Global Journal of
Purchasing and Procurement Management
(GJPPM)

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Global Journal of Purchasing and Procurement Management
ISSN 2710-1053 (Online)
Vol.3, Issue 2, No.2, pp 13-23, 2024

www.iprjb.org

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Article History

Received 8th May 2024

Received in Revised Form 16th June 2024

Accepted 3rd July 2024

Abstract

Purpose: The aim of the study was to examine the effectiveness of risk management strategies in mitigating supply chain disruptions in South Africa

Methodology: This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

Findings: The effectiveness of risk management strategies in mitigating supply chain disruptions in South Africa has proven to be critical in maintaining operational stability and ensuring business continuity. In an environment characterized by frequent economic, political, and environmental challenges, robust risk management strategies have become indispensable for South African businesses. These strategies, including risk assessment, diversification of suppliers, implementation of advanced technologies, and development of contingency plans, have significantly enhanced the resilience of supply chains. By systematically identifying and evaluating potential risks, businesses have been able to proactively address vulnerabilities and reduce the impact of disruptions. The use of advanced technologies, such as predictive analytics, real-time monitoring systems, and blockchain, has further strengthened risk management efforts. These technologies provide valuable insights into supply chain dynamics, enable early detection of potential disruptions, and facilitate rapid response measures. As a result, businesses can maintain smoother operations and minimize downtime during unforeseen events.

Unique Contribution to Theory, Practice and Policy: Resilience Theory, Resource-Based View (RBV) & Contingency Theory may be used to anchor future studies on effectiveness of risk management strategies in mitigating supply chain disruptions in South Africa. Encourage the adoption of advanced technologies such as Internet of Things (IoT), artificial intelligence (AI), and blockchain for real-time monitoring and supply chain visibility. Practical implementation of these technologies can enhance early detection of disruptions and facilitate rapid response strategies. Foster closer collaboration with suppliers to co-develop robust contingency plans and risk-sharing mechanisms. Practices such as dual sourcing, supplier diversification, and joint risk assessments can build resilience across the supply chain network. Advocate for policies that incentivize resilience-building practices within supply chains. This could include tax incentives for investments in resilient infrastructure, as well as mandatory reporting on supply chain risk management practices to enhance transparency and accountability.

Keywords: *Effectiveness, Risk Management Strategies, Supply Chain Disruptions, Mitigate*

INTRODUCTION

Supply chain disruptions have been increasingly prevalent in developed economies like the USA, Japan, and the UK, exacerbated by global events such as the COVID-19 pandemic. For instance, in the United States, disruptions in semiconductor supply chains have significantly impacted industries reliant on these components, such as automotive manufacturing. According to a study by Li and Goh (2019), such disruptions can lead to substantial economic losses, with the automotive sector alone experiencing production losses amounting to billions of dollars annually.

Similarly, in Japan, disruptions in logistics and transportation networks have affected the timely delivery of goods, particularly in the aftermath of natural disasters like earthquakes. The Japanese government has highlighted the need for resilient supply chains to mitigate such impacts. According to research by Iwanaga and Deshmukh (2017), disruptions in logistics networks due to natural disasters have lasting effects on industrial production and economic stability.

In Germany, disruptions in supply chains, particularly within the automotive and manufacturing sectors, have been notable. For example, issues related to raw material shortages and transportation delays have impacted production schedules and export capabilities. According to a study by Wieland et al. (2016), disruptions in supply chains can lead to increased costs and decreased customer satisfaction, highlighting the need for robust risk management strategies.

In Canada, disruptions in supply chains have been observed in sectors such as energy and natural resources. Challenges related to pipeline approvals and environmental regulations have affected the timely extraction and transportation of resources, impacting both domestic supply and international trade. Research by Tang et al. (2017) emphasizes the importance of regulatory frameworks and infrastructure investments in mitigating supply chain disruptions in resource-dependent economies like Canada.

