

American Journal of **Supply Chain Management** (AJSCM)



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Crossref

Article history

Submitted 29.03.2024 Revised Version Received 06.05.2024 Accepted 08.06.2024

Abstract

Purpose: The aim of the study was to assess the supplier diversity programs and supply chain resilience in Egypt. **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 study found that supplier diversity programs (SDPs) play a crucial role in enhancing supply chain resilience by fostering a more robust, agile, and adaptable supply chain. These programs, which prioritize the inclusion of diverse suppliers such as minority-owned, women-owned, and small businesses, contribute to a broader supplier base, reducing dependency on a limited number of suppliers. This diversification mitigates risks associated with supply disruptions, as it provides alternative sources of goods and services in the face of unforeseen challenges. Additionally, SDPs encourage innovation and competitive pricing, as diverse suppliers often bring unique perspectives and solutions to the table. The integration of SDPs into supply chain

strategies has shown to not only promote equity and economic growth but also enhance the overall stability and responsiveness of supply chains. This increased resilience is crucial for businesses aiming to navigate uncertainties and maintain operational continuity in today's dynamic market environment.

Implications to Theory, Practice and Policy: Resource-based view (RBV) theory, transaction cost economics and contingency theory may be used to anchor future studies on assessing the supplier diversity programs and supply chain resilience in Egypt. Companies should focus on developing robust metrics to measure the effectiveness of supplier diversity programs, ensuring these metrics go beyond diversity quotas to include performance indicators such as supply chain responsiveness, risk mitigation, and innovation outcomes. Governments and industry regulators should incentivize companies to adopt and expand supplier diversity programs through mechanisms such as tax benefits, grants, or recognition awards for demonstrating significant commitment and results.

Keywords: *Supplier, Diversity, Programs, Supply Chain, Resilience*

INTRODUCTION

Supplier Diversity Programs and Supply Chain Resilience are increasingly critical components of modern business strategies. Resilience in supply chains has become a critical concern, particularly in developed economies like the USA and Japan. For instance, after the disruptions caused by the COVID-19 pandemic, supply chain resilience gained significant attention. According to a study by Smith, Brown & Johnson (2021), the USA experienced a 50% increase in supply chain disruptions in 2020 compared to the previous year, highlighting the need for robust strategies to mitigate such challenges. Similarly, Japan, known for its efficient supply chains, faced disruptions due to natural disasters like earthquakes and tsunamis, leading to reevaluations of resilience strategies. Statistics from the Japan External Trade Organization (JETRO) show that the number of supply chain disruptions in Japan increased by 30% from 2019 to 2020.

In developing economies like India and Brazil, supply chain resilience is also a growing concern. For example, India's supply chains were severely impacted during the second wave of the COVID19 pandemic, with disruptions in transportation and logistics affecting various industries. A report by The Economic Times (2021) highlighted a 40% increase in supply chain disruptions in India during 2020-2021. Brazil, known for its agricultural exports, faced challenges in maintaining supply chains due to factors like infrastructure constraints and political instability. Data from the Brazilian Institute of Geography and Statistics (IBGE) indicates a 25% rise in supply chain disruptions from 2018 to 2020.

In developing economies like Indonesia and Mexico, supply chain resilience remains a key focus. Indonesia faced challenges in its supply chains due to the eruption of Mount Semeru in 2021, disrupting transportation routes and affecting various industries. A report by The Jakarta Post (2022) indicated a 30% increase in supply chain disruptions in Indonesia following the volcanic eruption. Similarly, Mexico experienced supply chain disruptions due to political instability and labor strikes, impacting industries such as automotive manufacturing. Data from the Mexican Institute for Competitiveness (IMCO) showed a 25% rise in supply chain disruptions from 2018 to 2020.

In Ghana and Ivory Coast, two key players in West Africa, supply chain resilience has been a focal point amid various challenges. Ghana faced disruptions in its supply chains due to energy shortages and transportation constraints, impacting sectors like manufacturing and agriculture. Data from the Ghana Statistical Service (GSS) indicated a 35% increase in supply chain disruptions from 2018 to 2020. Similarly, Ivory Coast encountered challenges in its supply chains due to political unrest and fluctuations in commodity prices, affecting industries such as cocoa exports. Statistics from the National Institute of Statistics (INSTAT) showed a 30% rise in supply chain disruptions in Ivory Coast during the same period (Johnson, 2021).

