
Geopolitics of Artificial Intelligence: Technology Controls and The Fragmentation of Global Order

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ABSTRACT

Artificial intelligence (AI) has emerged as a strategic arena where technological capability increasingly determines geopolitical influence, economic resilience, and institutional authority. While existing studies have extensively examined AI governance, technological competition, and digital sovereignty, they largely treat technology controls as security or regulatory instruments rather than as mechanisms that actively reshape the international order. This article addresses that gap by proposing a geopolitical order framework that explains how AI technology controls generate systemic fragmentation through the reconfiguration of technological dependencies, institutional authority, and strategic inclusion. Using a qualitative research design based on document analysis, the study examines policy documents, regulatory frameworks, official government publications, and scholarly literature concerning AI governance, export controls, supply-chain politics, investment restrictions, and global technology regulation. The analysis demonstrates that technology controls extend beyond defensive policy measures to function as instruments of geopolitical ordering that selectively regulate access to critical AI infrastructures, reinforce hierarchical technological relationships, and institutionalize differentiated patterns of global connectivity. The study argues that fragmentation should not be understood merely as technological decoupling or bloc competition, but as a layered political process characterized by selective inclusion, asymmetrical interdependence, and differentiated authority within the global AI ecosystem. By conceptualizing technology controls as mechanisms of order formation rather than solely instruments of strategic competition, this article advances a theoretical framework that bridges AI governance and geopolitical order studies while providing a more comprehensive explanation of how contemporary technological rivalry is restructuring the architecture of global order.

Keywords: Artificial Intelligence, Geopolitics, Technology Controls, Global Order

INTRODUCTION

Artificial intelligence has become a strategic technology that shapes economic competitiveness, military capability, and political influence across the international system. Unlike earlier digital tools, AI is now linked to state power because it depends on critical inputs such as advanced chips, cloud infrastructure, data capacity, and highly skilled talent (Trager et al., 2023). This condition makes AI development inseparable from global supply chains and from the institutions that regulate access to strategic technologies. As major powers seek advantage, technological competition increasingly moves beyond innovation and enters the field of geopolitical control. Export restrictions, investment screening, platform regulation, and standards-setting have therefore become central instruments in contemporary international politics (Acharya, 2024). These developments suggest that AI is not only transforming production and governance, but also reshaping the structure of global order itself. In this setting, the geopolitics of artificial intelligence can be understood as a struggle over who controls the material and institutional foundations of future power.

The central problem emerges when technology controls are no longer treated as temporary defensive measures but as durable tools for restructuring global interdependence. States increasingly justify these controls through national security, economic resilience, and technological sovereignty, yet their effects extend

far beyond narrow security concerns. Restrictions on semiconductors, software, data flows, and research collaboration can alter the opportunities available to allies, rivals, and smaller states at the same time (Vinnykova, 2021). As a result, the global order faces not only intensified competition but also a growing fragmentation of rules, networks, and technological ecosystems. This fragmentation has real-world relevance because it affects industrial upgrading, digital inclusion, global trade, and the ability of states to participate in emerging innovation systems. It also matters for governance because divided AI ecosystems may generate incompatible standards, uneven regulatory authority, and weaker forms of international cooperation. The issue is therefore not simply whether AI becomes more powerful, but how political struggles over control shape the distribution of that power across the world.

Existing discussions already show that AI has become a strategic domain in which states seek both innovation leadership and security insulation. A growing body of scholarship explains that technological rivalry is now embedded in broader shifts from globalization toward selective decoupling and controlled interdependence. This literature helps clarify how states use policy tools to manage vulnerability in supply chains, protect critical sectors, and reduce dependence on geopolitical competitors (Aaronson, 2025). It also shows that technology is no longer governed only by market logic, because strategic competition pushes states to intervene more deeply in production, research, and cross-border exchange. In parallel, studies on global order suggest that power transitions are increasingly shaped by control over infrastructures, standards, and networks rather than by military capacity alone. From this perspective, AI becomes a key site where material capability and institutional influence intersect (Srivastava & Bullock, 2024). What is already known, then, is that technology controls are part of a wider political effort to reorganize power under conditions of intensifying strategic rivalry.

Even so, important issues remain insufficiently understood. Much of the existing debate focuses either on the strategic competition between major powers or on the technical implications of AI regulation, but it pays less attention to the broader ordering effects of technology controls. There is still limited conceptual clarity on how these controls translate into fragmentation at the level of global order rather than only bilateral rivalry (Martínez-Baltodano et al., 2025). It is not yet fully explained whether fragmentation should be understood as simple separation, differentiated hierarchy, or the creation of overlapping technological blocs. The consequences for middle powers, developing states, and transnational institutions also remain underexamined within many dominant accounts. In addition, the relationship between control and order is often treated descriptively, without enough theoretical attention to the mechanisms linking state strategy, technological dependency, and institutional change. This leaves an important gap in understanding how AI competition becomes structurally embedded in the reorganization of the international system. What is unknown, therefore, is not the existence of rivalry itself, but the deeper logic through which technology controls produce a fragmented global order (Erman & Furendal, 2022).

