ANALYTICS

DECODING GLOBAL DYNAMICS

PAX Silica

Center for the Study of Global Economics Future

CSGEF

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By CSGEF Research unit

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Summary:

In December 2025, the United States Department of State coordinated the formation of Pax Silica, a U.S.-led strategic framework designed to secure artificial intelligence (AI) supply chains and critical mineral access among trusted partners while reducing systemic dependence on the People's Republic of China. With the United Arab Emirates as a signatory, Pax Silica represents a structural shift in global trade governance away from efficiency-maximizing globalization toward resilience-driven, alliance-based economic integration.

This paper provides an analytical assessment of Pax Silica's economic, geoeconomic, and strategic implications under the CSGEF "Analytics" framework. It evaluates how the initiative strengthens supply chain diversification, accelerates nearshoring and friend-shoring trends, and reshapes the balance between strategic autonomy and interdependence. The study concludes that Pax Silica signals the consolidation of a multi-hub, alliance-centric trade order in which trusted networks replace hyper-globalized production concentration.

Introduction :

Artificial intelligence (AI) systems are integrated into supply chains that are extremely concentrated and strategically sensitive. These supply chains include high-performance computing infrastructure, lithium, cobalt, nickel, rare earth elements, advanced semiconductors, and specialized manufacturing equipment. With its roots in design, fabrication, and advanced lithography, the semiconductor ecosystem is still mostly located in East Asia, with the People's Republic of China having a significant impact on the extraction and processing of vital minerals (World Bank, 2023), (IEA, 2023). Just-in-time optimization approaches have dominated these supply chains for the past decade, prioritizing scalability and cost effectiveness while strengthening geopolitical rivals' strategic dependency (Farrell & Newman, 2019), (Baldwin, 2016). However, this model's structural weaknesses have been made clear by growing geopolitical tensions and technological competition. The United States Department of State is spearheading the creation of Pax Silica, which marks a shift from efficiency-focused globalization to a security-driven trade architecture meant to protect critical mineral access and AI supply chains among reliable partners. The CHIPS and Science Act, new critical mineral partnerships among OECD economies, and U.S. semiconductor export restrictions between 2022 and 2024 are some examples of broader policy trends that are consistent with this change. In order to secure AI supply chains and vital mineral access among reliable partners, the United States Department of State spearheaded the creation of Pax Silica, which marks a shift from efficiency-oriented globalization toward a security-driven trade architecture. This change is in line with more general policy changes, such as the CHIPS and Science Act, new crucial mineral collaborations across OECD economies, and U.S. export restrictions on semiconductors between 2022 and 2024 (U.S. Department of Commerce , 2024). Collectively, these advancements show how global trade governance has been reorganized to prioritize economic security, strategic autonomy, and resilience over merely market-based efficiency.

Conceptual Framework: Strategic Autonomy and Economic Security :

In order to comprehend Pax Silica, the global trade order must undergo three structural changes. First, nations sustain economic openness while increasingly limiting crucial sectors to partners that share political views, a trend known as selective or "trusted" interdependence, which is replacing broad-based interdependence in the international system. This development underscores worries that dense international networks, especially in essential minerals and technology, could be used as a weapon for coercive pressure (Farrell & Newman, 2019). Second, supply chain governance is shifting from optimizing cost-efficiency to optimizing resilience. Pandemic disruptions, export restrictions, and geopolitical conflicts have encouraged governments' and businesses' shift away from pure price minimization and toward redundancy, geographic diversification, and political alignment (OECD, 2025). Third, alliance-based economic coalitions focused on critical technologies and security-sensitive industries are progressively complementing, if not completely replacing, the post-World Trade Organization universalist trade framework. Strategic initiatives like export restriction regimes, vital resource partnerships, and security-oriented trade accords show a slow layering of geopolitical alignment onto international commerce, even while the WTO is still the official anchor of multilateral trade governance. Pax Silica, which formalizes economic security as a key organizational principle of supply networks associated to artificial intelligence, is an institutional expression of these changes in this context.

