

Salient aspects of the geopolitical risks and impact on the global supply chain

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Abstract

The pandemic and recent geopolitical instability have highlighted the vulnerability of the global supply chain and many sectors have experienced shortages of raw materials and critical goods. The global supply chains are increasingly regionalized to mitigate risks from uncertainties such as US-China trade conflicts or the Ukraine war. In this environment, the category procurement needs to adapt and build a more resilient supply chain. To enhance resilience, effective adaptability is needed by regionalization, supplier collaboration, digitalization and data analytics and risk categorization. This study aims to analyze recent research focusing on geopolitical risks impacting macroeconomics, raw materials, energy demand and logistics and to formulate shared perspectives for higher impacts. For this purpose, a systematic literature review, based on 22 articles, was carried out to observe the main areas of concern in case of geopolitical turmoil and to identify the main factors for the supply chain resilience. The collective viewpoints conclude that, in this challenging environment, the industries must adapt quickly, enhancing their flexibility and resilience, invest in digitalization and data analytics for better visibility and prediction and consider supplier collaboration and regionalization as key factors in their procurement strategies. Further research is needed to define the geopolitical risk categorization.

Keywords: *category procurement; geopolitical risks; global supply chain; risk categorization; supply chain resilience*

JEL Classification: F40; F51; F63

I. INTRODUCTION

For category professionals concerned with macroeconomic and geopolitical risk and the future of procurement, the buzzword is the supply chain's resilience. In recent political turmoil, there are several risks among many that have the power to disrupt the functioning of supply chain. Resilience is their ability to withstand negative impacts and recover from disruptions (Odulaja et al, 2023, pp. 463-486), including geopolitical events associated with war or political tension which affects the peaceful course of international relations (Caldara and Iacoviello, 2022, p.1197). There is a broader scale of global risks that can impact procurement and these risks can vary depending on several factors such as macroeconomics, raw materials, supply chain-specific risks, logistics, environmental and others (Bednarski, Roscoe et al, 2023, pp.1-27). However, these challenges will likely accelerate certain procurement trends that were already in motion, such as the transition towards a resilient supply chain, digitalization and data analytics and risk mitigation (Um and Han, 2020, pp. 240–255). The effects of the macroeconomics and raw material crisis will likely be complex on the industrial sector and its global supply chain. Category procurement must cope with several challenges by building resilience along the supply chain and proactively identifying and managing potential risks and disruptions (Dijmarescu, 2021). Often these risks arise from economic or political events that occur outside of the control and can result in changes in exchange rates and inflation and overall impact the economic growth. In a globalized economy, these macroeconomic risks are interrelated and can have a domino effect amplifying their impact. Geopolitical risks have always been a significant factor influencing the global supply chain, but their occurrence has increased substantially in recent years (Haas and Huber, 2023). These risks arise from political instability, international conflicts, trade wars or other political tensions.

The ongoing geopolitical conflict in Ukraine has significant implications for the global steel market because Ukraine is a major exporter of semi-finished steel products (Nygaard, 2020). In this war context, the conflict escalates tensions between Russia which is another key steel producer and the rest of the world. Sanctions and trade restrictions had been imposed on Russia and these further exacerbated the supply issues (Seong, White et al, 2024, pp.1-56). This uncertain environment may lead to volatility in steel prices and directly impact steel-consuming industries globally. One salient aspect of geopolitical risks is trade policy imposed by

cold wars, for example particularly between the US and China, which have led to increased tariffs, causing a cascading effect throughout the supply chain. The sanctions imposed on countries like Iran or North Korea limit their access to global markets, leading to supply shortages and increased prices. Brexit is another notable geopolitical event impacting global supply chain at the beginning of 2020 by increased paperwork in customs regulations with a direct impact on border delays. Cybersecurity is another crucial aspect of the pandemic remote activities and more cautious actions about sharing sensitive data have been considered, impacting digital supply chain (Dijmarescu, 2021). The current ongoing geopolitical conflict in Israel can have significant effects on the global supply chain considering that Israel is a key player in several high-tech industries, including semiconductors, consequently, any disruption due to conflict can limit the supply of several critical components. Suez Canal and Red Sea have a strategic location connecting Asia, Africa and Europe (Seong, White et al, 2024, pp1-56) which means that any conflict in the area could disrupt important trade routes. It raises the alarms about escalating disruptions to global trade due to geopolitical tensions and climate change affecting the world's key trade routes (Huissoud, 2024).

