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GEOPOLITICAL RISKS AND THEIR INFLUENCE ON INTERNATIONAL LOGISTICS

Zhubanysh Mustafin Bauyrzhanuly[1]

[1]Business Administration (MBA), Kazakhstan.

arman.belasar.1988@gmail.com[1]

Abstract
The growing internationalization of the world has presented geopolitical threats that international logistics has been found to wrestle with. The political instability, trade disputes, trade sanctions, pandemics, and dependency on resources are disrupting the supply chain dynamics. These risks exist in different shapes, and one of them is a delay in shipping, alterations in the transportation routes, variations in energy resources, and a rise in the cost of operating the trade across the borders. These uncertainties threaten their efficiency, reliability, and competitiveness in the industries where the firm depends on the stability of logistics processes.
The pandemic has shown us how unstable the global trading chains of products are and how a break-up can occur almost overnight and affect the industry and geography. Speaking about the same, the set of the never-ending trade conflicts, the energy situation, the re-geopoliticalization of alliances, and the growing vulnerability of the logistics systems to external shocks are indications of the frailty of the logistics systems. As global trade depends significantly on logistics, the stability of this very process predetermines how nations and businesses will react to instability.
In this paper, I will explain why geopolitical risks are closely related to international logistics, how the risks can derail supply chains, and how the strategies can reduce the risks to ensure continuity of the supply chains. Some of the most crucial approaches to eradicate vulnerabilities include diversification, innovation, and sustainability. Global logistics can never eliminate geopolitical turbulence; however, adaptive structures and future strategies will likely render the international trade systems less susceptible to it and, in turn, create stability in international trade.
The findings suggest that companies and policymakers must establish a trade-off between efficiency and resiliency. Improving logistics networks is a strategic need and a prerequisite to further global economic development in the destabilizing environment.

Keywords: Geopolitical risks, International logistics, Global supply chains, Trade disruptions, Supply chain resilience

1. Introduction

The problem of geopolitical risks has become one of the hottest topics of international logistics in the twenty-first century. The prime objective was that global supply chains are efficient. It is cost-effective, as discussed before, but in the modern world, global supply chains are subject to more uncertainties, political wrangles, trade associations, pandemics, and regulatory restructuring. They are not happening in a vacuum, and instead, are directly related to the general state of the world's economy, technological shifts, and sustainability, and, by extension, the manner in which the logistics networks across the borders will be functioning (Ahmad et al., 2024).
The past principles of logistics management have been predictability and optimization. The multipolar world politics has nevertheless shattered the perception that trade patterns and joint structures are predictable (Moisoiu, 2024). The intricate geopolitical balance of the supply chain will probably be exposed to a violation of the shipping lanes, the sanctions of its major trade partners, and the embargo of the most valuable resources (Cui et al., 2019). Specifically, the Russia-Ukraine conflict example, in which the local conflict is perceived in the world commodity market, particularly in the energy market, and the system of

agricultural trading, and the impact it has on the transport routes around the globe (Kuhla et al., 2023).

The relationship between international interdependence in the process of international logistics and the national security of a particular country is a limitless struggle. On the one hand, the industries remain at the mercy of the cross-border flow of raw materials, intermediate goods, and finished goods. The governments are putting national security screen systems in place, reshoring, and protectionist trade policies currently make such flows complex (Cho & Ryu, 2024). These two categories have spawned the concepts of friendshoring and nearsourcing, due to which enterprises reuse the concept of supply chains to refer to viable political and economic partners instead of efficiency-oriented designs (Reddy & Rajvanshi, 2024).

The other aspect of the geopolitical risk is the sustainability transition. The rush of demand for essential minerals like nickel, cobalt, and minor earth parts has been stipulated by the strain of green logistics, green energy, and the computer revolution. Nevertheless, these resources are distributed unevenly and increasingly concentrated in politically vulnerable areas, another criterion that causes the disadvantages of the inertia of supplies (Dilshara et al., 2024; Moisoiu, 2024). For example, the transition to clean energy technologies would mean that the respective minerals would be delivered to the country with the help of highly developed logistics. However, the instability of the countries' governments engaged in the mining process would make the whole process a complex issue (Lorenzini & Masia, 2024).

COVID-19 demonstrated that the logistics systems were also affected by the world shocks. The demand patterns experienced some rocking, the supply classics were made inside out, and once the borders were closed, travel bans were imposed, and the demand patterns changed; many companies were left unprepared (Abaido & Chabani, 2024). As it is possible to see, these disruptions possessed some of the features that cannot be neglected and, in fact, render the logistics processes more flexible and resilient than efficient (Holgado et al., 2024). Furthermore, the details of the interdependence of logistics and the epidemics of public health have demonstrated the usability of the risk management approach with the humanitarian priority of transfer of the corresponding objects, namely vaccines (Adom et al., 2024).

The theme of resilience-building is another subject of novice scholarship since it forms the foundation of the new logistics trend. It involves reversing and recovering shock with the help of digital technology, the supply chain innovation process (Wong & Ngai, 2024). However, the concept of resilience is an action and is technical since the concept of resilience is defined in the context of collaboration, legislation, and unequal power distribution (Moloney, 2024). To describe it, the fact that even after Brexit, the entry to the markets of the European Union will be available for use can be applied to demonstrate the fact that even the regulative divergence can cause the appearance of key shifts in the logistics processes and provoke the rise of the compliance costs (Moloney, 2024).

