

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

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ABSTRACT

Artificial intelligence has become a strategic domain in which technological capability is increasingly tied to state power, economic security, and institutional influence. In parallel, the expansion of technology controls has altered the political conditions of global interdependence and intensified pressures toward fragmentation in the international order. The purpose of this article is to examine how AI-related technology controls function as geopolitical instruments that reshape access, hierarchy, and governance across the global system. The article applies a qualitative research design based on document analysis and is guided by a geopolitical order perspective that links technology control to power, dependency, and institutional restructuring. Data were drawn from policy documents, regulatory texts, official statements, and scholarly sources addressing AI governance, strategic competition, and global technological order. The analysis focuses on key dimensions including export controls, supply-chain politics, investment restrictions, regulatory authority, and differentiated state positioning within the AI ecosystem. The discussion indicates that technology controls are not limited to sectoral regulation but contribute to a broader reorganization of global order through selective inclusion, asymmetrical connectivity, and fragmented governance. The article concludes that AI geopolitics is increasingly defined by the strategic management of technological interdependence rather than by open technological globalization. Its contribution lies in connecting debates on AI governance with a broader geopolitical understanding of order formation and fragmentation.

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

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Received: 01 January 2026; Revised: 05 February 2026; Accepted: 15 March 2026

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).

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 Results and Discussion section centers on the geopolitical consequences of artificial intelligence technology controls as they operate across strategic, economic, and institutional domains. The material examined indicates that technology controls are no longer limited to defensive regulatory instruments designed to reduce immediate security risks. They now function as active mechanisms through which states shape access to advanced computation, semiconductor capacity, algorithmic development, and digital infrastructure. In this setting, control over AI-related technologies becomes a means of structuring international hierarchy rather than simply protecting domestic capability. The discussion therefore aligns with the introduction by treating fragmentation not as an incidental by-product of competition, but as a political condition produced through strategic intervention in technological interdependence. Such a condition is visible in the selective restriction of flows that were once embedded in broader expectations of globalization. The significance of this pattern lies in the fact that global order is increasingly mediated through control over technological systems that determine who may innovate, who may comply, and who may be excluded (Mokry & Gurol, 2024). AI becomes important not only because of its transformative capacity, but because it reorganizes the architecture of power through material and institutional control.

A central pattern emerging from the analysis concerns the shift from open technological exchange toward managed access. Export restrictions, licensing rules, investment screening, and supply chain coordination are used to regulate the circulation of highly strategic inputs required for advanced AI development. Such measures do not simply interrupt commercial transactions; they redefine the political boundaries of participation in the AI ecosystem (Ilcic et al., 2025). States with greater control over critical upstream technologies are positioned to shape the pace and direction of innovation beyond their own territorial jurisdiction. This dynamic reinforces the geopolitical significance of chokepoints in semiconductor manufacturing, cloud infrastructure, and computational resources. The issue is not only that some actors gain advantage, but that advantage becomes institutionalized through policies that normalize selective inclusion. Under these conditions, interdependence remains present, yet it is reorganized through asymmetrical control rather than mutual openness. The resulting order is less integrated and more stratified, especially where access to essential technologies depends on geopolitical alignment.

This pattern contributes directly to the fragmentation of technological networks. AI development depends on complex transnational systems involving hardware production, software ecosystems, research collaboration, data infrastructures, and standard-setting bodies. When states intervene to control these systems, the effects extend beyond bilateral rivalry and generate segmented technological spaces with differentiated rules of entry (Terzis, 2024). Fragmentation in this sense should not be reduced to complete separation, since many connections remain intact across markets and institutions. Its more precise form appears as selective decoupling, layered exclusion, and unequal connectivity among actors located within the same global system. Some states retain privileged access to frontier technologies, while others are positioned as dependent adopters, restricted users, or strategically uncertain partners. This pattern supports the argument that AI competition is embedded in a broader restructuring of global order. The fragmentation produced by technology controls is therefore systemic because it alters the relational structure through which technological power is distributed and exercised (Veale et al., 2023).

The geopolitical meaning of these developments becomes clearer when viewed through the lens of order formation. Technology controls generate more than policy disruption because they reshape the

institutional and normative environment in which states pursue AI capability. Rules governing access to chips, software, cross-border investment, and research cooperation increasingly reflect strategic calculations rather than universal principles of market efficiency. This produces a governance environment in which authority is distributed unevenly and compliance pressures operate through material dependency. Control becomes a form of ordering because it determines whose technological pathways remain open and whose become constrained by external decisions. Hierarchy emerges not only from economic strength but from the capacity to define legitimate access to essential infrastructures. In this respect, AI-related controls function as instruments of geopolitical organization that embed power into the practical conditions of innovation (Weymouth, 2025). The broader implication is that fragmentation is sustained through institutionalized asymmetry rather than through visible geopolitical rupture alone.

