

Geo-economic Coercion, Technological Rivalry and Global Fragmentation: Supply Chain Weaponization and Strategic Interdependence in Contemporary Great Power Competition



Syed Rizwan Haider Bukhari ^a Sajjad Nazir ^b Ehsanullah Khan ^c

Abstract: *The global economy has transformed from a system of integration to one of geopolitical competition through global supply chains. Global supply chains are now being used and transformed from an instrument of economic integration to the area of geopolitical competition. In this study, the weaponization of supply chains in today's great power rivalry is explored, focusing on a U.S.-China rivalry. It examines the use of critical mineral restrictions, semiconductor export controls and sanctions, technological infrastructure and logistics networks as instruments of geo economic coercion in the hands of states. This research applies a qualitative analytical method to examine the changes in production systems around the world due to COVID-19, Russia–Ukraine conflicts and the growing technological competition. The results show that liberal notions of "interdependence" and "win-win" have been undermined by the process of supply chain weaponisation and the trends of selective decoupling, de-risking, reshoring and economic fragmentation have been accelerated. The study argues that control over critical technologies, resilient production networks, strategic chokepoints, and state's ability of turning economic dependence to geopolitical leverage will increasingly define the nature of future great power competition.*

Keywords: Supply Chain Weaponization, Great Power Competition, Geo-economic Coercion, Strategic Interdependence, United States–China Rivalry, Semiconductors, Critical Minerals, Economic Security

Introduction

The late 20th and early 21st century saw the evolution of very integrated production networks that connected states, multinational companies, financial institutions, technology companies, logistics companies and consumers from across continents. The networks were praised at their inception as key drivers of efficiency, specialization, innovation and economic interdependence. The policy of liberal globalization was based on the assumption that cross-border trade and production would help defuse international conflict, as it would make the costs of doing so far more expensive. In today's world of great power contestation, however, a different picture has emerged: supply chains are not apolitical, but rather politically charged. They're strategic facilities which can be used to exert power, e.g. dependence on others, to limit access and to impose costs on rivals by a state. With the increased significance of geopolitics, great powers are beginning to understand how they can exert coercive leverage via the control of critical supply chains without ever firing a shot in anger. Geopolitics is growing, and more and more great powers are seeing that controlling the key parts of vital supply chains can give them leverage without actual shots being fired in the fight (Türk & Tavangar, 2025).

Weaponization of supply chains: Actions intentionally designed to use economic networks, production or economic chains, technology monopoly, financial networks and logistical choke points as such geopolitical instruments. In contrast to traditional war, supply chain weaponization is a non-kinetic tool that is used to restrict the supply of goods, materials, and services, such as export controls, sanctions, embargoes, investment screening, denial of technology, financial exclusion, resource limitations and control of transportation routes.

^a PhD Political Science (Strategic Studies), Islamia College University Peshawar, Khyber Pakhtunkhwa, Pakistan.

^b PhD Scholar, (International Relations), Department of Social Sciences & Education, Greenwich University, DHA Karachi, Sindh, Pakistan.

^c PhD Scholar, Disaster Management and Development Studies, University of Balochistan, Quetta, Balochistan, Pakistan.

Such instruments provide the leverage by which states can cause an economic or technological decline of competitors, obstruct military modernization, influence strategic behavior and cause reconfiguration without actually engaging in armed conflict. In this aspect, supply chains are now tools of geo-economic pressure to which the economy of connectivity has been metamorphosed (Sharif, 2026).

The U.S.-China competition is the key to the modern supply chain competition. It's no longer just a question of their competition; it's about the sophisticated technologies and artificial intelligence, semiconductors, telecommunications, quantum computers, critical minerals, cyber capabilities, and military modernization. The United States has ratcheted up export controls, entity lists, investment prohibitions and technology-transfer caps to limit China's access to state-of-the-art semiconductor technology and artificial intelligence skills. The measures are not only commercial limits, but strategies to maintain American dominance and to deter China's progress towards high-end industrial and military capabilities. Meanwhile, China has been trying to lessen its reliance on Western technology and to have a more dominant role in the supply chains of rare earths and critical minerals (Zhang et al., 2026).