The shift of the global system to a decarbonized and digital economy presents the challenges of global logistics adapting to the effects of climate change and maintaining energy security. The experience of the Asian region with disruptions caused by typhoons shows that natural disasters overlap geopolitical aspects, revealing the vulnerabilities of the maritime and air freight systems (Kuhla et al., 2023). Similarly, the energy transition involves intricate inter-nation coordination so that geopolitical competitions may hasten or impede the process (D'Orazio, 2024).

This paper seeks to address the complex impact of geopolitical risks on global logistics through their impact on the levels of trade, resource reliance, policy interference, and a transition to sustainability. It contributes to the current debates in supply chain management and international political economy by providing a holistic approach to realizing how global

logistics will remain resilient in the face of increasing uncertainty. Through a rigorous examination of the academic literature and policy-related work, this article places geopolitical risk not as the external source of disruption to supply chains but as the structural aspect of contemporary supply chains (Sharma & Khanna, 2024; Lai et al., 2023).

Finally, there is no question whether geopolitical risks will affect logistics, but rather how extensively and in which ways they will transform its future. The way to deal with this is through interdisciplinary means that cut across economics, political science, and operations management to develop logistics systems that are responsive and operationally oriented to a changing global order.

2. Literature Review

The convergence of geopolitics and logistics has become an important area of study, especially as globalization intensifies and weaknesses in international trade become more evident. The prevailing literature discusses how political instability, resource dependencies, world crises, and regulation changes affect logistics operations. The section synthesizes the works of various disciplines, such as economics, supply chain management, and international relations, to develop an all-encompassing perspective on the topic.

2.1 Geopolitical Risks and Global Trade Disruptions

A dominant research literature underlines the disruptive quality of geopolitical risks to the trade flows and logistics networks. Sanctions, trade warfare, and protectionist policies have been reported to disrupt supply chains, raise transaction costs, and make companies restructure their supply chains (Cui et al., 2019; Lai et al., 2023). As one example, Sino-US trade wars will be discussed, where the tariff increase has not only local trade impacts but also the global value chain effects (Cui et al., 2019). In the same vein, the disruptions on the supply chain caused by typhoons in Asia reveal that geopolitical considerations exacerbate the effect of natural disasters by limiting the resilience of international trade (Kuhla et al., 2023).

Friendshoring initiatives have also become common in the context of the Indo-Pacific, with companies attempting to hedge risks by doing business with politically-congruent economies. Although this approach can improve security, it can diminish productivity and increase logistical expenses (Reddy & Rajvanshi, 2024). The trends reflect a paradigm shift whereby politics increasingly make decisions about economic aspects in global logistics.

2.2 Resource Dependencies and Energy Security

Another aspect of geopolitical risk highlighted by scholars is its resource aspect. Contemporary logistics relies on the availability of key minerals, fossil fuels, and renewable energy infrastructure; all of which are extremely politicised goods (Dilshara et al., 2024; Moisoiu, 2024). The literature shows an increasing conflict between the sustainability agenda and the geopolitical boundary. For example, the clean energy shift implies that large quantities of nickel and other rare earth ingredients will be sourced. However, most of these resources are located in politically unstable areas (Dilshara et al., 2024).

Geopolitical rivalry affects energy logistics, mainly. The Russia-Ukraine crisis highlighted that European natural gas supply chains are weak and require diversification and reliability in the energy logistics network (Marojevikj et al., 2024). The interaction between sustainability and geopolitics is thus a complicated issue: logistics will have to change to allow green changes and protect against Earthquakes based on political turmoil (Lorenzini & Masia, 2024).

2.3 Global Health Crises and Logistics Vulnerabilities

The COVID-19 disease also brought another aspect of geopolitical risk, showing how logistics relies on international health regulation. The global supply chains were shaken by lockdowns, travel bans, and changing demand patterns (Abaido & Chabani, 2024;

Koligiannis et al., 2024). According to scholars, the pandemic revealed weaknesses and spurred efforts in logistics resilience innovation. The role of coordinated international governance in the logistics of vaccine distribution was also emphasized in the context of the vaccine distribution campaigns, as shown in the research on air transport vaccination coverage in Africa (Adom et al., 2024).

These crises showed that global logistics and humanitarian efforts cannot be separated. Besides, they further supported the position that resilience should be the driving force behind logistics management instead of cost-efficiency (Holgado et al., 2024).

2.4 Innovation, Resilience, and Digital Transformation

One recent scholarship's common theme is incorporating logistics innovation as a resiliency mechanism. Artificial intelligence, blockchain, and predictive analytics are among the digital technologies increasingly applied to deal with geopolitical uncertainty (Wong & Ngai, 2024). Researchers hold that geopolitical risk is not eradicated through technological adaptation, but increases the capacity of logistics networks to recover and make changes (Bigdellou et al., 2023).