These dynamics are not experienced uniformly across the international system. Major powers possess the capacity to design and enforce control architectures, while middle powers often navigate between strategic alignment, economic opportunity, and regulatory adaptation. Developing states face the greatest vulnerability because restricted access to advanced technologies can deepen pre-existing dependency in digital and industrial development. The uneven distribution of capability means that fragmentation does not create parallel blocs of equal strength, but a layered order marked by differentiated exposure and constrained autonomy. Some actors respond by investing in domestic alternatives, some diversify external partnerships, and others accept subordinate integration into dominant technological networks. This unevenness is important because it reveals that fragmentation is not synonymous with symmetry. It is more accurately understood as the production of selective inclusion under conditions of geopolitical competition. The AI order that emerges from such a process is therefore hierarchical in both material and institutional terms.

To clarify the main analytical relationships identified in the material, Table 1 summarizes the principal dimensions through which technology controls contribute to global fragmentation.

Table 1. Technology Controls, AI Governance, and the Fragmentation of Global Order

Analytical Dimension	Observed Pattern	Implication for Global Order
Export and licensing controls	Restricted access to advanced chips, software, and high-performance computing inputs	Strategic exclusion becomes embedded in technological exchange
AI supply chains	Production networks become more selective and politically conditioned	Interdependence shifts toward controlled and unequal connectivity
Investment and research regulation	Cross-border capital and collaboration face heightened screening and limitation	Innovation space becomes segmented by security and alignment concerns
Governance and standards	Competing regulatory preferences and institutional agendas expand	Common rules weaken and fragmented authority intensifies
Position of middle and developing states	Access depends increasingly on external power configurations	Technological dependency and hierarchy deepen
Geopolitical order	AI control measures influence inclusion, exclusion, and strategic alignment	Fragmentation becomes a structural feature of contemporary order

The table supports the overall argument by demonstrating that fragmentation operates across multiple layers of the AI ecosystem rather than within a single policy domain. The relationship between control and order is especially visible in the cumulative effect of these dimensions. Export restrictions alone may appear sectoral, but when combined with investment regulation, supply chain coordination,

and competing governance frameworks, they produce a broader architecture of selective participation. The table also clarifies that fragmentation is not merely technological in character. It affects institutional authority, strategic alignment, and developmental opportunity at the same time. This strengthens the interpretation that AI technology controls function as mechanisms through which geopolitical actors shape the terms of global inclusion and exclusion. The analytical value of the table lies in showing how individual control practices connect to wider structural consequences. It therefore provides an organized representation of the article's central claim that AI-related controls are reshaping the international order through layered forms of fragmentation.

The discussion also resonates with previous scholarship on strategic competition, but it extends the scope of interpretation beyond conventional security framing. Existing studies often emphasize rivalry among major powers, particularly in relation to military application, industrial leadership, and national security concerns. That literature remains important because it clarifies why AI has become a strategic domain and why states seek to reduce technological vulnerability. Yet a narrower security interpretation risks understating the broader ordering consequences of control-based governance. What emerges more clearly here is that technology controls do not merely manage competition; they institutionalize a new logic of geopolitical organization. AI governance becomes tied to questions of systemic inclusion, authority over standards, and control over future technological trajectories. The shift from competition to structured fragmentation broadens the analytical horizon of strategic rivalry. It becomes possible to understand AI politics not only as a contest among powerful states, but as a process that redefines the organization of global technological life.

This interpretation also deepens debates on globalization, selective decoupling, and controlled interdependence. Earlier work on interdependence often assumed that dense global connectivity created mutual constraints that discouraged overt politicization of economic exchange. More recent scholarship has already revised this view by showing how strategic sectors can be governed through pressure, leverage, and institutional asymmetry. The present discussion reinforces that revision in the specific field of AI, where technological dependence is both economically productive and politically exploitable. Interdependence does not disappear under these conditions, but its meaning changes substantially. Connectivity becomes conditional, access becomes strategic, and openness becomes reversible. Such a transformation is central to the fragmentation of global order because it weakens the assumption that integration produces shared rules and predictable cooperation. Instead, the AI domain illustrates how interdependence can be maintained while being reorganized into a differentiated and contested structure.