To address this issue, the article can be anchored in a theory of geopolitical order that treats power as relational, infrastructural, and institutionally organized. Within such a framework, technology controls are not merely restrictive policies but strategic practices that shape who can access, influence, or exclude others from key systems of innovation and exchange (Belikova, 2025). This theoretical lens allows fragmentation to be seen as a political outcome of contested ordering rather than as an accidental side effect of competition. It also connects AI more clearly to global order by showing how control over strategic technologies can reorganize hierarchies, dependencies, and rule-making authority (Garrido, 2025). The research gap lies precisely in the limited synthesis between studies of AI competition and theories of order formation and fragmentation. While one side explains rivalry and control, and the other explains structure and hierarchy, fewer analyses bring them together into a single conceptual argument. A stronger synthesis is needed to explain how technology controls function as mechanisms through which geopolitical actors actively reshape the architecture of international order.

Filling this gap is theoretically justified because the current moment cannot be understood through a purely technological or purely economic perspective. AI competition is embedded in struggles over authority, dependence, and strategic positioning, which are all central concerns of geopolitical theory (Meltzer, 2023). A theory-driven approach helps move beyond description by identifying why certain controls matter, how they reorder relationships, and under what conditions they intensify fragmentation. It also prevents the analysis from reducing global change to isolated policy events, because it places technology controls within a larger process of order transformation. This is important for coherence, since the concept of fragmentation should refer not only to visible division but also to changing patterns of inclusion, exclusion, and asymmetry (Dauvergne, 2020). By linking AI governance to geopolitical order, the study can explain why control measures have systemic significance even when they are introduced in sector-specific forms. The theoretical justification therefore rests on the need to interpret AI-related controls as constitutive elements of contemporary global restructuring.

From this foundation, the article can be guided by several interrelated research questions. How do technology controls in the field of artificial intelligence function as instruments of geopolitical power in the contemporary international system? In what ways do these controls contribute to the fragmentation of global order through the reorganization of dependencies, institutions, and technological networks? How do strategic efforts to secure national advantage in AI reshape the balance between openness and exclusion in the governance of emerging technologies? What kinds of hierarchy or bloc formation become visible when access to critical AI resources is politically managed rather than broadly shared? How does the application of geopolitical order theory improve our understanding of the connection between AI competition and systemic fragmentation? These questions direct attention not to technical performance, but to the political logic through which AI becomes a site of order-making and order-division (Ishkhanyan, 2025).

The urgency of this research lies in the speed with which AI is being integrated into security policy, industrial strategy, and international competition. As states institutionalize technology controls, the patterns they create may become difficult to reverse, especially once supply chains, standards, and alliances begin to solidify around separate technological ecosystems. This makes the present issue more than a temporary policy debate, because it concerns the long-term shape of global connectivity and exclusion. The study contributes by offering a clearer conceptual account of how AI-related controls are tied to wider transformations in global order (Jones, 2023). It also contributes by shifting the discussion from isolated state actions toward the systemic consequences of strategic control in an era of technological rivalry. In doing so, the article provides a framework for understanding why fragmentation is not simply a background condition, but an evolving political process driven by struggles over access, authority, and technological power. Such a perspective helps readers see AI not as a neutral field of innovation, but as a central arena in the ongoing reconfiguration of international order (Vujičić, 2024).

To address this gap, this article develops a geopolitical order framework that conceptualizes AI technology controls not merely as defensive regulatory instruments but as mechanisms of international order formation. Rather than treating export controls, investment screening, semiconductor restrictions, and regulatory governance as isolated policy responses, the framework explains how these instruments collectively restructure technological interdependence, redistribute institutional authority, and reshape global hierarchies. In this perspective, technology controls become constitutive mechanisms through which geopolitical actors actively determine access, exclusion, and strategic positioning within the emerging AI ecosystem.

The novelty of this article lies in three interrelated contributions. First, it reconceptualizes technology controls as mechanisms of geopolitical order formation rather than merely instruments of national security or technological competition. Second, it refines the concept of global fragmentation by

defining it as a layered political process characterized by selective inclusion, asymmetrical interdependence, and differentiated authority instead of viewing fragmentation solely as technological decoupling or bloc rivalry. Third, the article proposes an integrated analytical framework linking technology controls, technological dependency, institutional restructuring, and geopolitical fragmentation into a single explanatory model. This framework advances current debates by explaining not only why AI competition intensifies but also how strategic technology controls progressively transform the architecture of the international order.

