound, which tackles the problem of stabilizing connections with both superpowers while upholding their autonomy. The US-China competition will mold the world economy and military operational areas for years as AI advances (Lee, 2018).

Conclusion

The US-China AI competition is not just a technological rivalry but an international struggle for power that will determine the course of global power dynamics (Kong, 2016). Meanwhile, China is making steady progress in keeping pace with AI and semiconductor production and overcoming considerable challenges in the face of US-imposed restrictions. China's demonstrated ability to develop systems like Deep Seek is a huge setback for the US. This active competition, driven by both nations' desire to maintain technological supremacy, will keep the world on edge (George & George, 2023). This rivalry presents an opportunity to switch between the two superpowers, creating new coalitions and enhancing coordination between middle powers and developing states. While also coping with the uncertainties of this decisive geopolitical battle. The global landscape observes the development of the Tech Cold War; an extended period of competition as the US and China continue their geo-political rivalry that could last decades and transform the landscape of international relations (Takach, 2024).

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