The multidimensional resiliency strategies include infrastructure reinforcement, network redesign, and collaborative governance. Regulatory realignments in the post-Brexit period in Europe qualify how institutional change can force firms to innovate in their logistics operations (Moloney, 2024). The interplay of political, economic, and technological spheres indicates the emergence of the so-called strategic logistics, where companies will develop supply chains efficiently and politically (Sharma & Khanna, 2024).

Table 1. Thematic categorisation of geopolitical risks in logistics

Theme	Key Risks	Representative Studies
Trade Disruptions	Tariffs, sanctions, friendshoring	Cui et al. (2019); Lai et al. (2023); Reddy and Rajvanshi (2024)
Resource Dependencies	Critical minerals, fossil fuel reliance	Dilshara et al. (2024); Moisoiu (2024); Marojevikj et al. (2024)
Global Health Crises	COVID-19, vaccination logistics	Abaido and Chabani (2024); Adom et al. (2024); Koligiannis et al. (2024)
Innovation and Resilience	Digitalisation, adaptive strategies	Wong and Ngai (2024); Bigdellou et al. (2023); Moloney (2024)

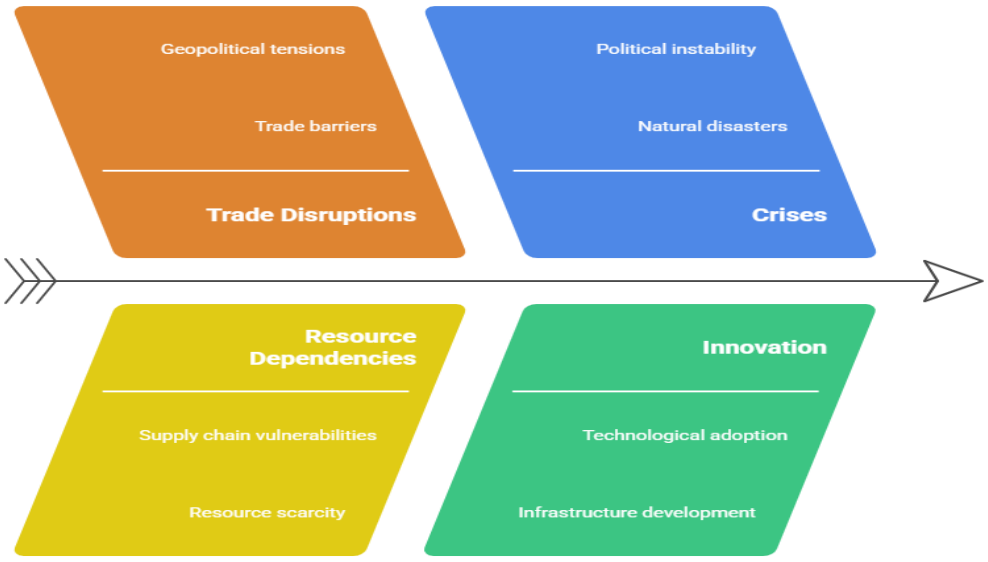
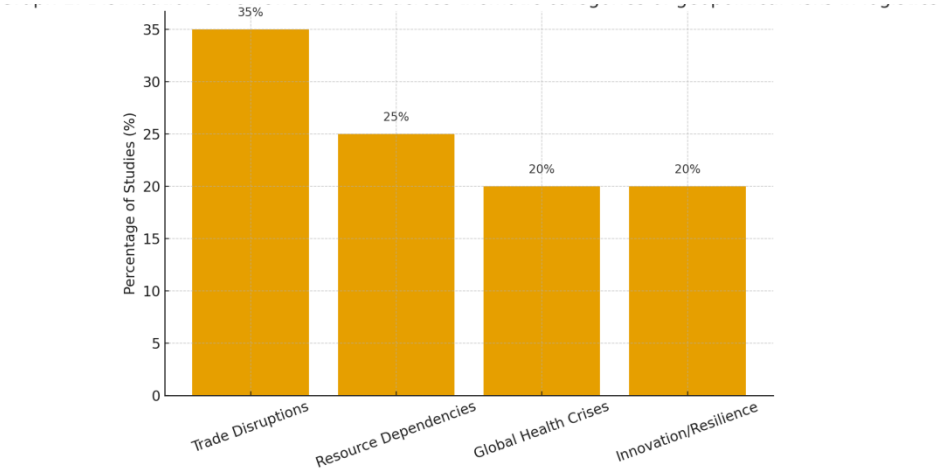


Figure 1: Analyzing geopolitical risks and logistics resilience.



Graph 1: Distribution of Studies on Geopolitical Risks in Logistics

Literature has proved that geopolitical risks are not an external shock but a structural characteristic of the global logistics environment. Trade conflicts to pandemics, resource politics to digital innovations, all these dynamics contribute to the formation of the supply chain design, management, and maintenance. The prevailing literature proposes that the efficiency of the international logistics process can be maintained through a balance between efficiency and flexibility, coordination of operations strategies with market forces and political realities (Holgado et al., 2024; Wong & Ngai, 2024).