In conclusion, understanding and managing these geopolitical risks is crucial for category procurement to maintain an efficient and resilient global supply chain in an increasingly interconnected world. However, the highly complex procurement strategies with a major impact on supply chain resilience are not enough extensively researched due to existing gaps. The main objective of this research is to highlight the important areas of impact in case of geopolitical conflicts in the early stage arising. The logical query in this context is: What are the salient aspects of the geopolitical risks and impact on the global supply chain?

To provide an answer to the above research question, an in-depth review of the specialized literature was carried out. Based on this, the main areas of concern in case of geopolitical conflict were identified (macroeconomics, raw materials, energy, logistics) and several salient directions of action for supply chain resilience were emphasized (adaptability, regionalization, supplier collaboration, digitalization and data analytics and risk categorization). Based on an in-depth literature review, this study aims to analyze the possibility of raising early alerts by explaining possible effects. The value of this study lies in its novelty and the synthesis of the body of knowledge on the impact of geopolitical disruptions on the supply chain. The study begins with an introductory section presenting the general framework and the items of previous research in the area are reviewed in the second section. Furthermore, the methodological approach is presented, emphasizing the stages in performing the study. In the next section, the results are presented and their significance is discussed. Finally, there is a section comprising the conclusions of the study, alongside its implications and limitations.

II. LITERATURE REVIEW

Geopolitical disruptions are defined as “risks associated with wars, terrorist acts, and tensions between state actors that affect the normal and peaceful course of international relations” (Caldara and Iacoviello, 2022, p.1197). In the recent post-pandemic times geopolitical risks have become the concerned spotlight of the category and professional strategic procurement. These risks encompass political instability and trade conflict changes that can disrupt global supply chain and business operations. Geopolitical risks refer to the uncertainties that may arise from the political environment of a country or region, which can significantly affect the economic conditions globally. In macroeconomics, it is important because changes in political stability can influence economic factors such as trade, investment, inflation and interest rates (Bednarski, Roscoe et al, 2023, pp.1-27). Though not strictly a geopolitical issue, the global response to the pandemic had carried geopolitical implications. Government-imposed restrictions have led to significant supply chain disruptions, highlighting the need for adaptability. Reduced workforce availability due to health concerns and social distancing rules has affected production rates. Many factories had to slow down or stop production, creating a domino effect throughout the supply chain. Many industries found their supply chain were overly dependent on single sources or geographical areas, such as China for manufacturing. While some research results (Bednarski, Roscoe et al, 2023, pp.1-27) indicate that the impact of geopolitical disruption can be mitigated through regionalization, blockchain technologies and data analytics, other studies (Roscoe, Aktas et al, 2022, pp.1407-1434) consider that the supply chain design is the effect of the managerial perception upon the severity of the supply chain disruption risk and these findings are developing the concept of the supply chain logics. In the study of Odulaja et al. (2023, pp. 463-486), diversification of supply sources, technological innovations, policy adaptations and the development of collaborative networks are indicated as solutions to build resilience as an impact of supply chain volatility. Authors consider that digitalization and data analytics, sustainability and circular economy and resilient third-party logistics are part of the risk mitigation. More recent pieces of research have assessed the notion of flexibility in the supply chain as an important strategy that allows companies to deal with interruptions and develop resilience (Piprani, Jaafar et al, 2022, pp. 307-325). The moderating role of supply chain risks (Um and Han, 2020, pp. 240-255), as part of the attributes of category management (Burlakova, et al, 2019, pp 2099-

2107), is effective by combining flexibility, supplier collaboration and transparency for internal and external risks from the suppliers' side (Piprani, Jaafar et al, 2022, pp. 307-325). The impact of supply risk of geopolitics on critical minerals for renewable energy (Islam et al, 2023, pp.1-13) and storage technology in China and electric vehicles is related to the geographical distribution and geopolitical risk characteristics of these critical metal minerals such as cobalt, lithium and nickel supply (Wang, Wang et al, 2021, pp.1-13). Restrictions on international travel and increased freight costs have complicated the logistics of getting raw materials to the required destinations on time.