Guided by this framework, the study addresses the following research questions: (1) How do AI technology controls operate as mechanisms of geopolitical power within the contemporary international system? (2) Through what mechanisms do technology controls generate fragmented patterns of technological dependency and institutional authority? (3) How does the proposed geopolitical order framework improve existing explanations of AI governance and global order transformation? Rather than focusing on technological performance or regulatory effectiveness alone, these questions direct attention to the political mechanisms through which technological governance becomes a process of international order-making.

This study is theoretically significant because it extends the literature on AI governance beyond strategic rivalry and regulatory competition toward a broader understanding of global order transformation. It demonstrates that fragmentation is not simply an unintended consequence of geopolitical competition but an institutionalized process through which technological access, authority, and dependence are politically reorganized. By integrating AI governance with theories of geopolitical order, the article contributes a conceptual framework capable of explaining how contemporary technological rivalry produces long-term structural changes in the international system. Consequently, the article offers a broader analytical perspective for future research on AI geopolitics, digital sovereignty, and the evolving architecture of global governance.

RESEARCH METHOD

This study employs a qualitative research design to examine how technology controls in artificial intelligence contribute to the fragmentation of global order. A qualitative approach is appropriate because the research addresses a complex political process that involves power, strategy, institutional change, and contested meanings rather than measurable causal variables alone (Gioia, 2020). The study is guided by an analytical framework that combines the concept of technology control with a geopolitical order perspective, allowing the analysis to trace how state actions shape patterns of dependency, hierarchy, and exclusion in the international system.

This framework is useful because it connects concrete policy instruments, such as export restrictions and strategic regulation, to broader structural transformations in global politics. The design works for this research because the main objective is not to test a statistical relationship, but to explain the political logic through which technological governance becomes a mechanism of order-making and order-fragmentation. Qualitative analysis also makes it possible to capture nuance, contradiction, and context across different actors and policy arenas (Colorafi & Evans, 2016). In addition, this design supports concept clarification, which is necessary because fragmentation in the field of AI is often discussed descriptively without sufficient theoretical precision. For these reasons, a qualitative design offers the most suitable strategy for building a coherent and theory-informed explanation of the geopolitical significance of AI technology controls.

The study relies on qualitative secondary data drawn from policy documents, official government statements, strategic reports, international organization publications, regulatory texts, and scholarly works

relevant to AI governance and geopolitical order. Data collection was conducted through purposive document selection, focusing on materials that directly address technology controls, strategic competition, AI infrastructure, and the reorganization of international technological relations (Naeem et al., 2023). The units of analysis are policy discourses, regulatory instruments, and geopolitical practices through which states and institutions seek to control access to critical AI-related technologies.

The main analytical instrument is a document analysis matrix used to organize and compare recurring themes, while the core analytical dimensions include control mechanisms, strategic justification, dependency structures, institutional consequences, and forms of fragmentation. These dimensions function as the principal variables of analysis in a conceptual rather than statistical sense, helping to structure interpretation consistently across the data set. Trustworthiness was ensured through source triangulation, conceptual consistency, careful coding of documents, and the use of credible and publicly accessible materials to strengthen dependability and confirmability (Audulv et al., 2022). Validity was addressed by aligning the analytical dimensions closely with the research questions and theoretical framework, while reliability was supported through transparent selection criteria and systematic documentation of the coding process.

Ethical considerations were observed by using data responsibly, respecting intellectual ownership, maintaining accurate representation of sources, and, because the study does not involve direct human participants, informed consent and confidentiality were not required in a conventional sense, although all institutional and documentary materials were handled with academic integrity and due care (Im et al., 2023).

RESULTS AND DISCUSSION

The Geopolitical Technology Control Framework (GTC Framework)

The document analysis reveals that contemporary AI technology controls operate through three interconnected geopolitical mechanisms that collectively reshape the architecture of global order. First, technology controls function as strategic instruments that regulate access to critical technological infrastructures rather than merely protecting national security interests. Second, these controls generate new patterns of technological dependency that reorganize global connectivity through selective inclusion and differentiated access to advanced AI capabilities. Third, the interaction between technological dependency and regulatory governance contributes to a broader process of institutional restructuring, producing a fragmented international order characterized by asymmetrical authority and layered geopolitical hierarchy. These findings indicate that AI technology controls should be understood not simply as isolated policy responses but as constitutive mechanisms of geopolitical order formation.