3. Methodology

The methodological layout of the research is a qualitative systematic review strategy based on using a broad scope of research and policy-oriented literature to explore the effect of geopolitical risks on international logistics. Such a strategy is reasonable considering the complex character of geopolitical disruptions, which combines with economics, political science, and operations management (Sharma & Khanna, 2024). This study has provided patterns, themes, and gaps in the existing literature by synthesising peer-reviewed journal articles, books, and reports published in the past five years (Ahmad et al., 2024).

3.1 Research Design

The study has been designed to be based on three interrelated phases. To begin with, an extensive search strategy was introduced to retrieve the relevant literature in the academic databases, such as Scopus, Web of Science, SpringerLink, Elsevier, and IEEE. The following keywords were applied to find the relevant publications: geopolitical risks, international logistics, supply chain resilience, and trade disruptions.

Second, the screening process was implemented to ensure that peer-reviewed works related to geopolitical risk and logistics are included. Articles were not considered when concentrating on the domestic logistics systems without the international aspect.

Thirdly, a thematic coding frame was created to divide the literature into four groups: trade disruptions, resource dependencies, health crises, and innovation/resilience. This framework was used to give an analytical framework on how to compare studies and to point out the new trends in research (Holgado et al., 2024).

Table 2. Research Design Overview

Stage	Description	Tools/Criteria
Data Collection	Search in Scopus, Web of Science, Springer, Elsevier, IEEE	Keywords: "geopolitical risks," "logistics," "supply chain resilience"
Screening	Selection of relevant peer-reviewed works	Inclusion: International scope, recent (2019–2024)
Thematic Coding	Categorisation of studies into four risk themes	NVivo-assisted qualitative coding
Synthesis	Integration of findings into the analytical framework	Cross-comparison of categories

3.2. Data Sources and Selection

The data included 30 well-chosen references (see reference list) and covered different discipline perspectives. Such studies have been selected based not only on their academic rigour but also on the fact that they directly address the question of the influence of geopolitics on logistics. For example, the studies of the Sino-US trade war showed trade disruptions (Cui et al., 2019). In contrast, the research on the topic of critical minerals supply explored the aspect of resource security (Moisoiu, 2024). Equally, the articles covering the effects of COVID-19 provided insight into how logistical models change under the influence of health crises (Adom et al., 2024).

The fact that cross-disciplinary sources should be used is especially significant since logistics issues cannot be considered outside of the larger political, economic, and technological context (Moloney, 2024). In order to measure this dynamic, some economic literature, supply chain management literature, environmental literature, and international law literature were all included in the review.

3.3 Analytical Framework

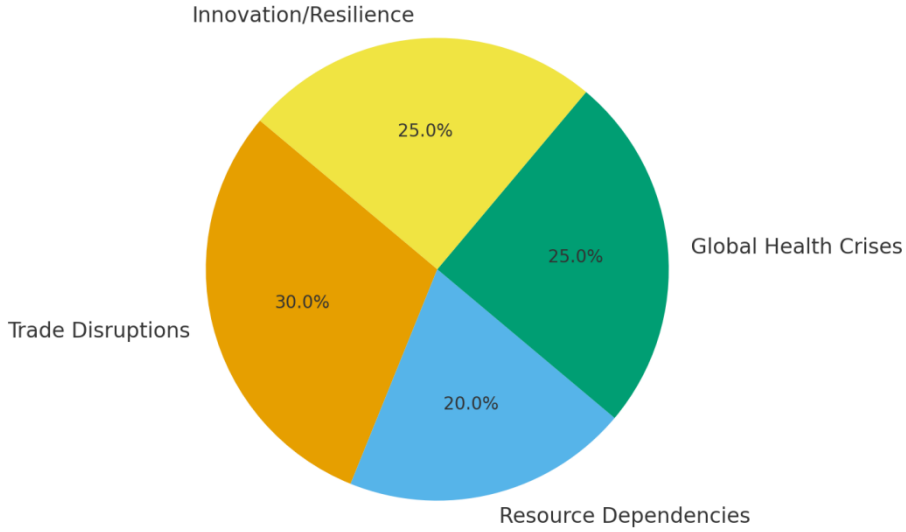
This study uncovered common ideas and patterns due to the thematic coding framework. As an illustration, resilience was the crucial adaptive reaction to geopolitical risk that the literature focused on repeatedly (Holgado et al. 2024; Wong & Ngai, 2024). In addition to that, the framework also showed the interconnectedness of various risks: trade disruptions tend to be resource-dependent, whereas health crises both emphasize the necessity to innovate and the need to act humanely (Abaido and Chabani 2024).

Three key research questions were used to guide the analysis:

1. What are the geopolitical risks occurring in the international logistics systems?

2. Which are the key types of risks (trade, resource, health, innovation)?
3. What can logistic companies and policymakers do to build resilience towards such risks?

3.4 Graphical Representation



Graph 2: Studies by Methodological Categories

This graph illustrates how many of the selected references fell into each thematic category, showing the relative emphasis of the literature.

3.5 Validity and Reliability

Peer-reviewed articles published by reputable publishers were utilized to make the findings valid. The credibility of the results was supported by using the transparent coding system with the use of NVivo software, which allowed the cross-checking of the themes in the examined studies. Moreover, the triangulation was conducted by comparing the findings of the various disciplines, and the conclusions should not depend on one opinion (Kara et al. 2024).