The geopolitical issues are exacerbating the situation, according to the study by examining the impact of the US-China trade war (Fan, Zhou et al, 2021, pp.1-61). The relationship of geopolitical risks and container throughput number of shipments (Atacan and Acik, 2023, pp. 251-262) shows that the risks among countries converge with each other. This means that the existing gap between high-risk and low-risk countries is closing in the long run. Considering the panel dataset increases in geopolitical risk cause decreases in container traffic. However, the decrease in geopolitical risk on a panel basis does not reflect positively on container traffic, which may be due to the prudent behavior of companies or the effect may be delayed (Atacan and Acik, 2023, pp. 251-262). Recent analysis of the current situation and risks of the global supply chain in the context of the Russia-Ukraine war highlight logistics disruptions, shortages and increased energy prices, and all further contributed to supply shortages and spiraling transport costs. The impact of food supply disruptions is also inevitable as Russia and Ukraine together account for more "than a quarter of wheat exports, 19% of corn exports and 80% of global sunflower oil exports" (Tien, 2022). The geopolitical risk significantly promotes mergers and acquisitions through possible mechanisms of real option and prospect synergy effect (Sheng, Liang et al, 2020, pp.1-9). The energy sector is susceptible to geopolitical risks. Many of the world's largest oil and gas reserves are located in regions with high geopolitical risks. Any conflict or political instability in these regions can disrupt supply, causing energy prices to fluctuate, affecting both producers and consumers worldwide (Naeem, Balli et al, 2020, pp.1-16).

III. RESEARCH METHODOLOGY

As the main purpose of our study is to highlight the important areas of impact in case of geopolitical conflicts, a systematic review of the scientific literature was conducted to uncover these specific areas. Numerous empirical studies were identified in international databases, using keywords such as: geopolitical risks, geopolitical conflicts, risk mitigation, war, force majeure and global supply chain. A number of 22 articles from all those identified were selected as the most suitable for the purpose of the research, based on the following criteria: presentation of empirical data, publication in a peer-reviewed journal, publication in the English language. The review followed the steps outlined in the literature (Dziopa and Ahern, 2011; Xiao and Watson, 2019): formulating the question, identifying relevant publications, assessing study quality, summarizing the evidence, and interpreting the findings.

In the attempt to answer the question "What are the salient aspects of the geopolitical risks and impact on the global supply chain?", the investigated pieces of research revealed the following focused areas of concern in case of geopolitical turmoil as the ones most critically affected: M= Macroeconomics (inflation, investments, interest and exchange rates), R= Raw materials (steel metal, rare metals, semiconductors, chemicals), E= Energy (crude oil, natural gas, electricity, carbon emission cost), L= Logistics (freight costs). A summary of the evidence was done for each article (Table 1) from which several keywords as main directions of action for supply chain resilience were further extracted.

Table 1 Geopolitical risk research study with impact on Macroeconomics/ Raw Material/ Energy/ Logistics