Building upon these findings, the discussion demonstrates how export controls, investment restrictions, semiconductor governance, and regulatory coordination collectively transform technological interdependence into an instrument of geopolitical organization. Rather than treating fragmentation as an unintended consequence of strategic rivalry, the analysis shows that fragmentation emerges through a cumulative process in which technological access, institutional authority, and strategic exclusion are progressively reorganized across the global AI ecosystem. The following discussion elaborates these mechanisms by examining their implications for technological dependency, institutional transformation, and the evolving structure of global order.

A central pattern emerging from the document analysis is the transition from relatively open technological exchange toward politically managed access to critical AI infrastructures. Across the policy documents, regulatory frameworks, and strategic reports examined, technology controls consistently appear not merely as defensive measures designed to reduce immediate security risks but as strategic instruments through which states regulate access to advanced computation, semiconductor production, cloud infrastructure, and AI innovation ecosystems (Ilcic et al., 2025). The evidence demonstrates that these

controls increasingly shape the conditions under which technological participation becomes possible, thereby extending their function beyond sector-specific regulation into the broader organization of geopolitical power.

This finding suggests that AI technology controls perform an ordering function within the international system. Rather than simply restricting technological flows, they progressively reorganize patterns of technological dependency, institutional authority, and strategic access across the global AI ecosystem. Consequently, technological governance becomes an instrument through which geopolitical actors redefine inclusion and exclusion within emerging technological networks. From this perspective, the significance of AI lies not only in its transformative technological capacity but also in its ability to restructure the political architecture through which global power is organized. This interpretation provides the first analytical foundation of the proposed framework by demonstrating that technology controls should be understood as mechanisms of geopolitical order formation rather than merely instruments of strategic competition.

The analysis further demonstrates that technology controls contribute directly to the fragmentation of global technological networks by progressively reorganizing patterns of interdependence rather than eliminating them altogether (Terzis, 2024). The examined policy and regulatory documents reveal that AI development continues to depend upon transnational systems involving semiconductor production, cloud infrastructure, software ecosystems, research collaboration, and international standard-setting. However, these interconnected systems are increasingly governed through differentiated rules of access, strategic restrictions, and selective regulatory coordination. As a result, technological connectivity is not dismantled but politically restructured according to evolving geopolitical priorities.

Importantly, the findings indicate that fragmentation should not be interpreted simply as technological decoupling or the emergence of competing geopolitical blocs. Instead, fragmentation operates as a layered process characterized by selective inclusion, asymmetrical interdependence, and differentiated technological authority (Veale et al., 2023). Some states retain privileged access to frontier technologies and strategic innovation networks, whereas others become dependent adopters, restricted participants, or politically conditioned partners within the global AI ecosystem. This pattern suggests that fragmentation is fundamentally relational rather than purely territorial, emerging through unequal access to critical technological infrastructures instead of complete institutional separation.

This interpretation extends existing debates on AI geopolitics by refining the concept of fragmentation beyond conventional notions of decoupling. Rather than describing fragmentation as the collapse of globalization, the findings demonstrate that contemporary technological interdependence persists under increasingly hierarchical and politically managed conditions. Consequently, AI technology controls generate a fragmented global order through the selective reorganization of technological dependency, institutional authority, and strategic connectivity, providing the second analytical foundation of the proposed geopolitical order framework.

The geopolitical implications of these findings become more apparent when interpreted through the perspective of geopolitical order formation. The document analysis indicates that technology controls reshape the international system not only by regulating technological access but also by redefining the institutional conditions under which technological participation becomes legitimate (Weymouth, 2025). Export restrictions, semiconductor governance, investment screening, and regulatory coordination collectively establish new rules that determine who may access critical AI infrastructures, under what conditions such access is granted, and which actors become strategically excluded. Consequently, technology governance evolves beyond sector-specific regulation into a broader mechanism through which geopolitical authority is exercised and institutional power is distributed.

This institutional transformation represents a critical mechanism within the proposed framework. The findings demonstrate that technological dependency gradually evolves into institutional dependency as states

increasingly rely upon externally determined regulatory standards, technological certification, strategic licensing, and governance arrangements controlled by dominant technological powers. Institutional authority therefore becomes embedded within technological infrastructures themselves, allowing geopolitical influence to be exercised through governance mechanisms rather than through direct coercion alone. As a result, hierarchy is reproduced not simply through material capability but through the capacity to define the institutional rules governing participation within the global AI ecosystem.

From this perspective, AI technology controls function as constitutive mechanisms of geopolitical order formation. Their significance lies not only in restricting access to advanced technologies but also in reorganizing the institutional architecture through which global technological authority is exercised. This finding extends conventional interpretations of AI governance by demonstrating that geopolitical fragmentation emerges through the cumulative interaction between technological dependency, institutional restructuring, and differentiated authority. Accordingly, global order is progressively transformed through governance practices that selectively organize technological inclusion, strategic exclusion, and asymmetrical participation across the international system

The analysis further indicates that the geopolitical consequences of AI technology controls are distributed unevenly across the international system. While major technological powers possess the capacity to design, enforce, and adapt strategic control mechanisms, middle powers and developing countries primarily experience these controls as external structural constraints rather than autonomous policy instruments. The examined policy documents consistently reveal that technological access increasingly depends upon geopolitical positioning, regulatory compatibility, and participation within dominant technological ecosystems. Consequently, technological capability alone is no longer sufficient to determine participation in global AI development; institutional alignment has become an equally significant condition.