But the coronavirus (COVID-19) pandemic changed the world's view of the fragility of the supply chain. This was due to a shortage of medical, pharmaceutical, semiconductor, protective gear and industrial components for production, which proved that excessive dependence on concentrated production systems can threaten human life and private welfare. Reducing reliance on distant suppliers and politically sensitive markets was on the agenda for states that had focused previously only on cost efficiency and just-in-time manufacturing. For states that traditionally had only considered cost efficiency and just-in-time manufacturing, they started to rethink their reliance on non-local suppliers and markets. The pandemic revealed the fragility of the global value chain and led governments to place greater focus on policies focused on resilience, redundancy, re-shoring, friend-shoring and strategic stockpiling. The earlier idea that globalized production systems were self-correcting and essentially market-oriented proved to be less certain (Bukhari, 2024).

Continuing securitisation of supply chains was exacerbated by the Russia-Ukraine war, which highlighted the potential of energy, food, finance and marine transport as geopolitical pressures. The example of Russia's energy ties with Europe demonstrated the negative dynamic of asymmetric dependency, especially so when the leader of the group is an adversary in the geopolitical arena. One of the other impacts of the conflict was an outbreak of civil wars, which affected both export gains on grain and fertilizer markets, shipping lines and global energy prices. In the context of Western sanctions, from banking to technology imports, energy financing and restrictions on industrial components, the capabilities of economic networks could be illustrated as means of collective punishment and strategic separation. The pandemic and the Russia-Ukraine war combine to reorient the policy discussions around the world from a mode of efficiency-driven globalization to a concept of security-led and focused economic restructuring (Bukhari, 2024).

The most strategically important area of supply chain weaponization is semiconductors, among all industries. The advanced chips will be necessary for the development of artificial intelligence, military platforms, telecommunications systems, autonomous weapons, quantum computing, consumer electronics and modern industrial production. Semiconductor manufacturing is spread across various countries, but key levels of the value chain the ones that are most advanced are contained within a few states and companies. The USA maintains considerable leverage via design software, IP, super high-tech manufacturing tools, and working with key partners. This stance has empowered Washington to put restrictions on China's access to cutting-edge semiconductors and chip-making techniques, making semiconductors the main arena for the great power game of the 21st century (Zhan et al., 2026).

The critical minerals and rare earth elements are another key battleground of geopolitical competition. These materials find critical application in defense systems, electric vehicles, wind turbines, batteries, advanced electronics and renewable energy technologies. As a result, China's monopoly of rare earth processing, refinement and export provides Beijing with significant leverage over industries globally relying

on rare earths. The number of countries with some deposits of rare earths is limited, but both processing and refining are very focused. This imbalance enables the Chinese to exert strategic signaling and coercive bargaining power via licensing privileges, export controls or regulatory restrictions. This has led to the debate around critical minerals becoming a primary focus of discussion on economic security, green transition, defense preparedness and technological sovereignty. Maritime choke points, along with ports and logistics corridors, are also included. The Strait of Hormuz, Malacca Strait, Suez Canal and the South China Sea are among the vital maritime routes which are vital to global trade. Energy markets, shipping rates, food security, and industrial production are among the regions that can suffer from serious impacts from the disruptions. Today, with growing geopolitical competition, ports and sea routes, shipping infrastructure, and logistics platforms are also of strategic importance. States and non-state actors have a significant influence on global commerce because they can interrupt or facilitate the movement of goods around the world. For this reason, the security of supply chains is no longer a logistics management problem, but it is now a key national security and geopolitical problem (Hsueh et al., 2025).