Article Research	Geopolitical	Impacts on M= Macroeconomics R= Raw material E= Energy L= Logistics	Main Factors of Supply Chain Resilience
Atacan and Acik, 2023	■	M, R, E, L	Regionalization
Bednarski, Roscoe et al, 2023	■	M, E	Adaptability, Digitalization and data analytics, Regionalization
Caldara and Iacoviello, 2022	■	M, R	Risk categorization
Chu et al, 2020	■	M, R, E, L	Risk categorization
Fan, Zhou et al, 2021	■	R, L	Adaptability
Islam et al, 2023	■	R, E	Adaptability, Risk categorization
Jiao et al, 2022	■	M, R, E, L	Adaptability, Digitalization and data analytics
Lee et al, 2022		R	Digitalization and data analytics
Mignon and Saadaoui, 2023	■	R, E	Adaptability
Naeem, Balli et al, 2020	■	E	Adaptability
Nygaard, 2020	■	M, R, E, L	Adaptability, Regionalization
Odulaja, Oke et al, 2023	■	M, R	Digitalization and data analytics
Piprani, Jaafar et al, 2022	■	R, L	Adaptability
Roscoe, Aktas et al, 2022	■	M, L	Regionalization
Shen, Liang et al, 2020	■	M, E	Digitalization and data analytics
Sreedevi and Saranga, 2017	■	M, R, L	Adaptability, Supplier Collaboration
Um and Han, 2020	■	M, R, L	Supplier Collaboration
Tien, 2022	■	M, R, E, L	Adaptability, Regionalization
Wang, Wang et al, 2021	■	M, E	Regionalization, Risk categorization
Wujie, 2023	■	M	Regionalization, Risk categorization
Xu, Zhang et al, 2021	■	M, R, E, L	Adaptability, Supplier collaboration
Yang and Chan, 2023	■	M, R, L	Regionalization

IV. RESEARCH RESULTS

A global supply chain connects the trade world across geopolitical differences. In a fragmented world the future trends will be reconfigured through a suite of actions such as: adaptability, regionalization, supplier collaboration, digitalization and data analytics, risk categorization.

- **Adaptability** is the ability to adjust the procurement strategies in response of geopolitical uncertainties (Bednarski, Roscoe et al, 2023, pp.1-27). Also referred as “flexibility” in several studies (Fan, Zhou et al, 2021, pp.1-61; Piprani, Jaafar et al, 2022, pp. 307-325), the adaptability is a significant driver of resilience. Being adaptable allows category procurement to better manage risks as they can quickly respond and adjust to negative events like war situations (Tien, 2022). In a specific war case scenario it is required a significant shift in priorities, operations and strategies. The supply chain disruption has received increased attention and in order to mitigate its detrimental effects it is necessary to enhance the robustness and flexibility (Xu, Zhang et al, 2021). Congestions and raw material bottleneck also combined with the increase of crude oil costs and energy demand requires effort and adaptability (Mignon and Saadaoui, 2023). According to the authors (Jiao et al, 2022) to adapt the industrial growth to the economic uncertainties can affect positively the ecological foot. However other study (Naeem, Balli et al, 2020, pp.1-16) presents that the energy commodity uncertainties have direct impacts on several industries and can predict the systematic risk of these. The critical raw materials and the increased green energy demand require specific approaches and to adapt the circular economy is one of the drivers (Nygaard, 2020). The research of (Sreedevi et al, 2017, pp.332-342) identifies the appropriate types of flexibility that can mitigate the uncertainty risks, as follows: supply flexibility, manufacturing flexibility, delivery flexibility. Strategic category procurement and supply chain adaptability are crucial during uncertain times to mitigate the risks.
- **Regionalisation** is the strategy of changing the supply chain to a closer geographical region to reduce logistic costs and avoid delays and most importantly to increase control in case of geopolitical crisis (Atacan and Acik, 2023, pp. 251-262). The regionalization strategy has been significantly accelerated

by the covid pandemic (Bednarski, Roscoe et al, 2023, pp.1-27) or the geopolitical standoff between the United States and China (Yang and Chang, 2023, pp. 1-14) or by the raw material shortages and logistic congestions due to Ukraine war (Nygaard, 2020; Tien, 2022). As part of the supply chain design is an important make or buy procurement process with requires an important financial investment process in case of facility relocations in favor of third parties and supply chain manufacturing (Lee et al, 2022, pp. 495-510; Nygaard, 2020). The cited papers are highlighting different terminologies for the similar regionalization approach like “geographical distribution” (Wang et al, 2021, pp.1-13) and “supply chain design” (Roscoe, Aktas et al, 2022, pp.1407-1434). Collateral sectors, such as local tourism, are impacted by perceived risks in instances of geopolitical uncertainty (Wujie, 2023).