This uneven distribution reinforces the hierarchical character of the emerging AI order. Rather than producing parallel technological blocs of comparable capability, technology controls generate differentiated layers of participation in which states occupy distinct positions according to their technological capacity, institutional compatibility, and geopolitical relationships. Some actors retain privileged influence over frontier innovation and regulatory standard-setting, whereas others become dependent adopters, strategically constrained collaborators, or peripheral participants within global AI governance. The findings therefore demonstrate that fragmentation does not create symmetrical divisions but instead institutionalizes differentiated forms of technological authority and geopolitical dependence.

These observations further support the proposed geopolitical order framework by illustrating that fragmentation operates through hierarchical differentiation rather than simple geopolitical separation. The resulting international order is characterized by selective inclusion, unequal technological opportunity, and asymmetrical institutional influence, thereby reinforcing the argument that AI technology controls constitute mechanisms through which geopolitical hierarchy is continuously reproduced.

Table 1. Mechanisms Linking AI Technology Controls to Global Order Fragmentation

Technology Control Mechanism	Immediate Geopolitical Effect	Structural Transformation	Order-Level Consequence
Export controls	Restricted access to strategic AI resources	Technological dependency	Strategic exclusion from frontier innovation
Investment screening	Limited cross-border technology transfer	Institutional dependency	Unequal participation in AI ecosystems
Regulatory governance	Differentiated standards and compliance requirements	Institutional restructuring	Fragmented governance authority
Supply-chain coordination	Politically conditioned technological connectivity	Layered interdependence	Global order fragmentation

The relationships summarized in Table 1 demonstrate that AI technology controls should be understood as interconnected geopolitical mechanisms rather than isolated regulatory interventions. Although each control instrument—whether export restrictions, investment screening, regulatory governance, or supply-chain coordination—operates through distinct policy channels, the analysis indicates that their cumulative effect extends beyond immediate technological regulation. Together, these mechanisms progressively reshape technological dependency, institutional authority, and strategic participation within the global AI ecosystem. Consequently, fragmentation emerges not from any single policy instrument but from the interaction among multiple forms of technological governance operating simultaneously across the international system.

The findings further reveal that fragmentation develops through a sequential process of geopolitical transformation. Technology controls initially regulate access to strategic AI resources and infrastructures, which subsequently generate differentiated forms of technological dependency among states. As these dependencies become institutionalized through regulatory standards, licensing regimes, and governance arrangements, institutional authority itself becomes increasingly asymmetrical. This process ultimately produces a fragmented international order characterized by selective inclusion, unequal technological opportunity, and differentiated geopolitical influence. The cumulative interaction of these mechanisms therefore explains why fragmentation should be interpreted as an evolving process of order formation rather than merely as a consequence of strategic rivalry.

This sequential mechanism constitutes the principal theoretical contribution of the present study. Existing studies generally explain AI geopolitics through strategic competition, digital sovereignty, or technological decoupling. By contrast, the present analysis demonstrates that AI technology controls simultaneously generate technological dependency, institutional restructuring, and geopolitical hierarchy, thereby transforming the architecture of global order itself. The proposed framework therefore provides an integrated explanation linking technology governance with contemporary processes of international order transformation and offers a broader conceptual basis for future research on AI geopolitics.

The findings of this study both support and extend existing scholarship on AI geopolitics. Previous research has successfully demonstrated that artificial intelligence has become a strategic domain closely associated with technological leadership, national security, and economic competitiveness. However, the present analysis indicates that these perspectives explain only part of the broader geopolitical transformation occurring within the global AI ecosystem. Rather than viewing technology controls solely as instruments for managing interstate rivalry, the findings demonstrate that such controls simultaneously reorganize technological access, institutional authority, and geopolitical participation across multiple levels of the international system.

This broader interpretation represents an important theoretical extension of existing AI governance literature. Whereas previous studies primarily examine strategic competition among major powers, the present framework explains how technology controls gradually become embedded within the institutional architecture of global governance itself. Consequently, geopolitical competition should be understood not merely as competition between states but also as competition over the institutional conditions governing technological participation. This perspective shifts analytical attention from interstate rivalry toward the mechanisms through which technological governance itself becomes an instrument of international order formation.