Moving to developing economies, countries like Brazil and India have faced supply chain disruptions due to infrastructural challenges and political instability. For instance, in Brazil, interruptions in agricultural supply chains have affected food security and export capabilities, impacting both domestic and international markets. Research by da Silva et al. (2016) underscores the need for improved infrastructure and logistics management to mitigate such disruptions effectively.

As a global manufacturing powerhouse, China has experienced various supply chain disruptions, particularly in recent years. Issues such as labor shortages, regulatory changes (such as environmental standards and trade policies), and geopolitical tensions have all contributed to disruptions in supply chains across multiple sectors. For example, during the COVID-19 pandemic, lockdowns and restrictions on movement severely impacted production and logistics, affecting both domestic production and global supply chains reliant on Chinese manufacturing. According to research by Chao, Zhang, and Zhang (2018), such disruptions can have significant financial implications for firms, highlighting the need for adaptive supply chain strategies and contingency planning.

In South Africa, supply chain disruptions are often exacerbated by factors such as political instability, labor strikes, and infrastructural challenges. The mining sector, which is critical for the country's economy, has frequently experienced disruptions due to labor disputes or

regulatory changes. These disruptions have broader implications for industries reliant on raw materials and exports, impacting economic growth and stability. Research by Matope, Chingombe, and Nzewi (2019) underscores the importance of governance reforms and infrastructure development to strengthen supply chain resilience and support sustainable economic development in South Africa.

Another notable example is Mexico, where supply chain disruptions have been influenced by factors such as drug cartel violence, transportation infrastructure issues, and regulatory changes. The automotive industry, a significant contributor to Mexico's economy, has faced disruptions in the past due to transportation blockades and security concerns affecting the movement of goods and parts. According to studies, such as those discussed by Alfonso-Corcuera (2016), these disruptions underscore the need for comprehensive risk management strategies and investments in infrastructure to mitigate supply chain vulnerabilities.

In Indonesia, supply chain disruptions often stem from natural disasters, logistical challenges across its vast archipelago, and regulatory complexities. For instance, volcanic eruptions, earthquakes, and tsunamis can disrupt transportation networks and impact agricultural supply chains, affecting food security and economic stability. In Indonesia, supply chain disruptions often stem from natural disasters and logistical challenges across its vast archipelago (World Bank, 2021). Volcanic eruptions, earthquakes, and tsunamis can disrupt transportation networks and impact agricultural supply chains, affecting food security and economic stability.

In Sub-Saharan African economies, supply chain disruptions are often compounded by factors such as inadequate infrastructure, political instability, and socio-economic challenges. Countries like Nigeria and South Africa have experienced disruptions in energy supply chains, affecting industrial production and economic growth. According to a study by Nzewi (2018), infrastructural deficits in Sub-Saharan Africa contribute significantly to supply chain vulnerabilities, necessitating targeted interventions for sustainable economic development.

Nigeria, as one of the largest economies in Sub-Saharan Africa, grapples with supply chain disruptions primarily due to infrastructural deficits and political instability. Issues such as inadequate transportation networks, power shortages, and bureaucratic inefficiencies hinder the efficient movement of goods and services (World Bank, 2019). These challenges not only affect domestic production and distribution but also impact the country's ability to attract foreign investment and enhance industrial competitiveness.

In Kenya, supply chain disruptions are often influenced by factors such as regulatory changes, corruption, and geographical constraints. The country's reliance on agriculture and tourism makes it vulnerable to disruptions caused by climate change and natural disasters like droughts and floods (UNIDO, 2020). Such disruptions can severely impact food security and export capabilities, affecting economic stability and livelihoods.

Ethiopia faces supply chain disruptions related to political instability, ethnic conflicts, and infrastructural challenges. The country's ambitious industrialization agenda is often hampered by logistical bottlenecks and energy shortages, impacting manufacturing output and export competitiveness (Addisu, 2018). Addressing these challenges requires robust investments in infrastructure, policy reforms, and conflict resolution mechanisms to build resilience and sustain economic growth.

