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The Impact of Current Wars on Global Supply Chains:A review of Disruptions, Sectoral Shock and Adaptive Responses in 2026.

Dr. Pinky Pandey[1]*, Prof. Mansi Saxena[2], Dr. Imad Ali[3]

[1]GNIOT Institute of Management Studies, Greater Noida, Uttar Pradesh, India
ORCID: 0009-0001-5397-6037
[2]GNIOT Institute of Management Studies, Greater Noida, Uttar Pradesh, India
ORCID: 0009-0004-1613-780X
[3]GNIOT Institute of Management Studies, Greater Noida, Uttar Pradesh, India
ORCID: 0000-0002-4088-8986
Corresponding Author:
Dr. Pinky Pandey
GNIOT Institute of Management Studies, Greater Noida, Uttar Pradesh, India

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supply chain resilience, geopolitical risk, Russia–Ukraine war, Red Sea crisis, Houthi attacks, nearshoring, friend-shoring

ABSTRACT

Between 2022 and 2026, global supply chains faced unprecedented simultaneous stress from overlapping geopolitical conflicts. The Russia–Ukraine war, the Gaza–Israel conflict and associated Red Sea crisis, broader Middle East escalations including the 2025 Iran–Israel confrontation, and the ongoing US–China technology and trade war have collectively created systemic, multi-front vulnerabilities with no historical precedent. This paper presents a systematic narrative review that synthesizes evidence across four interlocking disruption theatres to identify shared disruption mechanisms, sectoral impacts, and adaptive responses at organizational and policy levels. Drawing on peer-reviewed literature, industry reports, and empirical developments from 2025–2026, we conducted thematic analysis across the four conflict theatres. Disruption mechanisms were inductively coded and mapped against sectoral and regional impact data.

Five persistent disruption mechanisms were identified: maritime chokepoint vulnerability, sanctions-driven financial fragmentation, critical material concentration, food supply chain weaponization, and compound crisis amplification. Differential impacts were observed across sectors and regions. Adaptive strategies documented include supply diversification, nearshoring, friend-shoring, strategic inventory buffering, ESG-enabled resilience, and accelerated digitalization. Evidence points toward permanent structural reconfiguration of global trade networks, progressive economic bloc fragmentation, and an enduring elevation in supply chain risk premiums. This review proposes a conceptual framework for multi-conflict supply chain vulnerability and highlights priority research gaps, contributing foundational insight for scholars and practitioners navigating an era of enduring geopolitical fragmentation..

1. INTRODUCTION

The global supply chain network has now entered an unprecedented period of geopolitical tensions following World War II era of reconstruction of the international trade system. Unlike earlier decades when periodic crises occurred due to 2008 financial collapse, 2011 Tohoku Earthquake, 2021 Suez Canal blockage, and 2020 COVID-19 pandemic, 2022-2026 is characterized by several parallel wars and conflicts each one alone having the capacity to generate global supply chain shocks, but together creating complex interdependent vulnerabilities that cannot be reduced simply to sum of individual disruptions.

Firstly, Russia–Ukraine War, starting from February 2022, was responsible for the initial shock wave that generated geopolitical fault lines in the middle of the European breadbasket and energy corridor. Sarwar and Rye (2025), using a landmark systematic review of 22 peer-reviewed articles, discovered that there were five primary disruptive domains –.....

food security, energy market instability, critical raw material shortage, transport constraints, and financial response measures – resulting in asymmetrical vulnerabilities to developing countries in Middle East, North Africa, and South Asia. Disruption impact of the war proved resilient over the time period – according to Stemmler and Korn (2022), effects of the trade shift due to civil wars can endure up to nine years, implying structural changes caused by war will last beyond the end of hostilities Secondly, the occurrence of the Gaza-Israel war in October 2023 led to second significant shock due to unexpected source of supply chain disruption – non-state maritime warfare. Houthi rebel attacks targeting civilian ships in Red Sea and Gulf of Aden in November 2023 resulted in closure of the Suez Canal for large amount of container traffic, requiring a detour by the Cape of Good Hope and leading to a 10–14-day delay in Asia-Europe travel. The choke point created by the event impacted roughly 30% of the global container movement, and 12-15% of all traded goods in the world – it has exacerbated disruptions already occurring due to Russia-Ukraine war particularly regarding food and energy flows into developing countries dependent on imports.

Finally, a third level of geopolitics-induced supply chain disruptions lies in structural domain of the US-China war in the spheres of technology and trade policies. Export control actions related to semiconductor, rare-earth elements, and sophisticated equipment led to break-up of previously tightly connected electronics and renewable energy supply chains – for example, factory shutdowns occurred among the major automobile companies due to unavailability of crucial magnets, and multibillion-dollar investments took place in US, Europe, Japan, and South Korea in industrial policy programs.

In summary, this paper reviews the evidence from these four overlapping conflict arenas to provide a comprehensive analysis of global supply chain disruption trends in 2026. Contributions include:

(1) integrated cross-conflict comparison of disruption mechanisms,

(2) mapping of compound crisis effects between conflict theatres,

(3) identification of adaptation practices, and

(4) framework for multi-conflict vulnerability analysis and research agenda.