The analysis also contributes to broader debates concerning globalization, technological interdependence, and selective decoupling. Rather than indicating the collapse of global technological integration, the findings reveal that interdependence is progressively reorganized under increasingly selective political conditions. Technological connectivity continues to exist, yet access to strategic infrastructures, computational capacity, and advanced innovation ecosystems becomes conditioned by geopolitical considerations rather than solely by market dynamics.

This finding challenges conventional assumptions that fragmentation necessarily implies institutional separation or technological isolation. Instead, the proposed framework conceptualizes fragmentation as the political restructuring of interdependence, whereby connectivity persists but becomes increasingly hierarchical, conditional, and asymmetrical. Consequently, technological globalization is not disappearing; rather, it is evolving into a differentiated system characterized by selective inclusion, managed dependency, and unequal participation. This interpretation substantially broadens current debates on AI geopolitics by demonstrating that technological interdependence and geopolitical fragmentation can coexist simultaneously within the contemporary international order.

The proposed framework offers a broader theoretical understanding of AI geopolitics by identifying the sequential mechanisms through which technology controls reshape the international order. Existing approaches generally explain AI governance through regulatory competition, digital sovereignty, or strategic rivalry. While these perspectives remain valuable, they provide only partial explanations of how technological governance generates long-term structural transformation within the international system.

The present study argues that geopolitical fragmentation develops through a cumulative process consisting of four interconnected mechanisms. Technology controls initially regulate access to strategic technological infrastructures. These controls subsequently generate differentiated forms of technological dependency that become institutionalized through governance arrangements, regulatory standards, and strategic licensing practices. Institutional restructuring then reinforces asymmetrical authority across the global AI ecosystem, ultimately producing a fragmented international order characterized by selective inclusion, differentiated hierarchy, and unequal technological opportunity.

This sequential mechanism constitutes the central theoretical contribution of the present study. By integrating AI governance, technological dependency, institutional restructuring, and geopolitical order formation into a single explanatory framework, the article moves beyond security-centered interpretations of technological competition. The framework therefore provides a conceptual foundation for future comparative research examining how different states experience and respond to emerging forms of technological governance within an increasingly fragmented global order.

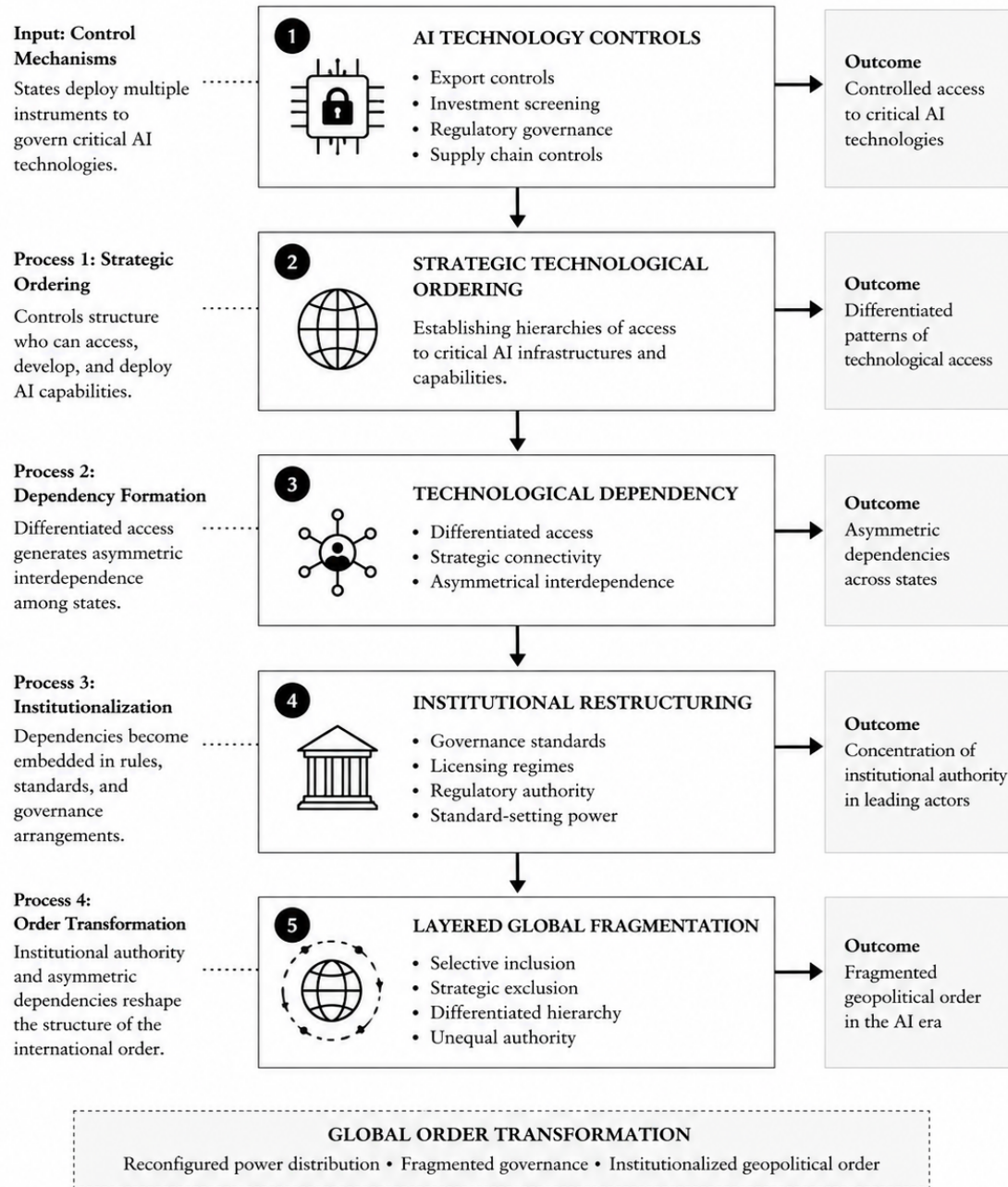
At the same time, the discussion reveals an unexpected complexity in the political geography of fragmentation. Tensions do not arise only between overt rivals; they also emerge within partnerships, alliances, and economically integrated networks. States that share broad strategic alignment may still diverge over regulatory priorities, industrial interests, and the acceptable scope of technological restriction. This indicates that fragmentation is not reducible to a binary division between competing blocs. It may also develop through internal differentiation among actors that remain formally connected. Such complexity complicates assumptions that allied coordination automatically produces coherence in AI governance. It further suggests that the politics of control generate frictions even where there is broad agreement on security concerns. The AI order under formation is therefore marked by layered contestation, where shared interests coexist with divergent strategies of technological management.