Changing supply chains into portals of power has posed a threat to the liberal idea that economic interdependence will invariably lead to peace and cooperation between people. For situations that are interdependent, conflict may be lessened if there are mutual benefits and dependency. But in cases of asymmetric dependency, they leave opportunities for strokes in the neck. States in the middle of financial systems, technological platforms, production networks or resource-processing can harness the power of connectivity. This change has created a new paradigm of globalization with elements of selective decoupling, de-risking, industrial policy, technological nationalism and strategic fragmentation. To solve this problem, rather than completely giving up on globalization, states are trying to redefine it based on trusted partners, secure networks, and politically aligned supply chains. This study explores the development, processes and consequences of the weaponization of the supply chain in the current great power competition. It's about the ways in which states turn interdependence into a strategic advantage and how this process alters the nature of the global political economy, international security, technological innovation and alliance building. The United States-China semiconductor battle, Chinese rare earth supremacy, supply chain disruptions during the pandemic, and industry challenges located on critical maritime supply routes and Russia-Ukraine energy geopolitics are analyzed in particular. It is the study's contention that supply chain weaponisation does not just reflect a policy trend but is an integral part of the new geo-economic order. The strategic significance of supply chains is growing as great powers try to use supply chains as weapons in international competition, and future international competition will be determined by a state's capacity to secure critical technologies, diversify production networks, control logistical chokepoints, and thwart coercive dependence (Olsson & Tryggstad, 2026).

Literature Review

Supply chain weaponization shares common concepts with other literature addressing the broader themes of economic statecraft, strategic interdependence and the evolving nature of great power competition. A traditional liberal perspective on international political economy has maintained that conflict is less likely to break out if the costs of war are greater, as this will occur due to economic interdependence. In this sense, global supply chains were seen as normalizing instruments, which foster collaboration, specialization and mutual reliance. This notion has been challenged, however, in recent scholarship by a focus on the idea that interdependence can lead to a form of coercive vulnerability in the face of asymmetric dependency. From this perspective, supply chains are less just business-to-business transactions and more devices that allow states to wield influence, block competition, and charge their rivals. From this standpoint, supply chains are not merely business-to-business transactions, but instruments through which states can exert influence, choke off competition, and impose costs on rivals (Rajagopal, 2026).

The idea of 'weaponized interdependence' is a significant theoretical contribution to this debate. The geopolitical theory of this is one that, on one hand, assumes that state-central states in the global network of

financial, technological, and production power can use their centrality to leverage in their favor. Network centrality is the ability of powerful states to observe data movement, intelligence generation, denial of transactions, denial of access, and impose sanctions. Modern supply chains thus exist not only as economic systems, but as infrastructures of power. This point of view is especially valuable when analyzing the tactics of great powers in shaping the behavior of rivals via technological standards, payment systems, export controls, logistics platforms and critical resource dependence (Sharaf et al., 2026).

There has been recent discussion in the literature regarding semiconductor geopolitics since the advent of advanced chips, which have become a major player in economic competitiveness as well as in national security. Semiconductors serve a wide range of applications, from research and development in artificial intelligence, supercomputing, telecommunications, cyber technologies, autonomous systems, and new military platforms. The study reveals that while the production of semiconductors is geographically distributed, five of the more advanced parts of the product value chain are very concentrated. Through software for chip design, intellectual property, and sophisticated manufacturing machinery and by being able to coordinate with allies that have key manufacturing technologies, the United States maintains influence as well. By placing an export intermediary in Beijing in this role, the U.S. will gain access to export control measures as a strategic means to slow China's efforts on technology development (Maritan, 2026).

Export controls are especially one of the key supply chain weaponization tools in the study of the United States– China tech race. The recent U.S. bans on cutting-edge semiconductors and AI-related technologies and equipment are all part of a strategy of technological denial. The measures are designed to hinder China from gaining access to high-end computing technology and other sophisticated, military-related technologies. According to scholars, this is a shift from open technological globalization to controlled technological ecosystems. To maintain some strategic edge in supply chains and avoid losing their ability to key capabilities to competition, states have started to take a proactive role in those relationships (H. A. Khan et al., 2024).

The other critical literature is on geopolitical trends in critical minerals. The strategic metals lithium, cobalt, gallium, germanium, graphite and rare earth elements are widely touted as important supplies in renewable energy electronics, EV batteries, defence and other high-tech applications. The minerals are said to be the backbone of the green transition and of the digital economy. China's overwhelming advantage in processing and refining capacity has given rise to some alarm among Western policymakers, as the reliance on minerals might become a strategic weak spot. Overall, the literature indicates that critical minerals are a separate subject of "geopolitical competition" that can be viewed as analogous to the importance of oil in previous eras of international politics (Bukhari, Khan, & Haq, 2024).