- **Supplier collaboration** plays an important role by supplier involvements in mitigating supply chain risks (UM, J., Han, N., 2020, pp. 240–255). By working closely with suppliers, category procurement can enhance resilience and responsiveness to potential disruptions. Risk awareness combined with supplier collaboration has a positive impact on mitigating major risks arising from geopolitical uncertainties (Sreedevi et al, 2017, pp.332-342). The strategic category procurement and suppliers by working together can improve supply chain visibility, delivery compliance and product quality. This approach enables proactive risk management, reducing the impact of disruptions and improving the overall resilience of the supply chain by focusing on unreliable suppliers (Xu, Zhang et al, 2021, pp. 3508–3526).
- **Digitalization and data analytics** help to monitor operational procurement and business in the geopolitical events in real-time and mitigate the impact (Lee et al, 2022, pp. 495-510). Digital tools and data analytics can help in risk assessment and assist category procurement in managing supply chain and operations in various regions (Odulaja et al, 2023, pp. 463-486). The effectiveness of data analytics in addressing geopolitical uncertainties depends on the quality and reliability of data. For appropriate decision making specific scenarios could be offered but cannot eliminate unpredictability associated with geopolitical events. The mergers and acquisitions are strategic decisions taken for synergy benefits, considering the geopolitical risks (Sheng, Liang et al, 2020, pp.1-9). Based on data analytics strategic procurement is able to take preventive measures and prepare contingency plans like regionalization (Odulaja et al, 2023, pp. 463-486; Xu, Zhang et al, 2021), further considering the adaptability and the supplier collaboration. According to the authors (Jiao et al, 2022) the economic uncertainty due to geopolitical risks reduces energy consumption and hinders the investments in renewable energy and economic growth. Several digital technologies (big data, blockchain, internet of things, artificial intelligence) are identified as transformational with positive impact on the supply chain resilience ((Bednarski, Roscoe et al, 2023, pp.1-27).
- **Risk categorization** is the first step towards effective risk management in a crisis scenario. The risks could be numerous and varied and the categorization helps to prioritise as essential strategic business and procurement plan (Caldara and Iacoviello, 2022, p.1197). The security of the supply chain becomes even more crucial in a war scenario and includes from the physical security protecting transportation routes and storage facilities and cybersecurity by protecting procurement systems and data from cyberattacks. In their risk factor identification research the authors (Chu, Park et al, 2019, pp.1691-1698) applying text-mining techniques, are considering the following regional risk
- categorization: political, logistic, environmental, financial, supply, demand and system risks. According the authors (Islam et al, 2023, pp.1-13) the geopolitical risk events are categorized as “treats”, “acts”, narrow” and “broad” based on the impact on the mineral imports and the renewable energy generation. According to other study (Lee et al, 2022, pp. 495-510) the geopolitical stability impacts positively by lowering the supply risk of critical metal minerals (such like cobalt, lithium and nickel) with further effect on the energy storage technologies. The risk categorization and regionalization are highlighted by the international country risk ratings including political (government stability, socioeconomic conditions, corruption, religious and ethnic tensions, etc), economic and financial risks (Wang et al, 2021, pp.1-13). The economical stability and the perceived risks within some sectors, with impact on their supply chain, are often affected by the regional political uncertainties (Caldara and Iacoviello, 2022, p.1197; Wujie, 2023). Thus it is difficult to evaluate, also is crucial to understand these geographical risk factors to prevent the global supply chain from collapsing.