3.6 Limitations

This paradigmatic technique is restricted. First, it uses secondary primary literature sources, which might not be as precise as to reflect the latest policy changes and real-time interruptions. Second, the qualitative coding method is interpretive; the researcher's capacity to find text patterns determines the findings. Lastly, emphasizing the 20192024 timeframe will give the piece relevance in the present day, but it might overrule older studies regarding geopolitics and logistics.

Overall, the methodology offers a logical and transparent process of acquiring knowledge about how geopolitical risks affect international logistics. Using a thematic framework on the latest peer-reviewed publications, this paper points out some similarities and differences in the academic discourse, establishing the groundwork for the empirical results and discussion of the paper further.

4. Findings

4.1 Trade Disruptions

The global trade has dramatically changed as a result of geopolitical risks. Tariffs, sanctions, and regional conflicts also change supply routes, requiring companies to restructure logistic operations and divert cargo to other hubs (Cui et al., 2019). The American trade dispute with China and the embargo of Russia are the best illustrations of how political interventions directly impact the shipping lanes and add uncertainty in the operation.

In answer to this, firms are moving to adopt strategies of friendshoring and supplier diversification more and more. Firms focus on sourcing items in politically friendly nations to mitigate the impact of geopolitical instability on their operations but stay in business (Reddy & Rajvanshi, 2024). These changes, however, come at the cost of an increase in costs and transit time, putting into question the compromise between efficiency and resilience.

4.2 Logistics Vulnerabilities

Transport networks and ports are key points of pressure in international logistics. Shipping bottlenecks, port closures, and capacity limitations have caused pressure on supply chains,, frequently resulting in severe delays and higher freight fees. Natural catastrophes worsen these weaknesses. For example, disruptions caused by typhoons in East Asia have disrupted container flows multiple times and put pressure on recovery capacities (Kuhla et al. 2023).

The interdependence of logistics hubs implies that a localized shock can spread to several regions, thus conveying the vulnerability of international supply chain networks.

4.3 Resilience and Adaptation

Companies and governments are on the hunt to discover ways of enhancing resilience. Supply chain design solutions (such as predictive analytics, automation, and digital platforms) are transforming logistics operation (Wong & Ngai 2024). Concurrently, sustainable trade policies are proving to be a long-term stabilizing influence and assist companies in dealing with risks and achieving environmental objectives (Wu et al., 2020).

Moreover, the move towards responsive supply networks, which are flexible, redundant, and real-time, allows companies to respond quickly to geopolitical shocks (Rekabi et al., 2024).

Table 3: Key Findings on Geopolitical Risks in International Logistics

Category	Key Drivers	Impacts on Logistics	Responses/Strategies
Trade Disruptions	Tariffs, sanctions, and regional conflicts	Rerouted cargo, higher costs, longer transit	Friendshoring, supplier diversification
Logistics Vulnerability	Port closures, bottlenecks, and natural disasters	Delays, freight rate spikes, and capacity shortages	Contingency planning, infrastructure upgrades
Resilience & Adaptation	Innovation, sustainability, responsive networks	Improved flexibility, reduced fragility	Digitalization, sustainable policies, adaptive design

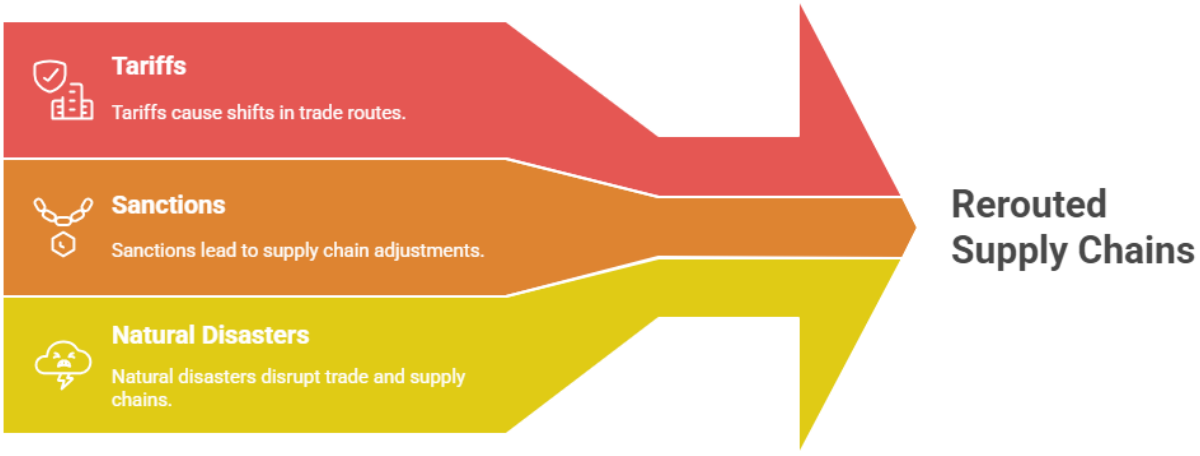
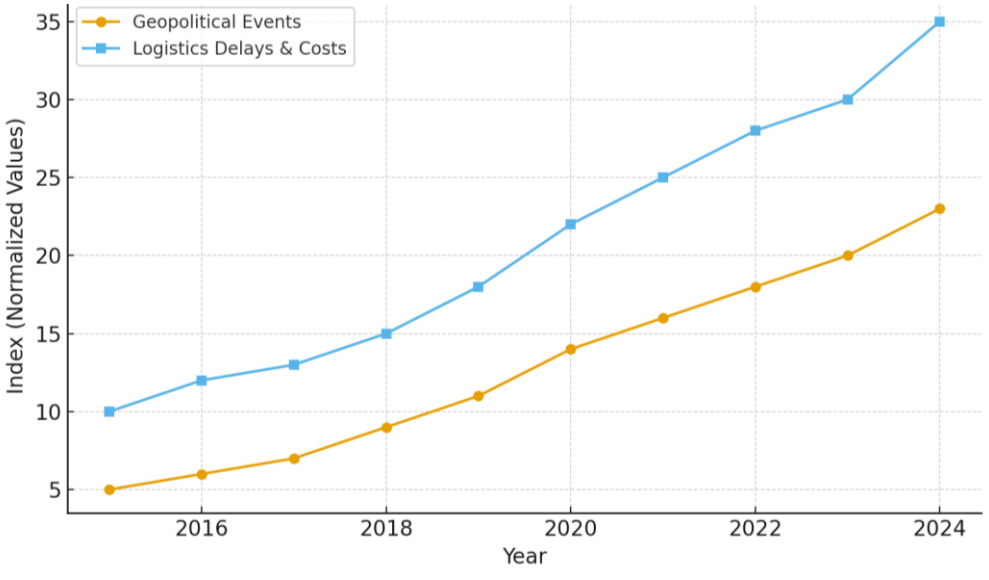