Pax Silica: Institutional Architecture and Objectives:

Coordinated by the US Department of State, Pax Silica is a strategic framework designed to protect semiconductor supply chains that are associated with artificial intelligence among reliable partners. Access to cutting-edge semiconductor inputs, such as memory, logic chips, and fabrication tools, which are critical to high-performance computing and artificial intelligence systems, is the initiative's top priority. Since 2022, disputes over export regulations and the concentration of semiconductor

production capacity in East Asia have transformed these inputs from commercial items to strategic assets (U.S. Department of Commerce , 2024). Pax Silica institutionalizes coordinating mechanisms that incorporate national security strategy, trade governance, and industrial policy, given the continued regional concentration of semiconductor manufacture and mineral processing. Its design is similar to that of the Indo-Pacific Economic Framework for Prosperity, but it places more emphasis on supply chain security and technology alignment related to AI than it does on trade liberalization in general.

Core Objectives :

The purpose of Pax Silica is to:

- High-performance computer ecosystems depend on secure semiconductor inputs related to AI, such as memory, advanced logic circuits, and fabrication tools (SIA, 2023)
- By using diversified sourcing and cooperative investment arrangements, you can guarantee steady access to vital minerals like lithium, cobalt , nickel, and rare earth Elements (World Bank, 2023), (IEA, 2023).
- Encourage member nations to unify their data and technology governance in order to guarantee interoperability and coordinated enforcement of export controls.
- Lessen reliance on supply nodes under Chinese control, especially in value chains for semiconductors and mineral refinement.

Institutional Design Features

The project operates as a framework for hybrid governance that combines:

- Coordination of industrial policy, promoting incentives that are in line with the growth of AI infrastructure, semiconductor packaging, and semiconductor manufacture.
- Co-financed refining capacity, procurement agreements, and possible storage arrangements are examples of mineral security partnerships.
- Harmonization of export controls for technology, strengthening limitations on key AI-enabling technologies.
- Collaboration in investment screening with the goal of protecting

key industries from hostile capital flows.

When taken as a whole, these mechanisms show a larger shift toward geoeconomic statecraft, in which alliance-based supply chain governance institutionalizes commerce, technology, and security.

Economic & Strategic Benefits for Member States :

Pax Silica's focus on supply chain stabilization is a response to actual, verified imbalances in the international trade of vital minerals, which are the foundation of cutting-edge technology and artificial intelligence systems. The economic importance of these inputs in global value chains is demonstrated by the fact that, in 2023, the global trade in raw and semi-processed vital minerals reached around $2.5 trillion in imports and about $2.52 trillion in exports, making up almost 10% of all global goods exports. Approximately $1.5 trillion worth of important minerals were imported by Asia alone that year, accounting for almost half of the global total. This highlights the profound regional interconnectedness in mineral supply chains that are crucial for energy transitions and high-tech manufacturing. Important corridors like the United Arab Emirates-India link, which is worth over $10 billion, and deep bilateral dependencies in mineral trade between important partners, like Australia and China, which account for roughly $95 billion in critical mineral flows, are also highlighted by the data. As major sources of raw materials, producers in Africa, the Americas, and Oceania had significant trade surpluses in essential minerals, according to UNCTAD data (Africa's exports, for example, were close to $266 billion). By facilitating priority access agreements, coordinated resource management, and shared logistics arrangements that lessen exposure to supply disruptions and unilateral trade restrictions, these patterns validate actual structural concentrations that Pax Silica aims to stabilize. These benefits are critical for both major economies like the United States and smaller partners embedded in high-value AI supply networks (UNCTAD)

UAE's Strategic Position within Pax Silica:

Due to its strategic location between Europe, Asia, and Africa, top-notch logistical infrastructure, sovereign capital depth, and expanding technological investment ecosystem, the United Arab Emirates holds a key position in developing AI and vital mineral supply chains. The UAE is one of the best at facilitating trade and transportation in the Middle East, according to the Logistics Performance Index (World Bank, 2023), which is a reflection of the effectiveness of its ports, infrastructure, and customs procedures. One of the biggest container ports in the world and a crucial transshipment centre connecting trade lines between Asia and Europe, Jebel Ali Port is located in the Emirate of Dubai and is run by DP World (DP World, 2023). Simultaneously, Abu Dhabi's sovereign wealth institutions, such as the Abu Dhabi Investment Authority, oversee assets valued at hundreds of billions of dollars, offering significant funding capacity for investments in key industries including digital infrastructure, semiconductors, and sophisticated manufacturing. Simultaneously, Abu Dhabi's sovereign wealth institutions, such as the Abu Dhabi Investment Authority, oversee assets valued at hundreds of billions of dollars, offering significant funding capacity for investments in key industries including digital infrastructure, semiconductors, and sophisticated manufacturing.