Moving to Central Africa, Cameroon and Democratic Republic of the Congo (DRC) also grapple with supply chain resilience issues. Cameroon faced challenges in its supply chains due to infrastructural limitations and regulatory hurdles, impacting sectors like logging and mining. A report by the World Bank (2021) highlighted a 25% increase in supply chain disruptions in Cameroon over the past five years. Meanwhile, DRC experienced disruptions in its supply chains due to conflicts and logistical challenges, affecting sectors such as mining and agriculture. Data

from the Central Bank of Congo (BCC) revealed a 20% rise in supply chain disruptions from 2019 to 2022.

In Tanzania and Uganda, supply chain resilience has been a critical area of focus. Tanzania faced challenges in its supply chains due to logistical constraints and border disputes, impacting sectors such as agriculture and manufacturing. A study by the Tanzanian Chamber of Commerce (TCC, 2021) reported a 30% increase in supply chain disruptions in Tanzania over the past five years. Similarly, Uganda encountered disruptions in its supply chains due to political instability and transportation bottlenecks, affecting industries like tourism and agriculture. Data from the Uganda Bureau of Statistics (UBOS) showed a 25% rise in supply chain disruptions from 2018 to 2021.

In Angola and Mozambique, supply chain resilience has been crucial amid various challenges. Angola faced disruptions in its supply chains due to economic diversification efforts and infrastructural limitations, impacting sectors like oil and gas. A study by the Angolan Ministry of Economy (2020) reported a 30% increase in supply chain disruptions in Angola over the past three years. Similarly, Mozambique encountered challenges in its supply chains due to climate-related events such as cyclones and floods, affecting industries like agriculture and mining. Data from the Mozambican Institute of Statistics (INE) showed a 25% rise in supply chain disruptions from 2018 to 2020.

Moving to East Africa, Rwanda and Burundi also grapple with supply chain resilience issues. Rwanda faced challenges in its supply chains due to landlocked geography and dependency on neighboring countries for trade routes, impacting sectors such as agriculture and manufacturing. A report by the Rwandan Development Board (RDB) highlighted a 35% increase in supply chain disruptions in Rwanda from 2019 to 2021. Meanwhile, Burundi experienced disruptions in its supply chains due to political instability and limited infrastructure, affecting industries like coffee production and mining. Data from the Burundi National Institute of Statistics (INSTAT) revealed a 30% rise in supply chain disruptions during the same period, Rwandan Development Board. (2021).

Turning to Southern Africa, Zambia and Zimbabwe also grapple with supply chain resilience issues. Zambia faced challenges in its supply chains due to currency fluctuations and trade barriers, impacting sectors such as mining and agriculture, Zambia Development Agency (2021). A report by the Zambia Development Agency (ZDA) highlighted a 35% increase in supply chain disruptions in Zambia from 2019 to 2021. Meanwhile, Zimbabwe experienced disruptions in its supply chains due to economic volatility and infrastructure limitations, affecting industries like manufacturing and mining. Data from the Zimbabwe National Statistics Agency (ZIMSTAT) revealed a 30% rise in supply chain disruptions during the same period.

Turning to sub-Saharan economies beyond Nigeria and South Africa, Ethiopia and Kenya also grapple with supply chain resilience issues. Ethiopia faced challenges in its supply chains due to internal conflicts and infrastructure limitations, impacting sectors like textiles and agriculture. A study by the Ethiopian Economic Association (EEA, 2022) reported a 40% increase in supply chain disruptions in Ethiopia over the past three years. Meanwhile, Kenya experienced disruptions in its supply chains due to port congestion and trade-related disputes, affecting sectors such as

horticulture and manufacturing. Statistics from the Kenya National Bureau of Statistics (KNBS) revealed a 20% rise in supply chain disruptions from 2019 to 2021.

In sub-Saharan economies such as Nigeria and South Africa, supply chain resilience is a critical factor for economic stability. For instance, Nigeria's supply chains were impacted by factors like insecurity in certain regions and infrastructural limitations. According to a report by the Guardian Nigeria (2021), supply chain disruptions increased by 35% in Nigeria from 2019 to 2020. Similarly, South Africa faced challenges in its supply chains due to labor strikes and logistical bottlenecks. Statistics from the South African Institute of International Affairs (SAIIA) show a 20% rise in supply chain disruptions from 2018 to 2021.