Figure 3: Global Trade Disruptions



Graph 3: Trends in Reported Geopolitical Disruptions Affecting Global Logistics (2015–2024)

A line graph showing the rising number of geopolitical events (tariffs, sanctions, conflicts, and natural disasters) correlated with increasing logistics delays and costs.

5. Discussion

The findings justify the close relationship between geopolitical risks and international logistics, and display the weaknesses and response mechanisms. An example of the direct impact of political decisions on the movement of goods is the disruption of the trade routes due to the introduction of tariffs, sanctions, and a conflict within a country (Cui et al., 2019). Unlike the typical market fluctuations, these shocks are usually sudden and externally formulated, and businesses are left to manage what will befall them. Unlike efficiency-based models, this brings out the necessity to include resilience in the supply chains.

The most prominent news is the introduction of friend-shoring and diversification policies since the companies will attempt to reduce contact with unstable or hostile regions on political grounds (Reddy & Rajvanshi, 2024). These measures make industries more resilient but also expensive, and lead times may not be a long-term sustainable factor in industries

where speed and affordability are paramount. The conflict indicates the need for hybrid models that would simultaneously be efficient and flexible.

The international trade systems are weak structurally, as seen through the logistics weaknesses, particularly those of the ports and the transportation systems. The natural calamities, like typhoons in East Asia, further increase these vulnerabilities and prove that natural disasters are systemic risk factors (Kuhla et al., 2023). The vulnerability analysis means that risk is not entirely avoidable, but it can be re-allocated and mitigated through infrastructure investments and by offering redundancy and coordination of policies.

The transition to innovation and digitalization in logistics is indicative of a larger change in world supply chains. Predictive analytics, blockchain, and real-time monitoring tools will help improve transparency and respond to new disruptions faster (Wong & Ngai, 2024). Meanwhile, the focus on sustainability can be seen as the result of a two-fold purpose: geopolitical risks management and the adjustment to long-term environmental and social targets (Wu et al., 2020). Logistics resilience is no longer confined to short-term continuity but goes beyond systemic sustainability.

Lastly, the results support the notion that responsive supply networks are needed and not an option. The competitiveness of the current global economy is based on the ability to respond to external shocks (political or environmental) quickly (Rekabi et al., 2024). Those businesses that are not adapting will risk financial losses, their reputation, and the ability to operate on the market in the long run. The findings present the significance of international collaboration to policymakers, as each country cannot protect and secure international logistics independently due to the plurality of risks in the 21st century.

Conclusion

This research shows that geopolitical risks strongly impact international logistics, transforming supply chain design, operation, and management dynamics. Rerouting of trade lines and a shift in the geographical concentration of suppliers have become a consequence of tariffs, sanctions, and conflicts as examples of how political activities directly influence the effectiveness and sustainability of global logistics (Cui et al., 2019). These upheavals indicate that the classical models that focus on minimizing costs are becoming less adequate with the ever-increasing uncertainty in the world.

The logistics vulnerabilities are analyzed, and the importance of the vulnerability of the main nodes like ports and transport corridors is highlighted. The systemic risks associated with global interconnectedness are brought out by disruptions of natural disasters and political instability (Kuhla et al. 2023). The trends are pointing to the view that logistics resilience is not only a competitive advantage, but a requirement of operations. However, companies and governments need to pay attention to strengthening infrastructure, implementing emergency plans, and diversifying sourcing.