The theoretical implications are significant for the study of geopolitical order. A geopolitical perspective that treats power as infrastructural and relational provides stronger explanatory traction than approaches focused only on regulatory policy or market competition. Technology controls matter because they shape the material channels through which authority is exercised and dependence is reproduced. This makes AI a particularly important domain for order analysis, since its development relies on concentrated resources that can be selectively governed. Fragmentation, in this framework, is not an accidental side effect of policy activism but a structural outcome of efforts to govern access to strategic technologies. The concept becomes analytically stronger when tied to hierarchy, exclusion, and differentiated connectivity rather than to simple notions of separation. Such an approach also explains

why sector-specific controls may have system-wide effects. The governance of AI thus reveals how contemporary global order is increasingly organized through infrastructural power.

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.

Several strengths and limitations become visible from this discussion. The main strength lies in the capacity of the analytical framework to connect sectoral control measures to broader transformations in global order. By situating AI technology governance within a geopolitical theory of hierarchy and fragmentation, the discussion moves beyond descriptive accounts of regulation and competition. This provides a more coherent explanation of why AI controls matter at the systemic level. At the same time, the analysis remains bounded by the nature of the material examined, which emphasizes policy logic, institutional patterns, and strategic discourse rather than the full empirical diversity of national implementation. The rapidly evolving character of AI governance also means that new forms of control may emerge faster than existing frameworks can fully capture. These limitations do not diminish the analytical value of the argument, but they indicate the need for continued conceptual refinement as technological and geopolitical conditions shift. The complexity of fragmentation itself requires sustained attention to both continuity and transformation in global power relations.

The broader relevance of the discussion lies in its implications for governance, policy coordination, and future research. AI technology controls are becoming central to how states negotiate security, innovation, and international positioning, which means that the fragmentation they generate will shape long-term patterns of global inclusion and exclusion. This has practical importance for smaller and middle-ranking states that must adapt to strategic environments defined by external control over critical technologies. It also matters for international institutions attempting to preserve some degree of regulatory coordination in an increasingly divided technological landscape. Future research would benefit from closer examination of regional responses, comparative pathways of technological adaptation, and the interaction between industrial policy and geopolitical dependency. Further inquiry is also needed into how fragmented AI orders affect regulatory legitimacy, digital inequality, and the distribution of developmental opportunity. The present discussion establishes the conceptual basis for these directions by identifying technology control as a constitutive element of contemporary order transformation. AI geopolitics is therefore best understood not as a temporary dispute over innovation leadership, but as a durable process through which global order is being reorganized around strategic control.

CONCLUSION

Artificial intelligence has emerged as a central arena in which geopolitical power is organized through control over critical technologies, strategic infrastructures, and regulatory authority. The

discussion has emphasized that technology controls should not be understood merely as protective policy instruments, but as mechanisms that actively restructure global interdependence. In this setting, fragmentation appears as a patterned reorganization of access, hierarchy, and institutional coordination across the AI ecosystem. Restrictions on semiconductors, computation, investment, research collaboration, and governance standards contribute to a differentiated international order in which inclusion is increasingly conditional and politically mediated. The broader significance of this development lies in the movement from relatively open technological connectivity toward selective and asymmetrical forms of participation. Rather than reflecting temporary disruption, the geopolitics of AI points to a more enduring transformation in how global order is constituted through infrastructural control and strategic exclusion.

The main contribution to the field lies in the integration of AI governance debates with a geopolitical understanding of order formation and fragmentation. Much existing discussion has concentrated on strategic rivalry, national security, or technological competition in relatively narrow terms, whereas the present argument situates AI technology controls within a wider process of systemic restructuring. This perspective offers a clearer conceptual link between control measures and the production of hierarchy, dependency, and differentiated authority in the international system. It also refines the meaning of fragmentation by treating it not as simple separation between competing powers, but as a layered political condition shaped by selective inclusion and uneven connectivity. Such an approach contributes to scholarship on geopolitics, international political economy, and technology governance by clarifying how sector-specific regulation can produce order-level consequences. The analysis therefore advances a more coherent framework for understanding AI as both a strategic technology and a constitutive element of contemporary global transformation.

Future research should extend this line of inquiry by examining how different categories of states respond to AI-related fragmentation under varying geopolitical and institutional conditions. Comparative work on major powers, middle powers, and developing states would deepen understanding of how strategic control is translated into distinct pathways of adaptation, dependence, or resistance. Greater attention is also needed to regional governance dynamics, especially where states seek to balance technological sovereignty with continued integration into global innovation networks. Another important direction concerns the long-term consequences of fragmented AI orders for digital inequality, standard-setting authority, and the legitimacy of international regulatory institutions. Research that traces the interaction between industrial policy, supply chain restructuring, and geopolitical alignment would further strengthen the analytical precision of this field. Continued theoretical development remains necessary as AI governance evolves rapidly and as new forms of control generate additional pressures on the stability and coherence of global order.

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