2. METHODOLOGY

The study uses integrative review methodology, which draws on peer-reviewed academic literature, reputable industry reports, evaluations by multilateral organizations, and empirical information published in the years 2022 through mid-2026. Building upon the systematic literature base established by Sarwar & Rye (2025), the scope expands in temporal and geographical terms to cover the Red Sea maritime conflict, the Middle East crisis of 2024-2025, and the US–China process of technological decoupling.

2.1 Scope and Search Parameters

Literature was sought in scientific bibliographic databases including Web of Science, Scopus, Google Scholar, and relevant policy-based data sources such as World Bank, International Monetary Fund, WHO, UNCTAD. Search terms utilized in the research comprised: (supply chain OR logistics OR trade disruption) AND (Russia–Ukraine OR Red Sea OR Houthi OR Gaza OR US–China OR geopolitical risk OR nearshoring OR friend-shoring). Industry reports by Marsh, J.S. Held, have been used to capture the quickly changing empirical reality. Inclusion criteria required publishing within 2022-2026 timeframe and discussion of supply chain, logistics, or trade consequences of modern conflicts. Figure 1 presents the PRISMA 2020 flow diagram illustrating the systematic literature search and selection process. Records were screened using the inclusion criteria of publication within 2022–2026 and relevance to supply chain, logistics, or trade consequences of geopolitical conflicts.

2.2 Analytical Framework

The analysis will use the following classification of disruption mechanisms found across all conflict theatres under investigation: maritime chokepoints risk; economic sanctions and fragmenting of financial systems; concentration of critical raw materials; weaponization of food chains; and compounding of crises through cascading effects. Adaptive solutions will be classified in accordance with three levels: firm-based, industry-based, and policy level. Comparative analysis will be carried out for the following four conflict theatres.

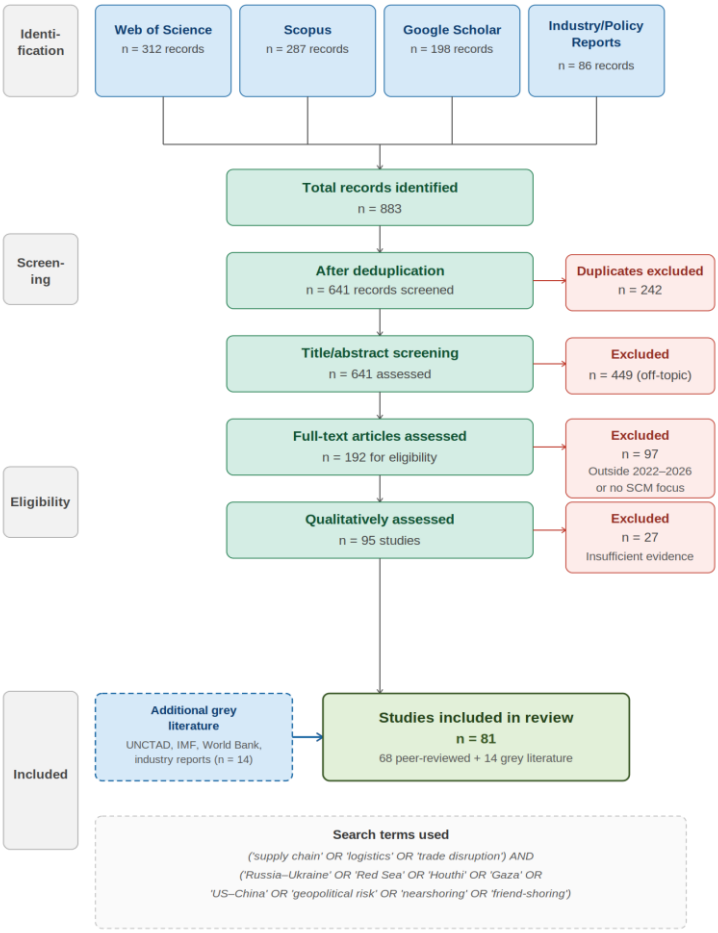

Figure 1: PRISMA Flow Diagram – Systematic Literature Search and Selection Process (2022–2026)

3. GEOPOLITICAL CONFLICT THEATRES AND SUPPLY CHAIN IMPACTS

3.1 The Russia–Ukraine War (2022–Present)

3.1.1 Food Security Disruptions

The war between Russia and Ukraine resulted in the immediate disruption of global food supply chains. As a combined total, Russia and Ukraine contributed about 25% to the world exportation of wheat and barley, 15% to maize, and 60% to sunflower seed oil (Zhang et al., 2023; Nasir et al., 2022). This created basic vulnerability once the war broke out. There have been huge disruptions to the agricultural output in Ukraine. As per Nasir et al. (2022), there is a fall in production when compared with pre-war levels by 26% for wheat, 32% for soybeans, and 21% for maize. According to Jagtap et al. (2022), around 20–30% of the lands used to grow winter cereals, maize, and sunflower could not be sown or harvestable. There was severe damage to exportation capacity, wherein the grain exports of Ukraine from the three major ports in the Black Sea (Odessa, Mariupol, Kherson) were at least 95%, which were either blocked or damaged due to the war (Ben Hassen and El Bilali, 2022). The price fluctuation has been quite severe, with price spikes of 24.53%, 14.66%, and 8.91% recorded in the month of March 2022 for wheat, maize, and soybeans respectively (Nasir et al., 2022). There have been hikes of up to 55% in the prices of wheat within the first few weeks after the war started (Kumar and Kumar, 2023).