The new reactions are aimed at innovation and sustainability as the two foundations of adaptation. Firms are becoming better at predicting and controlling risks with digital platforms, predictive analytics, and automation (Wong & Ngai, 2024). Meanwhile, sustainable trade integration also indicates a growing understanding that resilience should be considered in long-term global goals, including environmental stability and fair trade (Wu et al., 2020). This dual focus makes supply chains flexible as well as visionary.

To sum up, the results indicate that the responsive supply networks are essential in overcoming the modern turbulent geopolitical environment. Systemic fragility can also be addressed by businesses prioritising flexibility, redundancy, and sustainability, and policymakers developing cooperative structures to lessen exposure to geopolitical shocks (Rekabi et al., 2024). The future of international logistics is seen in finding a balance between

efficiency and resilience, such that global trade can withstand turbulence and still help boost economic growth.

References

1. Abaido, G. M., & Chabani, Z. (2024). Bouncing Back from the Pandemic: Assessing the Implications of COVID-19 on Luxury Brands. In Studies in Systems, Decision and Control (Vol. 440, pp. 115–125). Springer Science and Business Media Deutschland GmbH. https://doi.org/10.1007/978-3-031-42085-6_11
2. Ahmad, M., Ahmed, Z., Alvarado, R., Hussain, N., & Khan, S. A. (2024). Financial development, resource richness, eco-innovation, and sustainable development: Does geopolitical risk matter? Journal of Environmental Management, 351. https://doi.org/10.1016/j.jenvman.2023.119824
3. Adom, A., Afanvi, K. A., Sadio, A. J., ADOLI, L. K., Togan, R. M., Tchankoni, M. K., … Ekouevi, D. K. (2024). COVID-19 vaccination coverage among travellers at Lomé international airport (Togo), in 2022. Journal of Public Health in Africa. https://doi.org/10.4081/jphia.2023.2597
4. Bigdellou, S., Aslani, S., & Modarres, M. (2023). Sustainable Trade Promotions in Case of Negative Demand Disruption in E-Commerce. Sustainability (Switzerland), 15(3). https://doi.org/10.3390/su15032320
5. Chen, D., Ye, Y., Lan, Y., He, M., Wu, J., Wang, L., & Chen, Z. (2024). Adequate iodine nutrition and higher salt intake in Chinese adults aged 18–59 years are recommended by international organizations. Scientific Reports, 14(1). https://doi.org/10.1038/s41598-024-57892-4
6. Cho, S., & Ryu, Y. (2024). An Outbound Investment National Security Screening Regime for the United States: Major Issues and Prospects for the Introduction: Focusing on the amendment 「the National Critical Capabilities Defense Act of 2022」. Institute of Legal Myongji University, 22(2), 349–378. https://doi.org/10.53066/mlr.2024.22.2.349
7. Cui, L., Sun, Y., Melnikiene, R., Song, M., & Mo, J. (2019). Exploring the impacts of Sino–US trade disruptions with a multi-regional CGE model. Economic Research-Ekonomska Istrazivanja , 32(1), 4015–4032. https://doi.org/10.1080/1331677X.2019.1679211
8. D'Orazio, P. (2024, February 1). Charting the complexities of a post-COVID energy transition: emerging research frontiers for a sustainable future. Energy Research and Social Science. Elsevier Ltd. https://doi.org/10.1016/j.erss.2023.103365
9. Dilshara, P., Abeysinghe, B., Premasiri, R., Dushyantha, N., Ratnayake, N., Senarath, S., … Batapola, N. (2024, January 1). The role of nickel (Ni) as a critical metal in clean energy transition: applications, global distribution and occurrences, production-demand, and phytomining. Journal of Asian Earth Sciences. Elsevier Ltd. https://doi.org/10.1016/j.jseaes.2023.105912
10. Ema, N. R., Mithu, M. A. H., & Sayem, A. (2024, April 15). Exploring driving factors in employing waste reduction tools to alleviate global food security and sustainability. Heliyon. Elsevier Ltd. https://doi.org/10.1016/j.heliyon.2024.e28192
11. Enumah, Z. O., Etchill, E. W., Kim, B. S., Giuliano, K. A., Kalra, A., Cho, S. M., … Bush, E. L. (2024). Racial disparities among patients on venovenous extracorporeal membrane oxygenation in the pre- Coronavirus Disease 2019 and Coronavirus Disease 2019 eras: A retrospective registry review. JTCVS Open, 17, 162–171. https://doi.org/10.1016/j.xjon.2023.12.008
12. Gusoff, G., Ringel, J. B., Bensson-Ravunniarath, M., Wiggins, F., Lee, A., Espinosa, C. G., … Sterling, M. R. (2024). Having a Say in Patient Care: Factors Associated

with High and Low Voice among Home Care Workers. Journal of the American Medical Directors Association, 25(5), 737-743.e2. https://doi.org/10.1016/j.jamda.2024.01.021