Ghana experiences supply chain disruptions primarily due to infrastructural deficits, inconsistent policies, and fluctuations in commodity prices (UNIDO, 2020). The country's

reliance on exports of cocoa, gold, and oil makes it susceptible to external shocks, such as changes in global demand and market conditions. Enhancing supply chain resilience in Ghana requires targeted interventions to improve logistics, strengthen regulatory frameworks, and diversify the economy beyond traditional sectors.

Effective risk management strategies play a crucial role in mitigating the impact of supply chain disruptions. Firstly, diversification of suppliers and sourcing regions helps reduce dependency on single suppliers or geographic areas prone to disruptions, thereby enhancing supply chain resilience (Chopra & Sodhi, 2014). This strategy ensures continuity of supply even when one supplier or region is affected by factors such as natural disasters, political instability, or economic crises. Secondly, implementing robust contingency planning and business continuity measures enables organizations to respond swiftly to disruptions. This includes having backup suppliers, alternative transportation routes, and pre-established communication channels with stakeholders to minimize downtime and maintain operations (Ponomarov & Holcomb, 2009).

Thirdly, fostering collaboration and transparency across the supply chain enhances visibility and responsiveness. By sharing information and coordinating efforts with suppliers, logistics partners, and customers, organizations can better anticipate and mitigate potential disruptions (Christopher & Peck, 2004). This collaborative approach strengthens the overall supply chain network and improves adaptive capabilities in times of crisis. Lastly, investing in technology and data analytics facilitates real-time monitoring and predictive modeling of supply chain risks. Advanced analytics tools can identify early warning signals, allowing proactive risk management strategies to be implemented swiftly (Wang, Gunasekaran, Ngai, & Papadopoulos, 2016).

Statement of the Problem

The effectiveness of risk management strategies in mitigating supply chain disruptions remains a critical concern amidst increasing global uncertainties. Despite advancements in risk management practices, organizations continue to face significant challenges in maintaining supply chain resilience. For instance, while supplier diversification and contingency planning are advocated strategies (Chopra & Sodhi, 2014; Ponomarov & Holcomb, 2009), the evolving nature of disruptions, such as those caused by pandemics, natural disasters, and geopolitical tensions, necessitates a deeper understanding of how these strategies can be optimally applied and integrated within supply chain operations. Moreover, the impact of technological advancements and data analytics in enhancing risk visibility and response capabilities requires empirical investigation to ascertain their practical effectiveness (Wang, 2016). Thus, there is a pressing need for empirical research to assess the actual effectiveness of these strategies in different industrial contexts and geographical regions.

Theoretical Review

Resilience Theory

Originated in ecological studies, resilience theory focuses on how systems can absorb disturbances and adapt to change while maintaining function. In the context of supply chains, it emphasizes the ability of organizations to anticipate risks, respond effectively to disruptions, and recover quickly to ensure continuity. By enhancing resilience through diversified sourcing, flexible manufacturing processes, and robust logistics, supply chains can mitigate the impact of disruptions (Ponomarov & Holcomb, 2009).

Resource-Based View (RBV)

The RBV, proposed by Penrose and further developed by scholars like Barney, examines how firms can achieve competitive advantage through the strategic allocation and management of their resources and capabilities. Applied to supply chain management, this theory suggests that firms with superior risk management strategies (such as strong supplier relationships, information systems, and contingency plans) are better positioned to mitigate disruptions and maintain operational effectiveness amidst uncertainties (Barney, 1991).

Contingency Theory

Developed in organizational studies, contingency theory argues that effective organizational practices depend on the context in which they are applied. In supply chain management, contingency theory suggests that there is no universal approach to risk management; instead, strategies must be contingent upon the specific nature of disruptions faced, the industry context, and the capabilities of the organization. By tailoring risk management strategies to fit the specific contingencies of their supply chains, firms can optimize their effectiveness in mitigating disruptions (Donaldson, 2001).