3.1.2 Energy Market Volatility

The dominant position of Russia in international energy markets—having an 8.3% share of global mineral fuels exports and the position of the world s largest natural gas exporter (Cui et al., 2023)—created significant vulnerability for Europe. Over the period from 2017 to 2021, the European Union was importing 25.5% of its crude oil and 45-48% of all its energy commodities from Russia (Allam et al., 2022). The economic impact was quite substantial: oil prices had grown by roughly 15% to $130 per barrel by March 2022, European natural gas prices by 120-130%, and coal prices by 95-97% within six months after the war began (Kumar and Kumar, 2023). Cui et al. (2023), using computable general equilibrium modeling, found that the maximum drop in Russia s GDP would be 5.49% in the case of a full ban on Russian energy supplies imposed by the US and EU countries, whereas the effects on global GDP would be insignificant at only 0.008%.

3.1.3 Critical Materials and Manufacturing

Various reports have highlighted the impact of the conflict on the materials that play a vital role in manufacturing across the globe. For instance, Ukraine is responsible for producing almost 50 percent of the world s neon gas and 40 percent of krypton gas, which are important for the manufacturing of semiconductors (Nguyen et al., 2022). Additionally, Russia is a major producer of palladium, with its production accounting for almost 47 percent of global production, 25 percent of potash fertilizers, and 16 percent of nickel. There was significant disruption in the fertilizer manufacturing industry due to the conflict since both Russia and Belarus produce significant proportions of global fertilizer exports (Russia: 16 percent potash and 10 percent nitrogen, and Belarus: 17.6 percent potash). Fertilizer prices surged by about 80 percent in 2021 and reached record highs (Ben Hassen & El Bilali, 2022).

3.1.4 Structural Changes Over the Long Term

The data provided by Stemmler and Korn (2022) demonstrate that the changes resulting from such disruptions would be rather durable and structural in nature – agricultural and mining trade shifts quickly (by 12-13% to alternative sources within the course of one year), manufacturing trade takes somewhat longer (about 7% during several years) and trade related to fuels is much slower in shifting to other sources. Importantly, the effects on trade patterns caused by the disruption of relations between Russia and Ukraine last up to nine years after the resolution of the conflict, which suggests that the new configuration of supply chains established by then will persist for some time after that period. Financial system fragmentation is also a structurally dangerous phenomenon since the exclusion of Russian banks from SWIFT will likely accelerate the development of an alternative financial architecture and create new payment systems that could be used in regional transactions (Markus, 2022).

3.2 The Gaza-Israel War and the Red Sea Crisis (2023-Present)

3.2.1 Maritime Chokepoint Shock

The outbreak of the Gaza-Israel war in October 2023 initiated an unexpected and acute supply chain shock in the maritime sphere. In November 2023, the Houthi rebels, who were allied with Gaza, launched attacks against merchant vessels traveling through the Red Sea and the Gulf of Aden, effectively causing a disruption in one of the world s most important corridors for maritime commerce. The Red Sea and the Suez Canal are responsible for transporting about 30% of total international shipping cargo, including 12-15% of goods exported worldwide, among which are important oil, LNG and grain deliveries from the Black Sea area to Europe and Asia. The effect of the attack was dramatic – the throughput of containers moving through the Red Sea reduced by 75% during the peak of the crisis; 95% of container ships took the route around Africa s Cape of Good Hope, which added 10-14 days and costs associated with increased fuel consumption and insurance to the cost of moving goods between Asia and Europe (Smart Import and Customs, 2025). The Platts Container Index rose to US$5,272.50/40-foot equivalent unit in early January 2024 – the largest amount recorded since mid-2022. Oil shipping volumes through the Bab al-Mandab Strait declined from the average of 8.8 mln b/d before the crisis to 4 mln b/d through August 2024 (a drop of over 50%) (Frontiers in Political Science, 2025).

3.2.2 Sectoral Effects

One of the industries most affected by the attack was the automotive sector. European plants working with a just-in-time approach experienced production shutdowns because of delays in component delivery. Tesla had to shut down production at its plant in Grünheide, Germany, for two weeks in January 2024, due to disruption in shipping caused by Houthi attacks. Other industries impacted by increased transit times and disruptions in their inventory systems included electronics and pharmaceutical products. Food insecurity became a problem for countries dependent on imported grains in East Africa and Asia because of increased costs incurred during the process of diverting grain from Black Sea exporters (IFPRI, 2024). Notably, the aspect of asymmetric warfare played a role in the Houthi attacks as shipping companies from countries supporting Israel were targeted and ships belonging to China and Russia received de facto immunity. It created a competitive advantage for non-Western carriers as opposed to EU-based and Egypt-owned Suez Canal companies (Arab Center DC, 2025). The crisis also had the unfortunate side effect of polluting maritime transport in the ecologically sensitive waters in which vessels began navigating as a result of redirection.