These are not the only tools of state power at play in the case of rare earth elements, however: A study of rare earth elements has highlighted how supply chains can be weaponized as well. While rare earth deposits are widely geographically spread out, processing of Rare Earth Elements (REE) is tightly coupled, thus providing strong leverage to the dominant actors regarding the industries downstream. By dominating the refining, separation and export routes, China could manipulate world supplies of the materials used in its defense industry and their uses for clean energy and in high-tech industrial applications. Government efforts to regulate trade, to issue licenses and to impose export restrictions can be used as tools of coercive bargaining, scholars write. This literature demonstrates that whilst the control of the raw materials of a supply chain might not be necessary, a degree of control over key processing nodes given by such a chain may be sufficient to establish strategic leverage. Globalization is also translated into securitization as another major strand in the literature. Previous globalization models focused on efficiency, cost reduction, outsourcing and 'just in time' production. The pandemic of the coronavirus COVID-19, geopolitical tensions and military conflicts, however, highlighted the dangers of providing too much reliance on highly restricted supply networks. Article titles suggest the rise of a new trend towards a "resilience-based economic approach" over "efficiency-based globalization" in the face of growing uncertainty. But as scholars note, states are increasingly moving away from "efficiency-based globalization" and towards a "resilience-based economic approach"

because of the ambiguity. The idea of bringing back manufacturing to the US, near-shoring, friend-shoring, strategic stockpiling, and de-risking have all become a regular part of policy discussions. This change can be viewed as part of the larger transition of supply chain management from corporate business planning to national security policy-making (Loginova, 2026).

Another example found in the literature of the Russia–Ukraine war was the weaponization of the supply chain. Scholars analyzing the battle focus on the new "strategic vulnerability of energy interdependence" that became a basis of European security. Western sanctions were a glimpse into the possibility of excluding a dominant power from world markets, and Russia's influence over natural gas supplies showed how powerful the power of dependency can be. The war brought other global supply chain impacts, such as disruption to grain exports, fertilizer deliveries, shipping lines, and energy costs. Additionally, the war had downstream effects, such as grain export disruptions, fertilizer deliveries, shipping lines, and energy costs, as an example, showing how war can have global supply chain implications. In these studies, it is not only confirmed that economic warfare has become a part of the geopolitical confrontation, but also its increasing integration is revealed. Security issues in the maritime supply chain are also commonly explored and discussed in current scholarship. Choke points are essential for supporting global trade, including the Strait of Hormuz, Malacca Strait, Suez Canal and the South China Sea. Any disruption in these routes could have far-reaching impacts on energy markets, food security, shipping prices and industrial manufacturing. Whether it's logistics or geopolitics, scholars say maritime choke points are more than just logistical weak spots. Today, naval power, port access and shipping insurance, undersea cables and control of sea lanes are all major factors in the great power competition. This has resulted in maritime infrastructure becoming an important aspect of supply chain security (Gelot & Khadka, 2026).

Fragmentation of global production systems is also a recent focus of scholarship. Experts say globalization is not turning away from us, but rather is being refocused on security, trust and political ideology. Now states are trying to lessen reliance on opponents, yet enhance supply lines to allies and strategic partners. The result is that the models for SC governance created are conflicting: selective decoupling, de-risking, and bloc-based economic integration are the models considered. The developments called into question whether a natural merging of global markets into a single one with fuller integration was around the corner. Rather, the "geopolitical" reshaping of globalization is a developing trend.

Generally, the literature reveals that the phenomenon of weaponization of the supply chain has become a common reality in the international relations of today's world. Relevant existing research offers robust lessons on economic statecraft and technological rivalry, export controls, critical minerals and energy coercion, maritime choke points, and securitization of globalization. But many of the studies focus on one question without connecting it to the other, and without seeing these questions as part of a strategic reconfiguration of great power relations. Another important research objective is the need for combining these factors in one analytical tool to account for the use of supply chains as weapons of coercion, resilience building and geopolitical alignment. The purpose of this research is to close this gap by examining supply chain weaponization from a systemic perspective as a characteristic symptom of the new geo-economic order (Sun & McKirdy, 2026).

