



THE LANDSCAPE OF GLOBAL TECHNOLOGICAL COMPETITION: A US–CHINA BILATERAL ANALYSIS

<https://doi.org/10.57033/mijournals-2026-3-0318>

Abdulaziz Abdujabborov

Researcher

Abstract. *This paper analyses the dynamic landscape of global technological competition, focusing on the strategic and bilateral friction between the United States and China. It examines critical socio-technical domains, including artificial intelligence, semiconductor manufacturing, quantum computing, 5G/6G telecommunications and green technologies. The study highlights how the contemporary technology sector is governed by market mechanisms such as the “winner-takes-all” paradigm, the global talent war and intensive patent warfare. Furthermore, the paper evaluates the shifting regulatory frameworks of the US–China rivalry, characterised by a transition from total embargoes to case-by-case reviews in the semiconductor industry, coupled with strategic countermeasures involving critical raw materials. Finally, it outlines the “dual-track strategy” employed by Washington and Beijing, which balances offensive geopolitical containment in strategic sectors with pragmatic, managed trade reciprocity and risk-mitigation dialogues in non-strategic domains in order to maintain macroeconomic stability.*

Keywords: *technological competition, US–China relations, semiconductors, artificial intelligence, geopolitics, dual-track strategy.*

INTRODUCTION

The technological competitive landscape is conceptually defined as a highly dynamic and volatile arena in which corporate entities, nation-states and regional innovation hubs actively contend to develop, implement and monopolise cutting-edge technologies in order to secure global market hegemony (Wong, 2024). In the contemporary era, this environment is characterised by rapid structural transformations, manifesting primarily across five critical socio-technical axes.

The first is artificial intelligence and machine learning. Multinational corporations such as Microsoft, Google and OpenAI, together with sovereign actors – the United States and China – are engaged in a strategic race for dominance in generative intelligence and neural network architectures. The structural composition of the future global economy



depends heavily on which actor engineers the most efficient, scalable and secure AI frameworks (Lee, 2018). The second is semiconductor and microchip manufacturing. Silicon-based microchips serve as the foundational hardware infrastructure of modern technological systems; consequently, market competition among semiconductor manufacturers such as TSMC, NVIDIA, Intel and Samsung transcends economic metrics and assumes critical geopolitical and security dimensions (Miller, 2022). The third is quantum computing, where current research and development focus on engineering systems capable of executing in seconds complex computational tasks that conventional supercomputers would require years to resolve. The fourth is 5G/6G and broadband communications, where data transmission velocity and network topology stability, exemplified by low Earth orbit satellite constellations such as Starlink, offer substantial asymmetric advantages within the global competitive framework. The fifth is green technology, where high-stakes market competition characterises the renewable energy sectors and the electric vehicle markets, currently dominated by firms such as Tesla and BYD.

MAIN PART

According to institutional data, the contemporary technology sector operates under distinct market mechanisms. The first is the “winner-takes-all” paradigm: within digital platform ecosystems such as Apple, Google and Amazon, firms that secure early-mover advantages and capture critical mass achieve de facto monopolistic market consolidation. The second is the global talent war: multinational corporations and research institutions are locked in a continuous global recruitment race to secure elite software engineers, data architects and research scientists (Lee, 2018). The third is patent warfare: corporate entities aggressively leverage intellectual property rights and strategic litigation in order to protect proprietary innovations while systematically obstructing market entry for competitors.

Technological rivalry has escalated beyond private corporate competition, transforming into macro-level friction among major geopolitical powers, specifically the United States, China and the European Union. In order to preserve national security interests, state actors increasingly pursue the localisation of strategic technologies through stringently enforced export controls, sanctions and protectionist supply-chain policies (Abrams, 2024).



The technological competition between the United States and China represents the primary fault line in contemporary international political economy. This conflict extends beyond market-share optimisation; it is a structural struggle over the control of future global technological standards, military supremacy and macroeconomic hegemony (Doshi, 2021; Chang, 2023). Empirically, this rivalry is concentrated across three primary vectors.

The first is the semiconductor and microchip paradigm shift. Microchips constitute the core hardware infrastructure for artificial intelligence, telecommunications, supercomputing and advanced defence systems, and consequently this sector has become the epicentre of bilateral friction (Miller, 2022). For an extended period the United States maintained an absolute embargo policy regarding the export of advanced semiconductors to China. The Trump administration, however, modified this doctrinal approach, shifting from a baseline presumption of denial towards a case-by-case review framework based on fluid geopolitical parameters. Following this regulatory pivot, Chinese enterprises initiated multi-billion-dollar procurement contracts with United States hardware designers such as NVIDIA and AMD in order to acquire high-performance AI chips. In response, the United States imposed a 25 per cent tariff burden on these advanced components and mandated rigorous national security vetting for all Chinese purchasing entities (Northrop, 2026). Leveraging its dominant position in upstream supply chains, China for its part enforces strict export controls on critical raw materials and rare earth elements, including gallium, germanium and approximately 70 per cent of the global industrial silver utilised in semiconductor fabrication, thereby exerting structural leverage over Western supply chain security.

The second vector concerns artificial intelligence and bilateral security thresholds. Both Washington and Beijing are aggressively vying for global leadership in generative AI and autonomous systems (Teekah, 2026). United States defence and intelligence officials express profound concern that advanced AI architectures could be weaponised by Chinese state actors in order to execute asymmetric cyber operations, compromise cryptographic systems or orchestrate high-impact disinformation campaigns. Recognising that unaligned AI or systemic cyber shocks could trigger catastrophic global externalities, both states maintain baseline diplomatic channels. At the recent high-level summit in Washington, United States and Chinese delegations formalised a bilateral agreement to



establish a dedicated emergency communication hotline in order to mitigate AI-related escalation risks (Al Jazeera, 2026).

The third vector is managed trade friction and tariff reciprocity. While technological nationalism creates structural friction, both states exhibit pragmatic economic interdependence and seek calculated de-escalation where feasible. Following bilateral negotiations in Washington, both administrations codified a reciprocal agreement to reduce tariffs on approximately thirty billion dollars' worth of commodities (Reuters, 2026). This de-escalation targets non-strategic sectors, facilitating streamlined United States agricultural and cosmetic exports to China alongside reciprocal market access for Chinese consumer electronics and toys entering the United States.

CONCLUSION

In summary, the US–China technological rivalry operates under a dual-track strategy. On one track, both nations vigorously employ defensive containment and offensive innovation policies in order to achieve asymmetric advantages in military and strategic technologies. On the parallel track, they maintain pragmatic trade mechanisms and risk-mitigation dialogues in order to prevent systemic decoupling from destabilising the global macroeconomic order.

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