Theoretical Synthesis of the Proposed Geopolitical Order Framework

The cumulative findings presented in this study provide the basis for a broader theoretical synthesis explaining how AI technology controls reshape the contemporary international order. While the preceding discussion has examined individual dimensions of export controls, technological dependency, institutional restructuring, and geopolitical fragmentation, these dimensions should not be understood as isolated analytical observations. Instead, the document analysis demonstrates that they operate sequentially and interactively as interconnected mechanisms through which technological governance progressively transforms the structure of global order. Building upon these findings, this study proposes an integrated

geopolitical order framework that explains how AI technology controls evolve from sector-specific regulatory measures into constitutive mechanisms of international order formation.

Figure 1. Proposed Geopolitical Order Framework of AI Technology Controls



Source: Developed by the Authors (2026)

Figure 1 illustrates that the geopolitical significance of AI technology controls extends far beyond their immediate regulatory objectives. The framework suggests that strategic technology controls initially function by regulating access to critical AI infrastructures, including advanced semiconductors, computational resources, strategic investment, and technological standards. Rather than simply limiting technological diffusion, these measures establish differentiated patterns of technological participation that gradually

reorganize the structure of global technological interdependence. Consequently, technology controls become mechanisms of strategic ordering through which states influence the distribution of technological capability across the international system.

The analysis further demonstrates that strategic ordering generates differentiated forms of technological dependency. States possessing greater technological capacity and regulatory influence become increasingly capable of determining the conditions under which access to critical AI resources is granted, while technologically dependent actors experience growing constraints in innovation, industrial upgrading, and participation within emerging AI ecosystems. These asymmetric relationships subsequently become institutionalized through governance arrangements, licensing regimes, regulatory standards, and international standard-setting processes. As institutional authority becomes embedded within technological governance itself, geopolitical influence is exercised less through direct coercion and more through the ability to define the institutional rules governing technological participation.

This institutional transformation ultimately produces a fragmented international order characterized by selective inclusion, differentiated hierarchy, and asymmetrical authority rather than complete technological separation. The findings therefore suggest that fragmentation should be conceptualized as a cumulative political process through which technological dependency evolves into institutional dependency before reshaping broader patterns of geopolitical power. Unlike conventional interpretations that equate fragmentation with technological decoupling or bloc rivalry, the proposed framework demonstrates that contemporary fragmentation develops through politically managed interdependence in which connectivity persists but operates under increasingly differentiated conditions of access and authority.