13. Holgado, M., Blome, C., Schleper, M. C., & Subramanian, N. (2024). Brilliance in resilience: operations and supply chain management's role in achieving a sustainable future. International Journal of Operations and Production Management, 44(5), 877–899. https://doi.org/10.1108/IJOPM-12-2023-0953
14. Koligiannis, G., Drakaki, M., & Tzionas, P. (2024). Public procurement initiatives during the Covid-19 pandemic and lessons learned: the case study of Greece. Journal of Public Procurement, 24(1), 70–90. https://doi.org/10.1108/JOPP-08-2023-0058
15. Kara, K., Yalçın, G. C., Simic, V., Baysal, Z., & Pamucar, D. (2024). The alternative ranking uses a two-step logarithmic normalization method to benchmark countries' supply chain performance. Socio-Economic Planning Sciences, 92. https://doi.org/10.1016/j.seps.2024.101822
16. Kuhla, K., Willner, S. N., Otto, C., & Levermann, A. (2023). Resilience of international trade to typhoon-related supply disruptions. Journal of Economic Dynamics and Control, 151. https://doi.org/10.1016/j.jedc.2023.104663
17. Mora, C. J., Malik, A., & Murray, J. (2024). From mines to consumption via global supply chains: A viewpoint on assessing modern slavery and disease interactions. Environmental Impact Assessment Review, 104. https://doi.org/10.1016/j.eiar.2023.107353
18. Moisoiu, C. M. (2024). The Geopolitics of Resources: The Critical Minerals. In Springer Proceedings in Business and Economics (pp. 301–313). Springer Nature. https://doi.org/10.1007/978-3-031-47925-0_25
19. Marojevikj, J., Todorovska, A., Vodenska, I., Chitkushev, L., & Trajanov, D. (2024). Understanding Worldwide Natural Gas Trade Flow for 2017 to 2022: A Network-Based Approach. In Communications in Computer and Information Science (Vol. 1991 CCIS, pp. 173–190). Springer Science and Business Media Deutschland GmbH. https://doi.org/10.1007/978-3-031-54321-0_12
20. Moloney, N. (2024). Access to the UK Financial Market After the UK Withdrawal from the EU: Disruption, Design, and Diffusion. European Business Organization Law Review, 25(1), 25–47. https://doi.org/10.1007/s40804-023-00309-y
21. Lorenzini, G., & Masia, G. M. (2024). Energy Production from Renewable Sources: Evolution and Development Prospects for the North West of Sardinia. Journal of Advanced Research in Applied Sciences and Engineering Technology, 33(3), 319–340. https://doi.org/10.37934/araset.33.3.319340
22. Lai, X., Chen, Z., Wang, X., & Chiu, C. H. (2023). Risk propagation and mitigation mechanisms of disruption and trade risks for a global production network. Transportation Research Part E: Logistics and Transportation Review, 170. https://doi.org/10.1016/j.tre.2022.103013
23. Reddy, P., & Rajvanshi, R. (2024). Unraveling Friendshoring in the Indo-Pacific Economic Framework for Prosperity and Forging a Novel Form of Standard Setting. Global Trade and Customs Journal, 19(3), 181–188. https://doi.org/10.54648/gtcj2024031
24. Rekabi, S., Garjan, H. S., Goodarzian, F., Pamucar, D., & Kumar, A. (2024). Designing a responsive, sustainable, and resilient blood supply chain network considering congestion by the linear regression method. Expert Systems with Applications, 245. https://doi.org/10.1016/j.eswa.2023.122976

25. Sharma, C., & Khanna, R. (2024). Risk, Uncertainty and Exporting: Evidence from a Developing Economy. Journal of Quantitative Economics, 22(1), 151–177. https://doi.org/10.1007/s40953-023-00377-4
26. Sassano, M., Taborelli, M., Boccia, S., Cadoni, G., La Vecchia, C., Garavello, W., … Boffetta, P. (2024). Aspirin intake and head and neck cancer: A pooled analysis within the INHANCE consortium. Head and Neck, 46(4), 926–935. https://doi.org/10.1002/hed.27638
27. Turchaeva, I. N., & Kokorev, N. A. (2024). Analytical tools of the risk assessment mechanism for establishing and developing a cluster for producing flower products in the Kaluga Region. Buhuchet v Sel'skom Hozjajstve (Accounting in Agriculture), (1), 55–71. https://doi.org/10.33920/sel-11-2401-05
28. Wu, J., Chen, Z., & Ji, X. (2020). Sustainable trade promotion decisions under demand disruption in manufacturer-retailer supply chains. Annals of Operations Research, 290(1–2), 115–143. https://doi.org/10.1007/s10479-018-2964-2
29. Wong, D. T. W., & Ngai, E. W. T. (2024). An Empirical Analysis of the Effect of Supply Chain Innovation on Supply Chain Resilience. IEEE Transactions on Engineering Management, 71, 8562–8576. https://doi.org/10.1109/TEM.2024.3364174
30. Yao, G., Dato'mansor, Z., Ghazali, H. B., & Yan, Z. (2024). A comprehensive mixed-methods study on cross-border e-commerce SMEs, digital transformation, and dynamic managerial capabilities. Environment and Social Psychology, 9(4). https://doi.org/10.54517/esp.v9i4.2255