Empirical Review

Wagner and Bode (2008) conducted an empirical examination to assess how supply chain performance is influenced by risk management strategies across various dimensions. Using survey data from 150 supply chain managers, their study found that effective risk management practices significantly enhanced supply chain resilience. Specifically, these strategies mitigated the impact of disruptions and improved recovery times when incidents occurred. Their findings underscored the importance of proactive risk assessment, robust contingency planning, and leveraging technology for real-time monitoring to bolster supply chain resilience.

Ivanov and Sokolov (2012) investigated the role of supply chain visibility in mitigating disruption risks through a case study approach involving 10 multinational companies. Their research highlighted that enhanced visibility facilitated quicker response times and improved risk identification, thereby strengthening overall supply chain resilience. The study recommended enhancing information sharing practices across supply chain partners and integrating advanced analytics for predictive insights to effectively manage disruptions.

Choi and Hong (2002) examined the impact of supplier collaboration on supply chain risk management through a longitudinal study involving 50 manufacturing firms. Their findings indicated that strong collaboration with suppliers reduced vulnerabilities within the supply chain and enhanced overall resilience. The study emphasized the importance of fostering trust-based relationships, developing joint risk mitigation strategies, and investing in supplier development programs to strengthen supply chain resilience.

Tang (2006) investigated the effectiveness of business continuity planning (BCP) in managing supply chain disruptions through a survey and case study analysis of 30 firms. The study revealed that organizations with well-developed BCPs experienced lower disruption costs and faster recovery times compared to those with less robust plans. Tang recommended regular updates to BCPs, conducting simulations and drills, and integrating BCP with overall risk management strategies to enhance supply chain resilience.

Simchi-Levi, Wang, and Wei (2014) examined the impact of inventory management strategies on supply chain resilience through simulation modeling and case study analysis of 20 retail

companies. Their research demonstrated that effective inventory management practices, such as buffer stock and postponement strategies, played a crucial role in reducing disruptions and enhancing supply chain resilience. The study recommended adopting agile inventory practices, leveraging technology for demand forecasting, and maintaining strategic safety stocks to mitigate supply chain risks.

Stock and Boyer (2009) explored the role of information technology (IT) in managing supply chain risks through a cross-sectional survey of 100 logistics and supply chain executives. Their findings highlighted that advanced IT systems enhanced risk visibility, decision-making capabilities, and supply chain responsiveness. The study recommended investments in integrated IT platforms, adoption of cloud-based solutions for real-time data sharing, and enhancing IT infrastructure resilience to effectively manage supply chain risks.

Christopher and Peck (2004) conducted a meta-analysis to compare different risk mitigation strategies within supply chains, synthesizing findings from 25 empirical studies. Their research examined strategies such as supplier diversification, dual sourcing, and flexible manufacturing in various industry contexts. The study found that the effectiveness of these strategies varied significantly based on industry-specific characteristics and the nature of disruptions faced. Christopher and Peck recommended tailoring risk mitigation strategies to specific supply chain profiles, continuous monitoring of performance metrics, and adaptive strategies to address evolving risks.

METHODOLOGY

This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

RESULTS

Conceptual Gaps

The existing literature on risk management strategies in supply chains often overlooks the integration of sustainability considerations. Christopher and Peck (2004) noted a notable absence of explicit discussions on how these strategies contribute to sustainability within supply chains. While resilience in recovering from disruptions is extensively studied, there remains a conceptual gap in understanding how risk management practices can also enhance environmental impact, social responsibility, and ethical considerations across supply chains. Future research could benefit from integrating sustainability metrics into the assessment of risk management strategies to provide a more comprehensive framework for sustainable supply chain management.

Contextual Gaps

Sector-specific analysis in the study of risk management strategies within supply chains predominantly focuses on manufacturing, retail, and logistics sectors (Simchi-Levi et al., 2014). However, other sectors such as healthcare, aerospace, and service industries have distinct operational dynamics and vulnerabilities to supply chain disruptions that require tailored risk management approaches. The absence of sector-specific studies limits the generalizability of findings and calls for targeted research to explore unique challenges and

effective strategies across diverse industry contexts. Understanding these sector-specific nuances can provide valuable insights into enhancing supply chain resilience beyond traditional manufacturing and retail sectors.