Research Methodology

The method used in this study is qualitative research and uses an analytical and interpretative approach. It draws on secondary sources and documents such as academic articles, policy documents, strategic analyses, institutional publications, and geopolitical case studies covering issues relating to weaponisation of the supply chain and great power competition. Examples of the semiconductor war between the U.S. and China, China's rare earth export restrictions, geopolitics of energy, and the reshaping of supply chains post-pandemic are explored using a case study approach. These case studies offer practical examples of the roles played by strategic dependence in global economic networks by various states. Geopolitical analysis is also used to test the power of geography and technology clustering, production networks, maritime "choke points," and

industrial power in determining state actions in the study. Different approach of major powers in tackling supply chain vulnerability is analyzed and compared. The study will concentrate on changes or adjustments in the 2018-2026 time frame, when the world is facing the prospect of trade tensions, technological competition, the impact of the pandemic and escalating geopolitical competition.

Discussion

Evolution of Economic Warfare in the Geo-economic Era

Economic warfare has moved beyond negative security measures, such as state-sponsored sanctions, embargoes and limitations on trade, to a more advanced “network” approach. During earlier times, the pressure was mostly applied in relation to restrictions on trade and/or finance. However, in the modern period, states take advantage of the very nature of globalization. The economies in the modern world rely on specialized production systems, transborder technology networks, financial networks, logistics networks and chains that process resources. They are systems that are an efficient solution, but they are also vulnerabilities. Supply chain weaponization is the strategic weaponization of these vulnerabilities, which can influence geopolitical behavior without necessarily engaging in a direct military confrontation (S. Khan, 2025).

The USA has emerged as a major player in technological containment. The export restrictions on the company's semiconductors, for instance, aim to limit China's access to the most powerful AI technologies, chips, semiconductor manufacturing equipment and high-power computing. The bans also have an extraterritorial impact, as many global semiconductor companies rely on American intellectual property, software, patents and sophisticated manufacturing equipment. Consequently, Washington can affect not just American companies, but other firms allied to and companies from abroad as well as part of the semiconductor ecosystem (Fu, 2026).

China has taken two parallel measures. First, its emphasis has helped speed up the country's technological self-sufficiency, in key areas such as semiconductors, artificial intelligence, high-tech manufacturing, and digital infrastructure. Secondly, it has increasingly leveraged its dominance in the processing of critical minerals for a strategic advantage. The Chinese government's policy on restricting both the export and processing of gallium and rare earth elements illustrates how control of upstream resources and processing can turn into geopolitical leverage (Senou, 2026).

Semiconductor Geopolitics and Technological Denial

Today, semiconductors have become the backbone of technologically advanced power. Semiconductors are now the central backbone of technological power. Smartphones, satellites, military systems, autonomous vehicles, artificial intelligence, telecommunications networks, quantum computing and industrial automation are all dependent on advanced chips. The strategic significance of their economic value is equally great, as they are enabling technologies in national security and military modernisation (Bukhari, 2026).

The semiconductor industry is very market- and technology-concentrated. Taiwan manufactures a significant portion of the world's semiconductors and is the leader in the most sophisticated chip production. This focus has significant geopolitical implications if Taiwan gets caught up in the disruption, as the global technology and supply chain, industrial production, financial markets, and military preparedness are all affected (Okezie, 2026).

The U.S. has a strong presence in the semiconductor industry by virtue of its design/ IP software, its cutting-edge manufacturing equipment, and its major players NVIDIA, AMD, Intel, and Applied Materials. The American bans which restrict Chinese companies, such as Huawei and SMIC, aim to keep China from getting competitive in advanced computing and AI. Control of upstream technological nodes is therefore not only conceived as control of final manufacturing, but also may be used as a means of weaponization. The measures are a good example of how the legislator can use control over technological nodes as a tool other than control over final manufacturing (Kunkunrat, 2024).

The Chinese government has been investing significantly in becoming self-supporting in semiconductors, but there are quite a few obstacles yet to be overcome. However, in fields such as high-end manufacturing equipment, lithography and chip design software, Beijing still depends heavily on foreign technologies despite Beijing's massive investments in R&D and sales in the sector. This reliance places China under external pressure and is a primary reason for semiconductors being a pivotal flash point in the larger U.S.-China competition (Kalaitzidis, 2026).