V. CONCLUSIONS AND OUTLOOK

Geopolitical conflicts remain the top-cited risks to economic growth, in addition to the lack of capacities, energy demand, raw material shortages and logistics risks. Therefore, companies need to develop robust management strategies to mitigate these risks, such as adaptability, regionalization, supplier collaboration, digitalization and data analytics and risk categorization. To get an extended picture of the supply chain resilience the category management has to monitor a dashboard comprising the following crucial aspects: geopolitics and

macroeconomics, raw material and energy, supply chain and logistics, others (sustainability, environment, natural disaster, cyber risk, pandemic). The latter are not considered as focus of this approach; therefore, this study has a limitation considering a twenty-two articles literature review approach only.

The contemporary world becomes more and more volatile and unpredictable every year, with climate crisis, wars and natural disasters, but also with dynamic development of technologies and predictive data analytics. The global supply chain face challenges emerging from economic, sociological and political trends.

The global economic impact could be profound and all the considered focused area are impacted in face of uncertainty. There are a wide range of estimates case-scenarios driven by different assumptions, however across these analysis the global supply chain are directly affected. Logic result is that the procurement category professionals have to anticipate and develop a portfolio of strategic actions including new supply chain and in parallel to embrace cooperation. Supplier collaboration and regionalisation apparently in opposition have to balance the negative potential impacts and are part of the risk mitigation.

Geopolitical uncertainties encompass factors like political instability, terrorism and war, trade conflicts and force majeure which can dramatically disrupt global supply chain. These risks can lead to increased costs, delayed deliveries and reduced product availability. Therefore, understanding and managing these geopolitical risks are crucial for maintaining supply chain resilience and ensuring business continuity and strategically planning ahead for potential disruptions. As for future research directions the salient aspects of the global supply chain (adaptability, regionalization, supplier collaboration, digitalization and data analytics and risk categorization) can be implemented within various analyses to reduce and mitigate the negative macroeconomic effects, to ensure the raw material and energy demand and to find logistic alternatives in various crisis scenarios. The category procurement can then determine the severity of the risk in that region and adapt to changing economic conditions by diversifying the supply chain and protecting against commodity price fluctuations and shortages. In essence, strategic category procurement in a crisis scenario involves a strategic balance between meeting immediate needs and planning for long-term sustainability and resilience.