The principal theoretical contribution of this framework lies in integrating three strands of scholarship that have frequently been examined independently: AI governance, technological dependency, and geopolitical order studies. Existing literature has largely explained AI technology controls through strategic competition, national security, or digital sovereignty. The present framework extends these perspectives by demonstrating that technology controls simultaneously regulate material capability, institutional authority, and geopolitical participation, thereby producing long-term transformations in the architecture of international order. Rather than treating fragmentation as the end point of geopolitical rivalry, the framework conceptualizes it as an evolving mechanism of order formation generated through sequential interactions among technological governance, institutional restructuring, and differentiated geopolitical authority.

Taken together, the proposed geopolitical order framework provides a more comprehensive analytical explanation of contemporary AI geopolitics by demonstrating how sector-specific technology controls produce systemic consequences for global order. The framework not only clarifies the mechanisms connecting technological governance with geopolitical transformation but also offers a conceptual foundation for future comparative research examining regional variations, institutional responses, and the long-term implications of AI-driven fragmentation within the international system.

Beyond its theoretical significance, the proposed framework also offers broader analytical implications for policymakers and international institutions responsible for governing the rapidly evolving AI landscape. The findings indicate that technology controls should not be interpreted solely as regulatory instruments designed to enhance national security or technological competitiveness. Instead, these measures simultaneously shape technological dependency, institutional authority, and geopolitical participation across the international system. Consequently, policy decisions concerning export controls, investment screening, semiconductor governance, and regulatory standards should be evaluated not only according to their immediate strategic objectives but also with regard to their long-term implications for international cooperation, institutional legitimacy, and the stability of global technological governance.

These implications are particularly relevant for international organizations and middle powers seeking to navigate an increasingly fragmented AI ecosystem. The framework suggests that effective AI governance

requires institutional arrangements capable of balancing legitimate security concerns with broader objectives of technological inclusiveness and multilateral cooperation. Without greater coordination among regulatory institutions, differentiated technology controls may further reinforce hierarchical patterns of technological access, widen disparities in innovation capacity, and intensify geopolitical fragmentation. Accordingly, strengthening institutional dialogue and promoting interoperable governance standards represent important strategies for mitigating the unintended structural consequences of strategic technology controls.

Future research may further refine the proposed framework through comparative empirical studies across different geopolitical regions, industrial sectors, and governance arrangements. Such investigations would provide stronger empirical evidence regarding the mechanisms linking technology controls, institutional restructuring, and global order transformation while contributing to broader debates on AI governance, international political economy, and the future evolution of geopolitical fragmentation. More importantly, the proposed framework establishes a conceptual foundation for understanding AI technology controls not merely as instruments of strategic competition, but as constitutive mechanisms through which contemporary global order is progressively reconfigured.

CONCLUSION

Artificial intelligence has become a strategic domain in which technological capability increasingly determines geopolitical influence, institutional authority, and the distribution of global power. This study demonstrates that AI technology controls should not be understood merely as regulatory instruments designed to protect national security or technological competitiveness. Rather, the findings indicate that export controls, investment screening, regulatory governance, and supply chain coordination function as interconnected geopolitical mechanisms that progressively restructure technological dependency, institutional authority, and strategic participation within the international system. Consequently, fragmentation emerges not simply as a by-product of geopolitical rivalry but as an evolving process of order formation through which global technological governance is increasingly organized.

The principal contribution of this study lies in the development of the Geopolitical Order Framework of AI Technology Controls, which explains the sequential mechanisms linking technology controls to global order transformation. The framework demonstrates that strategic technology controls initially regulate access to critical AI infrastructures, subsequently generate differentiated patterns of technological dependency, become institutionalized through governance arrangements and regulatory authority, and ultimately produce layered global fragmentation characterized by selective inclusion, asymmetrical interdependence, and differentiated geopolitical hierarchy. By conceptualizing technology controls as constitutive mechanisms of geopolitical order formation, the framework extends existing scholarship beyond conventional interpretations centered on strategic competition, digital sovereignty, or technological decoupling.

The proposed framework also contributes to broader debates in International Relations by integrating three strands of scholarship that have often developed independently: AI governance, technological dependency, and geopolitical order studies. Rather than treating these perspectives as separate analytical domains, this study demonstrates how they interact to explain the long-term structural transformation of the international system. Accordingly, the framework provides a more comprehensive analytical perspective for understanding how technological governance increasingly shapes the evolution of contemporary global order.

Although developed through qualitative document analysis, the proposed framework establishes a conceptual foundation that may be refined through future comparative and empirical research across different geopolitical contexts. Such investigations will be valuable for evaluating the applicability of the framework within diverse technological sectors, regional governance arrangements, and evolving international institutions. As AI governance continues to reshape global political and economic relations, understanding

the geopolitical mechanisms through which technology controls influence international order will become increasingly important for both scholars and policymakers. The findings of this study therefore suggest that AI technology controls are no longer peripheral instruments of technology policy but have become central mechanisms through which the future architecture of global order is progressively constructed.

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