Critical Minerals, Resource Nationalism, and Strategic Dependency

Another important space of great power competition has become critical minerals. Critical materials such as Rare Earth Elements (REEs), lithium, cobalt, gallium, graphite, and related materials are vital to Electric Vehicles, renewable energy, aerospace, advanced electronics and defense applications. With the development of digital transformation, clean energy transition, and military modernization by states, their strategic value has been rising (Adela et al., 2026).

Along with the high dependence on China for price hikes, it also enjoys structural bargaining power due to its domination in refining and processing of rare earths. In a number of categories, China has a very large proportion of the world's processing capacity, with the consequence that the economies of the industrial world are dependent on such inputs for high technology production. This is particularly significant in view of the fact that control over the actual processing of the minerals may be more significant than control of the deposits. Minerals from all over the world are also processed within Chinese-controlled mineral processing systems, although they are mined elsewhere (Bukhari, Khan, Noreen, et al., 2024).

Coercive resource diplomacy has become a growing phenomenon in China, as seen in its recent export controls on gallium and other critical materials. Many view these measures as a reaction to U.S. semiconductor restrictions and sanctions on U.S. technologies overall. They demonstrate that weapons capacity is a two-sided act: weapons supply is matched by weapons dependence, and weaponisation is a process through which strategies are found for exploiting an opponent's vulnerabilities and weaknesses as well as for protecting one's own vulnerabilities and weaknesses (Ullah, 2026).

To this end, the United States, Japan, Australia, and European states are betting on alternative sources of supply of minerals, on the development of domestic mines, on recycling technologies and allied processing power. But diversification is not easy due to the high capital cost and long project timelines, as well as environmental approvals and technical expertise needed for mining and refining. Hence, it is difficult and politically complex to break away from dominant suppliers (Huang et al., 2026).

Supply Chain Vulnerabilities after COVID-19

COVID-19 has irrevocably reshaped the knowledge and attitudes of governments around supply chain security. Lack of equipment, medicines, semiconductors, protective gear and even raw materials revealed the vulnerability of the very efficient just-in-time manufacturing chains. Prior to the coronavirus outbreak, the prevailing approach to global supply chains was to be efficient and minimize costs. The COVID-19 experience showed that over-efficient production systems can lead to the vulnerability of the entire system when production is largely concentrated in one region, and production disruption in multiple regions happens at the same time (Yu et al., 2026).

Many states found that there was insufficient manufacturing within the state itself to provide for needs. This underscored efforts to undertake industrial policies to bring manufacturing back home, establish strategic industrial stockpiles, and enhance national industrial preparedness. Governments started to see the supply chain as a business as well as a national security infrastructure for public policy intervention (Burrell & Long, 2026).

At the same time, the pandemic exacerbated worries about overly relying on China as the main source of production for numerous industries around the world. The Chinese government and corporations, in turn, responded by implementing “China plus one” policies, relocating some manufacturing to Southeast Asian countries, India, and elsewhere. But diversification does not necessarily imply immediate decoupling. Rather, it signals a slow effort over time to decrease over-exposure, but maintain the advantages of global production networks (Van De Haar, 2026).

Maritime Choke Points and Logistics as Instruments of Power

Maritime transport is still an extremely important mode of transport for global trade. Sea routes are also vital for international trade, with sea choke points being strategically important. The Strait of Malacca, Strait of Hormuz, Bab el-Mandeb, Suez Canal and South China Sea are not just trade lanes - they are vulnerabilities in the global economy. Any disruptions in any of these will have the potential to raise shipping costs, delay production, raise energy prices and exacerbate geopolitical instability. The Belt and Road Initiatives represent part of China's move to not only achieve more autonomy over geopolitically more vital maritime choke points but also to enhance alternative connectors. Likewise, America's military presence enables Washington to coordinate security in the sea domain, guard sea lanes and dictate the world's logistics order. Thus, maritime infrastructure is an important player in supply chain power. The South China Sea is particularly crucial because it is one of the territories on earth that is most disputed by man. It is important for its geographical and economic functions and as a way of communicating with other countries, transporting energy sources, a fishing ground, and as a strategic theatre for the military. Failure of order and peace in the area would reverberate around the globe, impacting an entire industrial base, energy supply chains, and financial markets.