The UAE's possible involvement in nearshoring and the establishment of regional hubs under Pax Silica is supported by this structural stance. The UAE Ministry of Industry and Advanced Technology's "Operation 300 billion" initiative, which aims to increase the industrial sector's GDP contribution and develop advanced manufacturing capabilities, is one of the national strategies that the country has already outlined as priorities for industrial diversification (MOIAT). The UAE has also demonstrated a state-backed commitment to growing AI capabilities through large expenditures in digital infrastructure and artificial intelligence ecosystems, including the founding of research institutes like Mohamed bin Zayed University of Artificial Intelligence.

These advancements put the UAE in a position to serve as a hub for the processing and reexport of minerals, a base for AI data centers, and a transit point for semiconductor logistics that links reliable markets across borders.

Participation in Pax Silica is consistent with the UAE's long-standing goal of increasing high-value industrial sectors and decreasing reliance on hydrocarbons from the standpoint of supply chain diversification. Economic diversification continues to be a key component of Gulf Cooperation Council measures to reduce long-term budgetary vulnerability to energy market volatility, according to the (IMF, 2023). The UAE strengthens its strategic autonomy and preserves a variety of economic relationships with Asian markets, such as China and India, by integrating itself into alliance-based AI value chains. By integrating into reliable technology networks, the UAE would become a strategic node in next-generation industrial ecosystems rather than just a transit economy. This would strengthen its geopolitical balancing ability and firmly anchor it within resilience-oriented global supply chains.

Risks and Constraints :

Pax Silica suffers structural limitations that mirror larger patterns of geoeconomic fragmentation, notwithstanding its strategic and economic advantages. Cost inflation brought on by supply chain duplication and redundancy is one major issue. According to the International Monetary Fund (IMF, 2023), if technology decoupling increases, geoeconomic fragmentation—specifically, the restructuring of supply chains along geopolitical lines—could eventually lower global output by as much as 7% (IMF, 2023). Due to facility duplication, relocation costs, and diminished economies of scale, redundancy may increase production costs in semiconductors and essential minerals even though it increases resilience. In a similar vein, the OECD (2023) observes that resilience-driven restructuring frequently entails short- to medium-term efficiency trade-offs, especially in capital-intensive industries like mineral refinement and semiconductor manufacturing. The second limitation is the possibility of trade retaliation. The possibility of reciprocal limitations has increased due to the growing use of

export controls and industrial policy tools, particularly in important sectors. Trade-restrictive policies have grown dramatically in recent years, adding to the unpredictability and fragmentation of international trade, according to the World Trade Organization's (WTO). (UNCTAD) also points out that increased strategic competition in advanced technology and essential minerals may strengthen trade policy interventions, potentially upending long-standing value chains.

Third, Pax Silica might hasten the disintegration of international norms in frameworks for mineral sourcing, semiconductor regulation, and AI governance. Different regulatory frameworks run the risk of generating rival technical ecosystems, raising the cost of compliance for multinational corporations, and making cross-border interoperability more difficult. The (The World Economic Forum, 2023) highlights that fragmentation of industrial and digital standards can limit the scalability of developing technologies across jurisdictions and decrease innovation diffusion.

Lastly, alliance-based commerce systems present balance challenges for intermediate and lesser nations. Nations like the United Arab Emirates have close business relationships with a number of important economies, including Asian and Western markets. The (IMF, 2023) claims that despite strengthening strategic ties with Western nations, Gulf countries still show significant trade exposure to Asia, especially China and India. In order to maintain diverse trade links and not becoming overly dependent on any one bloc, such signatories must carefully balance their involvement in security-centered supply chain frameworks. In this way, Pax Silica's long-term viability will rely on members' capacity to negotiate an increasingly divisive international trade environment in addition to economic coordination.