3.2.3 Current Status (2025-2026)

The ceasefire in Gaza achieved in October 2025 made the Houthis cease commercial shipping attacks; by December 2025, the MV Eternity C crew had been freed. However, the crisis remains unresolved in some respects – major carriers have remained vigilant, many shipping companies continued to divert their vessels around the Cape of Good Hope, while the Bab al-Mandab Strait was considered under threat in April 2026 international shipping advisory (World Atlas, 2026). Houthi fighters have also threatened to recommence the attacks should the Gaza ceasefire break or the 2026 Iran conflict start. As a result, Suez Canal shipping volumes remain low compared to pre-crisis levels; J.P. Morgan estimates that shipping disruption could contribute 0.7 percent points to the core goods inflation rate.

3.3 Further Middle East Escalations (2024-2025)

In addition to the Red Sea maritime crisis, further Middle East escalations in 2024-2025 have created further supply chain risks. The Iran-Israel conflict lasting twelve days in 2025 sparked concern that the Strait of Hormuz – a chokepoint accounting for about 20% of international oil shipments – might be impacted, causing oil future prices volatility and increased insurance costs for the energy shipping industry worldwide. Besides, regional conflict resulted in supply chain disruption in industries as diverse as automotive and pharmaceuticals due to disruption in transport services, shortage of

raw materials and supplier limitations (ISM World, 2026). Another problem caused by the crisis is a disruption in the supply of pharmaceutical products relying on the shipment of specialty chemicals and active pharmaceutical ingredients from the regions currently involved in the conflict. Further, Middle Eastern conflicts have undermined plans regarding Gulf ports being used for logistics hubs. As mentioned above, the unintended consequence of the Red Sea crisis was accelerating production relocation to the Gulf ports like Jebel Ali in Dubai, where ships could reach certain European markets quicker than navigating the waters around the Cape of Good Hope (Washington Institute, 2024). The unique long-term challenge facing Egypt is the decline in income from the Suez Canal; Egypt receives approximately $9.4 billion worth of revenue from the passage yearly, which worsens existing debt-related problems (Wikipedia, 2025).

3.4 The US-China Technology and Trade War (Ongoing)

Structural change has occurred also in the realm of the ongoing US-China technology and trade war, which, although occurring on a longer timescale, creates similar changes in supply chains as the wars described above. US export restrictions targeting semiconductors and manufacturing equipment, Chinese retaliation in terms of rare earth element exports and tariff structure exceeding 20-32% for Chinese products sold to the United States (Lambda SCS, 2026) combined to disrupt decades-long interwoven electronic, EV, and clean energy supply chains. Practically, the outcome is drastic. In April 2025, China declared new controls on several critical mineral exports; by May 2025, Ford announced closing its automotive plants for three weeks due to shortage of high-power magnets (Z2Data, 2026). China dominates rare earth processing, holding a share of 60%; hence, the structural dependence on Chinese imports is inevitable in the long run despite policy preferences. Combined with restrictions on exporting semiconductor chips and restrictions imposed by China on importing them, it causes a shortage of neon and krypton needed for production. Tariff structures have become a constant feature of relations between two countries, no longer occasional (Lambda SCS, 2026). The United States applies 20-32% tariffs to Chinese goods, 18% to Indian and 25% to countries engaging with Iran. The CEPR analysis of the activities of Japanese multinationals shows that they did not choose reshoring but diversified their operations toward ASEAN states instead (CEPR, 2026).

4. CROSS-CONFLICT COMPARATIVE ANALYSIS

4.1 Comparative Summary: Conflicts and Impact Domains

Table 1 below summarizes the four conflict theatres analyzed in this review, their primary affected sectors, key disruption mechanisms, most vulnerable regions, and notable adaptive responses:

Conflict	Primary Sectors Affected	Key Disruption Mechanism	Most Vulnerable Regions	Notable Adaptation
Russia–Ukraine War(2022–present)	Food, Energy, Critical Materials	Black Sea port closures; sanctions on Russian SWIFT access; neon/palladium supply shock	MENA, Sub-Saharan Africa, South Asia	Black Sea Grain Initiative; EU energy diversification; nearshoring
Gaza–Israel War / Red Sea Crisis (2023–present)	Maritime Shipping, Manufacturing, Food	Houthi attacks force Cape of Good Hope rerouting (adds 10–14 days)	Europe, East Africa, import-dependent developing nations	Naval coalitions (Op. Prosperity Guardian); air-freight surge; Cape rerouting
Broader Middle East Escalations (2024–2025)	Oil & Gas, Pharmaceuticals, Automotive	Chokepoint risk at Bab al-Mandab; Strait of Hormuz threat; insurance premium spikes	EU energy importers, Asian manufacturers	Inventory buffering; alternative fuel sourcing; production relocation to Gulf hubs

US–China Trade / Technology War (ongoing)	Semiconductors, EVs, Critical Minerals	Export controls on rare earths; China retaliates on chip inputs; tariff escalation	Global electronics/automotive; US & EU manufacturers	Friend-shoring to ASEAN; CHIPS Act investments; supplier diversification