Supplier diversity initiatives are strategic programs designed to promote the inclusion of diverse suppliers, such as minority-owned, women-owned, veteran-owned, and LGBTQ+-owned businesses, in supply chains. One of the key initiatives in supplier diversity is supplier development programs, which involve providing training, mentoring, and resources to diverse suppliers to enhance their capabilities and competitiveness. By incorporating diverse suppliers into the supply chain through such programs, companies can build a more resilient supply chain. Study by Martinez, Smith & Johnson (2019) found that supplier development programs not only contribute to diversity goals but also enhance supply chain resilience by expanding supplier networks and fostering innovation among diverse suppliers.

Another important supplier diversity initiative is supplier collaboration and partnerships. This initiative involves forging strategic partnerships with diverse suppliers to jointly develop solutions, share risks, and create value. By collaborating with diverse suppliers, companies can tap into diverse expertise, perspectives, and capabilities, thus enhancing the agility and adaptability of the supply chain. A study by Johnson (2021) highlighted that supplier collaboration initiatives contribute significantly to supply chain resilience by creating flexible supply networks and fostering trust-based relationships, which are crucial during disruptions and uncertainties in the supply chain landscape.

Problem Statement

Despite the increasing emphasis on supplier diversity programs as a means to promote inclusion and social responsibility within supply chains, there remains a gap in understanding the direct impact of such initiatives on supply chain resilience. While research has explored the benefits of supplier diversity in terms of social impact and economic empowerment (Johnson, 2021), there is a lack of comprehensive studies that specifically examine how supplier diversity programs contribute to enhancing supply chain resilience in the face of disruptions and uncertainties (Martinez, 2019). This gap in knowledge hinders the ability of organizations to fully leverage the potential synergies between supplier diversity efforts and resilience strategies within their supply chains.

Theoretical Framework Resource-Based View (RBV) Theory

Originated by Birger Wernerfelt in 1984, RBV focuses on how firms can achieve a sustainable competitive advantage through their unique resources and capabilities. In the context of supplier diversity programs and supply chain resilience, RBV is relevant because it emphasizes how diverse suppliers can bring valuable resources and capabilities that enhance the resilience of the entire

supply chain. For instance, diverse suppliers may offer innovative solutions, alternative sourcing options, and flexible production capacities, which are critical during disruptions (Li, 2020).

Transaction Cost Economics (TCE)

Developed by Oliver Williamson, TCE examines the costs and benefits associated with different modes of transactions, such as outsourcing or internal production. When applied to supplier diversity programs, TCE helps understand the decision-making process regarding engaging with diverse suppliers. Diverse suppliers may reduce transaction costs through improved coordination, reduced monitoring needs, and lower dependence on a single source, contributing to supply chain resilience (Lee & Lin, 2019).

Contingency Theory

Introduced by Joan Woodward in the 1960s, Contingency Theory posits that there's no one-size-fits-all approach in organizational management; instead, strategies must be contingent on the specific context and conditions. In the context of supplier diversity and resilience, Contingency Theory suggests that the effectiveness of supplier diversity programs in enhancing resilience may vary depending on factors like industry characteristics, organizational culture, and market dynamics. Understanding these contingencies is crucial for optimizing the outcomes of supplier diversity initiatives (Samadi, Brown, & Johnson, 2021).

Empirical Review

Brown (2019) provided valuable insights into the impact of supplier diversity programs on supply chain resilience within the automotive sector. Through a rigorous quantitative methodology involving surveys conducted among automotive companies, the research aimed to understand how supplier diversity initiatives contribute to enhancing resilience in the face of disruptions. The findings from the study revealed compelling evidence that supplier diversity programs significantly contribute to bolstering supply chain resilience. This is primarily achieved through the diversification of supplier bases, which in turn reduces dependency on single sources and enhances the overall responsiveness of the supply chain when faced with disruptions such as material shortages, production delays, or transportation issues. Additionally, the presence of diverse suppliers introduces new perspectives and innovative problem-solving approaches, which further strengthens the supply chain's ability to adapt to changes and challenges. The study's recommendations underscore the importance for companies in the automotive industry to invest in robust supplier diversity programs. By establishing strategic partnerships with diverse suppliers, automotive firms can not only mitigate risks associated with supply chain disruptions but also foster innovation and enhance their competitive advantage in the market. Thus, supplier diversity is not just a social or ethical consideration but a strategic imperative for resilience and long-term success.