VI. REFERENCES

- Atacan, C., Acik, A. (2023) Impact of Geopolitical Risk on International Trade: Evidence from Container Throughputs. *Transactions on Maritime Science* 12, pp. 251-262.
- Bednarski, L., Roscoe, S., Blome, C., Schleper, M C. (2023) Geopolitical disruptions in global supply chains: a state-of-the-art literature review. *Taylor&Francis. Production Planning & Control*, pp.1-27.
- Burlakova, I., Karkh, D., Ruzhanskaya, I. (2019) Applying category management in procurement in manufacturing companies, *Upravlenets*, pp. 2099-2107.
- Caldara, D., Iacoviello, M. (2022) Measuring Geopolitical Risk. *American Economic Review*, 112, pp. 1194-1225.
- Chu, C., Park, K., Kremer, G. (2020) A global supply chain risk management framework: An application of text-mining to identify region-specific supply chain risks. *Advanced Engineering Informatics* 45, pp 1-39.
- Dijmarescu, E. (2021) Research on supply chains within the power energy sector: Salient points in a pandemic situation. *IBIMA 2021*
- Dziopa, F., Ahern, K. (2011) A Systematic Literature Review of the Applications of Q-Technique and Its Methodology. *Methodology* 7, pp. 39–55.
- Fan, D., Zhou, Y., Lo, C K.Y. et al (2021) The Impact of Tariff Trade Barriers on the Operating Performance of U.S. Firms: The Role of Supply Structure and Complexity, pp.1-61.
- Haas, R., Huber, C. (2023) Navigating geopolitics with Richard Haas. *McKinsey and Company*
- Huissoud, C., (2024) Report highlights unprecedented level of destruction of the economy of Gaza, which will take tens of billions USD and decades to reverse. *UNCTAD Press Release 2024/02*. www.unctad.org
- Islam, Md M., Sohag, K., Mariev, O. (2023) Geopolitical risks and mineral-driven renewable energy generation in China: A decomposed analysis. *Resources Policy* 80, pp 1-13.
- Jiao, Y., Xiao, X., Bao, X. (2022) Economic policy uncertainty, geopolitical risks, energy output and ecological footprint Empirical evidence from China. *Energy Reports* 8, pp. 324-334.
- Lee, K.L., Azmi, N.A.N. et al (2022) The effect of digital supply chain on organizational performance: An empirical study in Malaysia manufacturing industry. *Uncertain Supply Chain Management* 10, pp. 495-510.
- Mignon, V., Saadaoui J. (2023) How do political tensions and geopolitical risks impact oil prices? *Energy Economics* 129(5):107219
- Naeem, M.A., Balli, F., Shahzad, S.J.H., Bruin, A. (2020) Energy commodity uncertainties and the systematic risk of US industries. *Energy Economics* 85, pp.1-16.
- Nygaard, A. (2022) The Geopolitical Risk and Strategic Uncertainty of Green Growth after the Ukraine Invasion: How the Circular Economy Can Decrease the Market Power of and Resource Dependency on Critical Minerals. *Circular Economy and Sustainability*, pp. 1099–1126.
- Odulaja, B.A., Oke, T.T., Eleogu, T., et al (2023) Resilience in the face of uncertainty: A review on the impact of supply chain volatility amid ongoing geopolitical disruption. *International Journal of Applied Research in Social Sciences*, pp. 463-486.
- Piprani, A Z., Jaafar, N I., Ali, S M., Mubarik, M S. et al (2022) Multidimensional supply chain flexibility and supply chain resilience: the role of supply chain risks exposure. *Operations Management Research*, pp. 307–325.
- Roscoe, S., Aktas, E., Petersen, K., Skipworth, H., H. et al (2022) Redesigning global supply chains during compounding geopolitical disruptions: the role of supply chain logics. *International Journal of Operations & Production Management*, pp. 1407-1434.
- Shen, H., Liang, Y., Li, H., Liu, J., Lu, G. (2020) Does geopolitical risk promote mergers and acquisitions of listed companies in energy and electric power industries? *Energy Economics* 95, pp.1-9.
- Seong, J., White, O., Birshan, M. et al (2024) Geopolitics and the geometry of global trade. *McKinsey Global Institute*, pp1-56.
- Sreedevi, R., Saranga, H. (2017) Uncertainty and supply chain risk: The moderating role of supply chain flexibility in risk mitigation. *International Journal of Production Economics* 193, pp.332-342.

23. Um, J., Han, N. (2020) Understanding the relationships between global supply chain risk and supply chain resilience: the role of mitigating strategies *Supply Chain Management An International Journal*, pp. 240–255.
24. Tien, N.H. (2022) Russia-Ukraine war and risks to global supply chains. *International Journal of Mechanical Engineering*, pp.633-640
25. Wang, B., Wang, L., Zhong, S., Xiang, N., Qu, Q. (2023) Assessing the supply risk of geopolitics on critical minerals for energy storage technology in China. *Frontiers in Energy Research*, pp.1-13.
26. Wujie, X. (2023) The impact of geopolitical risks and international relations on inbound tourism - evidence from China and key source countries. *Cogent Social Sciences* 9, pp. 1-30.
27. Xiao, Y., Watson, M. (2019) Guidance on Conducting a Systematic Literature Review. *Journal of Planning Education and Research* 39, pp.93–112.
28. Xu, S., Zhang, X., Feng, L., Yang, W. (2021) Disruption risks in supply chain management: a literature review based on bibliometric analysis. *International Journal of Production Research* 58, pp. 3508–3526.
29. Yang, C., Chan, D. Y.-T. (2023) Geopolitical risks of strategic decoupling and recoupling in the mobile phone production shift from China to Vietnam: Evidence from the Sino-US trade war and COVID-19 pandemic Drawing upon the Global Production Networks (GPN) 2.0 theory. *Applied Geography* 158, pp. 1-14.