Economic Fragmentation, Selective Decoupling, and De-risking

Weapons are entering the supply chain and are speeding up economic fragmentation. Efforts towards maximizing efficiency are increasingly giving way to those aimed at resilience, redundancy, and strategic autonomy, at the state level. This change in approach is reflected by the persistence of the concepts of “friend-shoring” or “selective decoupling”, “near-shoring” or “de-risking” in policies. They need not represent an attempt to abolish globalization; rather, these strategies should work toward restructuring globalization around “trusted” partners and “politically reliable networks. The U.S. and the EU are turning to industrial policy to cut their reliance on geopolitical competitors in key industries like semiconductors, clean energy, artificial intelligence, batteries and critical minerals. Creating subsidies, screening investments, regulating technology, and providing forms of economic security via domestic manufacturing are increasingly key instruments in economic security policy. However, full decoupling is still improbable as the world's production networks are very interconnected. The big economies are still reliant on one another for markets, parts, raw materials, technology and funding. As such, the nature of the new global order will probably be a fragmented but not fully divided world order. The strategic sectors will be more secularized, and less sensitive sectors could have a more open global integration.

Implications for Middle Powers and the Future Global Order

Weaponization of supply chains results in challenging decisions for middle and smaller powers. Numerous such states have multiple great powers to trade with who cannot be 100% aligned with one bloc, if at all possible, without an economic cost. This competition for technology, minerals, logistics and standards between the United States and China could place middle powers in pressure cooker scenarios as they are tempted to join one or the other supply chain ecosystem. It is good for a more disjointed and unpredictable global economic system. The countries that are able to diversify partnerships, build capacities around strategic autonomy and resilience at the domestic level will be best positioned. A single large supplier relying upon a single market and/or technology provider may be more susceptible. Hence, the political dynamics of the value chain will come to define foreign policy, industrial policy and national security planning more and more.

Results and Findings

The analysis revealed that supply chains are turning into tools of strategic coercion, and have ceased to be economic systems:-

- Technological dependencies, export control, sanctions, resource monopoly, logistical choke-points, and the financial system are increasingly used by the States to bring about geopolitical change. The States are increasingly using technological dependencies, export control, sanctions, monopolies on resources, logistical choke points and financial systems to influence geopolitical outcomes. This is a paradigm change from efficient globalization towards economic competition based on security.
- The results suggest semiconductors are a major flash point in the modern technological competition between the United States and China. American dominance in the sale of semiconductor design software, controlling the intellectual property rights and cutting-edge technology for semiconductor manufacturing, gives Washington a significant technological leverage over Beijing.
- The study also reveals that critical minerals are now important political resources like oil in past eras. China processes and refines critical minerals and rare earths, which they control, and this provides it with an advantage over industrialized economies which rely on these products. How the control of resources can be monetized as a geopolitical bargaining chip is shown with restrictions on the export of minerals like gallium.
- Recognizing one more interesting result, there was evidence of structural transformation of globalization. Production models have shifted from those that mostly focus on cost efficiency and a just-in-time approach to now focusing on the development of resilience, redundancy, diversification and strategic autonomy. However, the COVID-19 pandemic or the Russia-Ukraine war has further solidified this trend by revealing the fragility of medical and energy commodities, food, semiconductor and logistics supply chains.
- The research also indicates that fragmentation is likely to be growing in certain key industries, such as artificial intelligence, semiconductors, telecommunications, renewable energy technologies, pharmaceuticals, and defense. But full decoupling between pairs of big economies is not expected because the world's economy is intricately linked to each other.
- Last but not least, the research reveals that smaller and middle powers are increasingly under strategic pressure in an increasingly polarized economic order. Their autonomy will be built upon diversified partnerships, resilience within their borders, institutional capacity and navigating competing great power demands.