Table 1: Comparative Summary of Active Conflict Theatres and Supply Chain Impacts (2022–2026)

4.2 Multi-Conflict Impact Matrix

The simultaneous activation of multiple disruption theatres produces compound effects qualitatively different from any single-conflict scenario. Table 2 maps key impact domains across conflict theatres, highlighting compounding effects:

Impact Domain	Russia–Ukraine	Red Sea / Houthi	Middle East Escalation	US–China Tensions	Compounding Effect
Food Security	Wheat/sunflower oil price spikes; 25% global wheat supply at risk	Grain rerouting from Black Sea adds cost to Africa/Asia	Limited direct impact; oil price inflation raises input costs	Fertilizer inputs affected by export controls	Severe for MENA, Sub-Saharan Africa
Energy Markets	EU dependency; gas +120–130%; oil $130/barrel	LNG rerouting; Red Sea oil flows halved	Bab al-Mandab threat; Hormuz risk; Brent volatility	LNG competition; China demand surge	Energy price inflation feeds broader CPI
Maritime / Logistics	Black Sea blockade; seafarer shortages	30% container trade via Suez disrupted; Cape rerouting	Insurance premiums elevated; war-risk zones expanded	Port congestion; tariff documentation delays	Systemic freight cost elevation globally
Critical Materials	Neon (50%), palladium (47%), potash disrupted	Iron ore / fertilizer rerouting cost increases	Phosphate (Jordan/Morocco) supply risk	Rare earths, magnets, chips; China controls 60%+ of rare earths	Semiconductor supply chain under multi-front pressure
Financial Markets	S&P +$99; Gold +$59; capital flight to USD	Insurance cost surge; shipping stock volatility	Oil futures volatility; Gulf sovereign funds strategic shift	Equity market decoupling (US-China)	Risk-off sentiment; trade finance tightening

Table 2: Multi-Conflict Impact Matrix Across Key Supply Chain Domains

4.3 Five Essential Disruption Mechanisms

In analyzing conflicts side by side, it becomes evident that there are five main disruption mechanisms operating in concert across multiple theatres, forming the structure of multi-conflict supply chain stress according to the parameters described by this review as follows:

4.3.1 Maritime Choke Point Weakness

The Black Sea blockade and the Red Sea dispute represent an example of how much control over maritime choke points can affect the conflict actors. In fact, the world s container shipping industry is structured around several straights and channels (Suez, Bab al-Mandab, Hormuz, Malacca) that can be disrupted immediately resulting in systemic consequences for the global industry. A new aspect brought up by the Houthis actions is the introduction of the leverage provided by non-state actors who can employ missile and drone technologies in order to disrupt key choke points at a significantly lower cost than conventional naval operations would entail.

4.3.2 Financial Fragmentation Due to Sanctions

Russian banks being disconnected from the SWIFT network and the combined actions of US sanctions, EU sanctions, and Chinese counter-sanctions lead to accelerating financial fragmentation of the global trade finance system. Emerging alternative payment systems include China s CIPS and bilateral agreements to pay in local currencies established among Russia, China, India, and Turkey, in addition to various state-sponsored pilot initiatives concerning digital currencies. According to Markus (2022), these developments are expected to become the most durable and persistent long-term impact of the Russia-Ukraine war, much like Iran s years-long period of financial isolation.

4.3.3 Concentration of Critical Materials

Each conflict brings about reliance on some form of critical materials, either rare earth elements in China, neon and krypton gases in Ukraine, palladium, potash, and nickel in Russia, or the energy sources such as oil and gas from the Gulf region. Concentration of critical material extraction in contested geographies creates structural weakness in the supply chain that cannot be easily solved even within one fiscal year. The 2025 J.S. Held Global Risk report lists critical material concentration as one of the top compounding factors for 2026, alongside challenges in rapidly expanding substitute processing capacities of the concentrated supply chains.

4.3.4 Food Chain Weaponization

Intentional destruction of the Ukrainian grain exporting infrastructure and export restrictions issued by 26 countries, resulting in the restriction of 36% of world s wheat exports and 78% of sunflower oil exports (Ben Hassen and El Bilali, 2022), and Houthis interference with shipping of food commodities can be viewed as evidence of a new trend in the use of food supplies as a means of political pressure. This development results in humanitarian consequences that have been analyzed in multiple studies, suggesting that the progress towards reduction of world hunger has been reversed: at least 850 million people face a food insecurity crisis by the end of 2022, a situation which was only aggravated by compounded crises that followed.

4.3.5 Amplification by Compounding Stress

Perhaps the most important conclusion drawn from cross-conflict analysis is that of amplification by compounded stresses. COVID-19-vulnerable supply chains became weaker when the Russia-Ukraine war took place; supply chains weakened by the same conflict became more vulnerable to the added strain of increased Red Sea rerouting costs; and increased shipping costs combined with US tariff escalation resulted in an inflationary multiplier estimated by J.P. Morgan to add one percent to global core goods inflation rate. Arisekola (2023) describes how COVID-19 vulnerabilities were systematically magnified during Russia-Ukraine war – a dynamic now replicated into four simultaneous fronts of multi-conflict stress up until 2026.