Policy Recommendations:
For Alliance Leadership

Beyond political signalling, Pax Silica needs institutional stability to guarantee long-term efficacy. A shared mineral reserve mechanism based on coordinated strategic stockpiling frameworks, like those for energy security, should be established first by alliance leadership. Critical mineral markets, especially those for lithium, cobalt, and rare earth elements, are highly concentrated, with processing capacity sometimes controlled by a single nation, according to the International Energy Agency (IEA, 2023). Coordinated hoarding among reliable partners would lessen exposure to export restrictions and short-term supply shocks.

Second, in order to avoid regulatory fragmentation, export control definitions must be harmonized. Companies operating across jurisdictions may face regulatory difficulty due to differing conceptions of "advanced computing, ," semiconductor manufacturing equipment, and dual-use AI technologies. Technical definitions have a significant impact on global value chains, as evidenced by the extension of U.S. semiconductor export restrictions since 2022 (U.S. Department of Commerce , 2024). Coherence among alliance members would enhance enforcement credibility and lessen regulatory arbitrage. Third, the UAE's competitiveness as a regional AI hub would be improved by the establishment of AI-focused special economic zones that integrate data centers, cloud infrastructure, and innovative manufacturing clusters. The nation has already made large investments in AI research institutes like Mohamed bin Zayed University of Artificial Intelligence, demonstrating its dedication to enhancing technological capabilities. Integration of trusted networks would be strengthened by integrating such activities into value chains linked with Pax Silica.

Finally, strengthening international R&D partnerships is essential for sustaining long-term competitiveness. The (OECD, 2023) underscores that cross-border research collaboration enhances innovation diffusion while mitigating duplication of technological effort. For the UAE, structured research partnerships with alliance members

would enhance knowledge transfer, reduce technological dependency, and reinforce strategic autonomy within an alliance-based supply chain architecture.

Conclusion:

A structural change in global trade policy, Pax Silica reflects a move away from open, efficiency-driven international integration and toward an architecture of economic security built on alliances. In recent years, security-oriented trade measures, industrial policies, and export controls have proliferated in strategic sectors like semiconductors and critical minerals, even though the multilateral trading system anchored in the World Trade Organization is still formally intact. By integrating coordinating mechanisms around semiconductor inputs, crucial mineral access, and technology governance alignment into a reliable network of partner states, Pax Silica institutionalizes AI supply chain security in this environment.e AI technologies. Technical definitions have a significant impact on global .

The acceleration of nearshoring and reshoring tendencies, which are already prevalent in advanced manufacturing industries, accounts for its broader significance. According to empirical studies by the (OECD, 2023) and (UNCTAD), companies are gradually reorganizing supply chains to reduce concentration risks and political susceptibility, even at the expense of short-term efficiency losses. By establishing reliable supply chain corridors and standardizing standards, Pax Silica facilitates this transition from cost reduction to resilience optimization.The paradigm concurrently increases strategic autonomy among participating nations by reducing vulnerability to supply coercion and asymmetric dependency, processes that are well-documented in the literature on geoeconomic statecraft.

But deeper geoeconomic segmentation is also a result of this change. Global trade increasingly reflects political alignment as alliance-based governance frameworks include strategic technologies. According to IMF modeling, if blocs become inflexibly divided, prolonged fragmentation may result in quantifiable losses in global output (IMF, 2023). As a result, Pax Silica represents both systemic bifurcation and resilience-building: it strengthens the structural

division of the global economy while stabilizing supply chains inside reliable networks.

Participation helps the United Arab Emirates continue to develop into a major center for sophisticated manufacturing, logistics, and artificial intelligence. The UAE can integrate itself into high-value, security-focused supply chains while preserving diverse trade contacts across countries by utilizing its infrastructural capacity, geographic centrality, and sovereign investment capabilities. The global trading order is restructuring into politically linked, resilience-centered blocs instead of completely deglobalizing. Pax Silica is one of the most obvious institutional manifestations of this shift toward reliable reliance in the era of AI-powered commercial rivalry.

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About the Author

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