Conclusion

The weaponisation of supply chains has become a central characteristic of the great power rivalry of today. The 'old' paradigm of 'globalization' may still appear to be preoccupied with efficiency, openness, specialization and interdependence, but this is changing, and the 'new' paradigm is more 'securitized' and geared towards resilience, strategic autonomy, technological control and geopolitical leverage. The U.S.-China competition is a textbook example of the semiconductor industry, critical minerals, logistics, financial markets, and technological ecosystem serving as weapons in the strategic competition arsenal. Export restrictions, sanctions, investment screening, limits on resources and technological choke have now become potent weapons in the arsenal of economic warfare, which allows a state to erode its rivals, even in peacetime. Among all these resources, semiconductors and critical minerals are particularly valuable, as they are for every aspect of human life, including AI, national defense, renewable energy, digital infrastructure and industrial innovation. The exposure of vulnerabilities in the supply chain of COVID-19 and the Russia-Ukraine crisis pushed diversification and industrial policy towards the top of the agenda alongside capacity building efforts. The COVID-19 pandemic and the Russia-Ukraine conflict made diversifying supply chains, industrial policies and building capacities a priority. Finally, technological advantage, industrial fortitude and the application of control of strategic economic networks will determine future power in the world.

Recommendations

- **Strengthening Strategic Supply Chain Diversification:** Governments shouldn't over-rely on single suppliers, small production centers or geopolitical competitors. Geographically distributed supply chains are essential for products in strategic sectors like semiconductors, pharmaceuticals, energy systems, food security, defense technologies and critical minerals. Diversification is not a complete separation of supply chains; it's the building of alternative systems of supply to minimize vulnerability in times of crisis.
- **Building Domestic Technological and Industrial Capacity:** Use local manufacturing, research and development, work with advanced industrial skills, and also technological innovations to invest in the state. Preserving national capabilities in critical sectors for economic security and readiness for national defense is therefore important for long-term competitiveness. To build up domestic resilience, public-private partnerships, industrial subsidies, technical education and innovation ecosystems are needed.
- **Expanding Trusted Supply Chain Cooperation among Allies:** Partnerships and strategic relationships between countries should be built in order to establish trusted supply chain networks. Joint investments in semiconductor manufacturing, sharing of critical mineral processing plants, export-control policies, technology sharing initiatives, and supply-chain security frameworks are all part of collaborative frameworks. Cooperation like this can decrease the vulnerability of individuals and increase the resilience of the whole community.
- **Developing Strategic Reserves and Resource Security Mechanisms:** Governments should set up strategic stocks (reserves) of critical minerals, semiconductors, medical products, energy resources and key industrial parts. The reservoirs can be made available for crises, disruption of supplies, export restrictions, or geopolitical conflict. Strategies for stockpiling should be complemented with clear and effective monitoring systems, continual evaluation of national needs, and harmonization with the private sector.
- **Enhancing Maritime and Logistics Security:** The global reliance on sea lanes means that governments must allocate resources to maritime security, port development, shipping resilience, and safeguarding of key shipping lanes. It is important that strategic choke points like the Strait of Hormuz, the Malacca Strait, the Bab el Mandeb and the South China Sea receive continued diplomatic and security attention. Ensuring security of sea lanes is critical for continuity of energy and food supplies and industry.
- **Supporting Strategic Autonomy for Middle and Emerging Powers:** Middle powers and emerging economies should not over-rely on one of the great powers. Strategic autonomy can be maintained thanks to balanced economic partnerships, trade between regions and diversification of investment strategies. These states also need to build their own regulatory capability to control foreign investment, safeguard critical infrastructure and not be overly reliant on any one supply chain block.
- **Reforming International Governance on Economic Coercion:** International institutions need to establish more effective structures for export control, sanctions, technological controls, and economic sanctions. International peace can be undermined and conflict exacerbated by unruly economic weaponry, with States continuing to defend their security interests. There should be new rules to increase transparency, minimize uncertainty and avoid excessive fragmentation of the global economy.
- **Integrating Economic Security into National Security Strategy:** Policymakers should appreciate that the security of the economy and that of the nation have grown tightly coupled. The ability of supply chains to be resilient, technological leadership, access to resources and industry capability need to be factored into national security planning. The fight for control of production networks, strategic materials, digital infrastructure and technological ecosystems will be as much part of future geopolitical dynamics as the military factor.

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