5. DIFFERENTIAL PATTERNS OF REGIONAL VULNERABILITIES

5.1 Regions Most Vulnerable: MENA & Sub-Saharan Africa

The two regions most vulnerable in the context of all identified conflicts appear to be Middle East, North Africa (MENA), and Sub-Saharan Africa. According to Zhang et al. (2023), 24 nations in those two regions display extreme vulnerability by applying the Herfindahl–Hirschman index analysis to the degree of dependency on food imports. Among the worst-affected nations, we find Egypt (importing 86% of wheat from Russia/Ukraine), Lebanon (74% of wheat), and Libya (58% of wheat, 74% of maize). These nations will experience a multidimensional vulnerability to food and energy supply, which cannot be managed with a singular adaptation strategy. Particularly problematic in terms of food insecurity appears to be Egypt, being the major food importer from the Black Sea with 9.4 billion USD annual transit revenue through the Suez channel, facing economic debt problems, and sitting in the middle of every identified disruption mechanism at once. IFPRI reports on potential supplier substitution (to Australia and Argentina) and higher cost of transportation of those regions for sub-Saharan African food security, resulting in higher prices, which adversely affect low income consumers.

5.2 Differential Impacts in South Asia

South Asia represents another example of pronounced intra-regional differential vulnerability. India emerges as a significant beneficiary of the multi-conflict environment, employing the strategy of strategic neutrality. Buying cheap Russian oil, refining it, and selling back to international markets at market prices, taking advantage of its position as a connector between the Western and Eastern technology ecosystems in order to attract friend-shoring investments, and

avoiding trade-finance-related disruptions suffered due to Western sanctions, India emerges as the major beneficiary of multi-conflict environment. On the other hand, Pakistan is experiencing wheat import disruption (receiving 39% of its import requirement from Ukraine) and economic instability (Naz and Kear, 2022).

5.3 Europe: Forced but Rapid Adaptation

Europe holds a unique position in terms of vulnerability to the Russia-Ukraine war: having been hit the hardest by energy and food disruptions from that theater, and being the region most affected by increased rerouting costs through the Red Sea, it has demonstrated unprecedentedly rapid policy adaptations, reducing its dependence on Russian energy from 45–48% down to significantly lower values, albeit with considerable economic cost. On top of high costs of rerouting through Red Sea, European manufacturers in the automotive and consumer goods industries have to contend with the impact of US tariff system on their supply chains.

5.4 Asia-Pacific: Emergence of a New Manufacturing Base

Asia-Pacific region, primarily represented by ASEAN countries, seems to take the leading role in reshaping global manufacturing landscape as a result of compounded supply chain disruptions. According to 2026 CEPR research, Japanese companies are redirecting investments from China to ASEAN countries, while Apple, Samsung, and other electronics companies have intensified production in Vietnam, Malaysia, and Indonesia. One of the drivers of the rapid Vietnamese GDP growth is the inflow of manufacturing activities displaced from China-centered supply chains. India, with its large domestic market, growing manufacturing sector, and strategic autonomy, is becoming an important production alternative, supported by friend-shoring investments in semiconductor industry.

6. ADAPTIVE STRATEGIES: ORGANIZATIONAL, SECTORAL, AND POLICY RESPONSES

6.1 Strategy Overview

A comprehensive overview of adaptive strategies based on the literature survey findings is provided in Table 3.

Strategy	Description	Sectors Leading Adoption	Evidence / Example	Limitations
Supply Diversification / Multi-Sourcing	Reducing reliance on single-source suppliers or regions; parallel supplier qualification	Automotive, electronics, pharma	Apple moved 25% iPhone production to India; Japanese MNCs shifted to ASEAN from China	Higher unit costs; quality control complexity
Nearshoring & Friend-Shoring	Relocating production closer to end markets or to politically aligned partners	Consumer goods, semiconductors, EVs	Mexico nearshoring boom; CHIPS Act investments in US & EU fab plants	Wage premiums vs. low-cost manufacturing zones; political instability in new hubs
Strategic Inventory Buffering	Increasing safety stock of critical inputs; national strategic reserves	Food, energy, semiconductors	Iran wheat model: 9.33% cost reduction with backup supplier + pre-positioning (Rahbari et al., 2023)	Carries cost; perishables unsuitable; demand volatility difficult to forecast
Digital Supply Chain Transformation	Digital twins, real-time visibility platforms, AI-driven risk monitoring, IoT tracking	All sectors, especially logistics-intensive	Ukrainian logistics companies accelerated digital-humanitarian operations within weeks of invasion (Krykavskyy et al., 2023)	Implementation cost; data sovereignty issues; cyber-attack exposure

ESG-Enabled Resilience	ESG disclosure linked to superior crisis performance; governance transparency reduces disruption severity	Listed corporates, global brands	Tsang et al. (2024): ESG-prioritized firms outperformed peers during conflict events	ESG frameworks vary globally; greenwashing risk
Policy & Multilateral Coordination	Government reserves, export controls, humanitarian corridors, multilateral grain agreements	Agriculture, energy, humanitarian	Black Sea Grain Initiative (July 2022); EU energy solidarity agreements; Operation Prosperity Guardian	Vulnerable to geopolitical reversal; trust deficit between parties