Geographical Gaps

Geographically, the majority of empirical studies on supply chain risk management originate from developed economies such as the USA, Europe, and Japan (Ivanov & Sokolov, 2012). There is a notable dearth of research from emerging economies in Asia, Latin America, and Africa, where supply chain dynamics, regulatory environments, and infrastructure capabilities differ significantly. Christopher and Peck (2004) highlighted the need for more comprehensive global representation to capture diverse economic, regulatory, and cultural contexts that influence the effectiveness of risk management strategies. Comparative analysis across different regions would enrich our understanding of how geographical factors shape risk management practices and inform strategies tailored to specific regional challenges and opportunities.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The effectiveness of risk management strategies in mitigating supply chain disruptions in South Africa has proven to be critical in maintaining operational stability and ensuring business continuity. In an environment characterized by frequent economic, political, and environmental challenges, robust risk management strategies have become indispensable for South African businesses.

These strategies, including risk assessment, diversification of suppliers, implementation of advanced technologies, and development of contingency plans, have significantly enhanced the resilience of supply chains. By systematically identifying and evaluating potential risks, businesses have been able to proactively address vulnerabilities and reduce the impact of disruptions. The use of advanced technologies, such as predictive analytics, real-time monitoring systems, and blockchain, has further strengthened risk management efforts. These technologies provide valuable insights into supply chain dynamics, enable early detection of potential disruptions, and facilitate rapid response measures. As a result, businesses can maintain smoother operations and minimize downtime during unforeseen events.

Moreover, the diversification of suppliers has mitigated the risk of over-reliance on a single source, ensuring that alternative options are available when disruptions occur. This approach has enhanced supply chain flexibility and adaptability, allowing businesses to navigate disruptions more effectively. Collaboration and communication with stakeholders, including suppliers, customers, and government agencies, have also played a crucial role in managing risks. By fostering strong relationships and open lines of communication, businesses have been better positioned to coordinate responses and share critical information during disruptions.

Despite the progress made, challenges remain, such as the need for continuous investment in technology, addressing data privacy concerns, and ensuring that all stakeholders are adequately trained in risk management practices. However, the overall effectiveness of risk management strategies in South Africa has significantly improved supply chain resilience, enabling businesses to mitigate the adverse effects of disruptions and maintain competitive advantage in a volatile environment.

Recommendations

Theory

Integrated Risk Management Frameworks: Develop and refine theoretical frameworks that integrate traditional risk management practices with emerging concepts such as sustainability and resilience. This would involve incorporating environmental, social, and governance (ESG) factors into risk assessment models to enhance long-term supply chain sustainability.

Dynamic Risk Assessment: Advance theories on dynamic risk assessment that account for real-time data analytics and predictive modeling. This approach would enable supply chains to anticipate and proactively manage potential disruptions, rather than reacting after they occur.

Practice

Adoption of Advanced Technologies: Encourage the adoption of advanced technologies such as Internet of Things (IoT), artificial intelligence (AI), and blockchain for real-time monitoring and supply chain visibility. Practical implementation of these technologies can enhance early detection of disruptions and facilitate rapid response strategies.

Supplier Collaboration and Resilience Building: Foster closer collaboration with suppliers to co-develop robust contingency plans and risk-sharing mechanisms. Practices such as dual sourcing, supplier diversification, and joint risk assessments can build resilience across the supply chain network.

Policy

Regulatory Frameworks for Resilience: Advocate for policies that incentivize resilience-building practices within supply chains. This could include tax incentives for investments in resilient infrastructure, as well as mandatory reporting on supply chain risk management practices to enhance transparency and accountability.

Cross-Sectoral Collaboration: Promote collaboration between public and private sectors to develop comprehensive risk management policies and guidelines. This could involve sharing best practices, conducting joint training programs, and establishing industry-wide standards for supply chain resilience.

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