Table 3: Adaptive Supply Chain Strategies Under Multi-Conflict Geopolitical Stress

6.2 The Structural Paradigm Shift: Moving from Efficiency to Resilience

A prevalent meta-pattern in both organizational and policy-level adaptation strategies relates to the structural change from efficiency-oriented to resilience-oriented supply chain designs. According to Sentrisk data of Marsh (2026), global supply chain disruptions cost businesses about US$184 billion yearly, with 65% of organizations experiencing at least one supply chain bottleneck (Marsh, 2026). The cost-effectiveness rationale for resilience-oriented adaptations has changed: in Rahbari et al. s (2023) comparative analysis of hybrid strategies incorporating both backup suppliers and strategic inventory compared to regular systems, hybrid supply chains achieve cost savings of 9.33% without being rendered infeasible by increased demand rates. In other words, the cost-effectiveness argument for resilience-oriented strategy is now mathematically validated and no longer considered a mere expense associated with inefficiency.

Some examples of resilience-oriented supply chain structures are nearshoring and reshoring to avoid reliance on high-risk geographies, diversifying the supplier base amid time compression pressures, building up strategic inventories of grains, fertilizers, and semiconductors, and digital transformations that ensure enhanced supply chain visibility and responsiveness. The idea of resilience being a key competitive advantage rather than just another cost has become prominent in large multinational corporations. This trend is partially attributable to the findings of Tsang et al. (2024), indicating that firms emphasizing ESG sustainability with supply chain transparency perform better than counterparts lacking this trait during conflict events.

6.3 Friend-Shoring and New Production Geographies

Friend-shoring—moving production facilities to geopolitically friendly partner countries—has emerged as a strategic adaptive response to stress generated by multiple conflicting supply chains. Compared to globalisation in preceding decades focused on lowest-cost manufacturing without geopolitical considerations, the recent 2022-2026 period has seen governments and corporations explicitly mention political alignment as one of the supply chain criteria. Some notable friend-shoring efforts are the US CHIPS Act, EU Chips Act, and Japan s semiconductor investment initiatives, all aimed at friend-shoring production geographies.

It is important to recognize the limitations of friend-shoring. According to CEPR (2026) study results, companies prefer supply chain diversification rather than complete reshoring to maintain cost advantages despite reduced geopolitical exposure, and complete reshoring in manufacturing to higher-wage domestic or friendly country locations is economically unfeasible for almost all types of products. Concentrating in few geopolitical ally countries carries its own risks since geopolitical alignments can shift; today s ally might become tomorrow s enemy. Political relationships change much faster than supply chain configurations.

6.4 Digitalization as Adaptation Infrastructure

Digitalization operates as an across-the-board enabling factor of adaptation in multiple conflict theatres. The case of Ukrainian logistics providers who established digital humanitarian platforms, routing apps with security measures, and partnership between railways and postal operators within days after the invasion (Krykavskyy et al., 2023) proves that Digitalization provides tools for adaptive action impossible in analog environments. Advanced technologies like digital twins, visibility platforms, artificial intelligence-based risk prediction, and internet-of-things-powered shipment tracking allow for anticipatory responses to geopolitical disruptions. The 2025 J.S. Held report identifies digitalization as the

necessary pre-requisite of resilience, helping with rapid scenario simulation, inventory optimization, and supplier risk assessment.

7. THEORETICAL IMPLICATIONS AND CONCEPTUAL FRAMEWORK

7.1 Extending Supply Chain Theory to Multi-Conflict Environments

Multiple geopolitical conflicts of 2022-2026 have contributed to theoretical advancements in supply chain studies. First, the literature suggests moving away from the assumption of Gaussian risk distribution towards fat-tail risk distribution in supply chains. Second, the multi-conflict environment validates the idea of compounded crises where supply chains damaged by the first event become increasingly fragile under the next one; it can be described as exponential risk amplification rather than additive. The case of Ukraine that suffered simultaneously from war damage, lingering consequences of the 2020 pandemic, and rerouting-related cost increase illustrates an example of triple compounded event that existing resilience models do not account for. Third, maritime warfare performed by non-state actors has emerged as another disruptor in geopolitics, thus necessitating theoretical rethinking. The Houthi campaign indicates that supply chain risk frameworks need to be extended beyond state actors to include well-armed non-state organizations equipped with cheap missiles and drones, and controlling chokepoints and coastlines. The asymmetric economic warfare aspect of Houthi actions—allowing only Chinese and Russian ships to pass while attacking Western vessels—is an unprecedented mode of economic sanctions using supply chains as delivery mechanism.

7.2 Multi-Conflict Supply Chain Vulnerability Conceptual Framework

On the basis of this literature synthesis, we suggest the following conceptual framework of multi-conflict supply chain vulnerability:

Structural Vulnerability: The extent of exposure to geopolitical risk factors represented by geographic proximity to supply chain, dependency on chokepoints, interconnectedness with the international financial system of sanctions targets, and specific dependencies on critical material availability depending on the industrial sector.

Compound Crisis Multiplier: Risk magnifier triggered by simultaneous activation of several disruption theatres, which is influenced by the number of active theatres, degree of geographic overlapping of these theatres with supply chain routes, and overall existing level of supply chain stress caused by prior events.

Adaptive Capacity: Organizational and policy assets available for absorbing, responding to, and restructuring in reaction to geopolitical disruptions in the form of financial reserves, diversification of supplier base, Digitalization and its advanced technologies, emphasis on ESG and supply chain transparency, and multilateral agreements and institutions.

Vulnerability is maximal when supply chains possess a combination of high structural vulnerability, high compound crisis multipliers, and poor adaptive capacity—a condition experienced by food-insecure developing nations with concentrated foreign dependencies and lack of financial resources. In contrast, vulnerability is minimized in geographically diversified supply chains, possessing high Digitalization, significant financial reserves, and ability to conduct transactions with multiple trade partners simultaneously—the condition characteristic of multinationals and Indian economy with its strategic autonomy.

8. RESEARCH GAPS AND FUTURE DIRECTIONS

Based on our literature review, we can identify six areas of highest priorities requiring future research:

1. Longitudinal adaptation: The nine years duration of adaptation effects observed by Stemmler and Korn (2022) calls for longitudinal studies tracking the evolution of adaptation measures in multi-conflict periods.
2. Compounding modeling: Models able to capture nonlinear compound effects triggered by multiple simultaneous geopolitical disruptions are currently underrepresented in the literature. Systems dynamics modeling and agent-based modeling techniques represent promising approaches.
3. Non-state actor disruption: Houthi attack indicates the need to theorize about supply chain risk in light of non-state actor disruption capacities. Factors allowing such organizations to perform sustained disruption at chokepoints, effectiveness of countering military efforts, and resilient architectures resistant to asymmetric threat are some potential research avenues.
4. Services sectors: Much literature focuses on disruptions in physical good supply chains (agricultural products, energy resources, manufacturing). However, considerable disruptions also occur in digital services, financial services, and knowledge-intensive business services. These industries are not sufficiently addressed by existing literature.
5. Friend-shoring: Although friend-shoring is extensively covered in the literature, there is still a lack of rigorous studies quantifying its effectiveness in terms of reduced risk of disruption. Comparing friend-shoring effectiveness between ASEAN and alternative geopolitical regions is crucial.
6. Informal economies: Informal economy is an important component in developing regions where it plays a significant role in adaptive capacities. Current literature lacks investigations of adaptation of informal economies in multiple-conflict situations.

9. CONCLUSION

The multi-conflict era of 2022-2026 has transformed the global supply chain risk architecture fundamentally. The Russia-

Ukraine war, Gaza-Israel war and Red Sea attacks, escalation of the Middle East tensions, and competition for technology in the US-China dispute have simultaneously activated several core disruptors—chokepoint vulnerability, financial fragmentation due to economic sanctions, critical material concentration, weaponized food supply chains, and compounded crisis—leading to a qualitatively new type of systemic stress in global supply chains.

There is significant regional vulnerability asymmetry between regions. MENA countries and Sub-Saharan African nations face multiple vectors of food and energy supply disruption that multilateral organizations cannot solve sufficiently well. Europeans have made sacrifices in order to diversify their energy sources. Asia, and specifically India, appears to benefit from geopolitical tensions thanks to proactive strategic alignment. The role of Asia Pacific region as a manufacturing center is growing.

Strategies for adapting to geopolitical stress discussed above reflect the paradigm shift from efficiency to resilience at the very structural level of supply chain designs. Even though there is a cost involved in this transformation, mathematical modeling shows that resilience-oriented adaptations are economically justified. The main implication of this review is the realization that geopolitical stresses of 2022-2026 will leave long-lasting imprints in the architecture of global supply chains. Effects of trade relocation persist for up to ten years after conflict; financial fragmentation acquires its institutional momentum; friend-shoring investments in semiconductor manufacturing are unlikely to be paid off in a couple of years. The world of 2036 will be shaped by conflicts and adaptation strategies developed in 2022-2026 to an extent hardly envisioned by either proponents of geopolitical optimism or proponents of economic decoupling.

Practically speaking, logistics professionals require diversification of geographies, hybrid resilience strategies involving diversified supplier base and inventory buffering, and advanced Digitalization and ESG. As for the policymakers, they should consider strategic reserves, multilateral institutions addressing critical supplies, and assistance in developing countries adaptation capacity. And finally, researchers can expect the multi-conflict stress in global supply chains in 2026 as a challenge to prevailing frameworks and opportunity for empirical investigation.

10. LIMITATIONS

This review adopts an integrative rather than fully systematic methodology, which introduces subjectivity in source selection and limits the rigour comparable to a formal meta-analysis. The review draws predominantly on macro-level and sector-level data, with limited firm-level evidence, meaning findings on adaptive capacity may not generalise beyond large multinational corporations. Furthermore, as several conflicts remain active at the time of writing, the empirical landscape continues to evolve, and conclusions on current disruption status and adaptive responses should be interpreted as a time-bound snapshot rather than a settled account. Finally, the Multi-Conflict Supply Chain Vulnerability Framework proposed in Section 7.2 remains conceptual and has not yet been empirically validated, necessitating future primary data collection and longitudinal testing..

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