Smith (2020) empirical research sheds light on the critical role of supplier collaboration in augmenting supply chain resilience, particularly focusing on diverse supplier partnerships within the electronics manufacturing sector. The study employed qualitative interviews with supply chain managers and diverse suppliers to delve deeper into the dynamics of collaborative relationships. The findings underscored that collaborative relationships with diverse suppliers positively impact supply chain flexibility, agility, and risk mitigation capabilities. This is evident through improved

coordination, knowledge sharing, and joint problem-solving efforts between companies and their diverse suppliers. For example, diverse suppliers often bring unique insights and innovative solutions that can address specific challenges in the electronics supply chain, such as component shortages or rapid technological advancements. As disruptions in the electronics manufacturing industry can arise from various factors such as component shortages, geopolitical tensions, or technological shifts, the study's recommendations highlight the importance of fostering closer collaborations with diverse suppliers. By prioritizing long-term partnerships built on trust and mutual benefit, companies in the electronics manufacturing sector can fortify their resilience and navigate challenges more effectively. Moreover, these partnerships can lead to the development of more robust and adaptive supply networks that can better withstand and recover from disruptions. Johnson (2021) delved into the effectiveness of supplier development programs in enhancing supply chain resilience within the pharmaceutical industry. The study employed a mixed-methods approach, combining surveys, case studies, and financial analysis of pharmaceutical companies to capture a holistic understanding of the impact of supplier development initiatives. The findings revealed compelling evidence that supplier development programs play a crucial role in bolstering supply chain resilience. This is achieved through various mechanisms such as improving supplier capabilities, fostering innovation through collaborative partnerships, and reducing lead times for critical supplies. For instance, pharmaceutical companies that invest in developing the capabilities of their diverse suppliers often see improvements in quality, reliability, and innovation in the supply chain. As disruptions in the pharmaceutical sector can have severe consequences on public health and patient outcomes, the study's recommendations emphasize the importance for pharmaceutical firms to continuously invest in supplier development efforts. By enhancing supplier capabilities and fostering knowledge sharing, pharmaceutical companies can strengthen their resilience and ensure continuity in the supply of essential medicines and healthcare products. This approach not only mitigates risks but also enhances the overall efficiency and responsiveness of the supply chain.

Martinez (2018) delved into the relationship between supplier diversity and supply chain risk management practices, particularly in the food and beverage sector. Utilizing a cross-sectional study design with survey data from industry companies, the study unveils a positive correlation between supplier diversity and enhanced risk identification, mitigation strategies, and overall supply chain resilience. The research highlights how diverse suppliers can offer alternative sourcing options and bring innovative approaches to managing supply chain risks, such as food safety issues and fluctuating demand. For instance, diverse suppliers can provide unique products or alternative ingredients that help companies adapt to supply chain disruptions. The study advises food and beverage firms to integrate supplier diversity into their risk management frameworks to fortify their resilience against disruptions. By doing so, companies can not only reduce their vulnerability to risks but also enhance their ability to respond quickly and effectively to unforeseen challenges. This proactive approach to risk management can lead to a more stable and resilient supply chain, capable of maintaining consistent operations even during periods of disruption.

Clark (2019) explored the impact of supplier diversity certification on supply chain resilience, focusing on the retail industry. Employing a longitudinal study design using financial data and performance metrics from certified and non-certified retail companies, the research finds that

supplier diversity certification is associated with improved supply chain transparency, supplier performance, and risk mitigation. The study shows that retailers with certified diverse suppliers tend to have more robust and transparent supply chains, which are better equipped to handle disruptions. For instance, certified suppliers are often subject to rigorous standards and audits, ensuring higher levels of reliability and quality. The study recommends that retailers consider obtaining supplier diversity certifications to bolster their supply chain resilience capabilities. By doing so, retailers can benefit from the enhanced reliability and performance of their supply chains, as well as the positive brand image associated with supporting diverse suppliers. Moreover, supplier diversity certification can serve as a tool for continuous improvement and accountability, driving better performance and resilience over time.

Nguyen (2020) delved into the barriers and enablers of supplier diversity programs in achieving supply chain resilience, specifically within the aerospace sector. Utilizing qualitative case studies and interviews with industry stakeholders, the research identifies barriers such as lack of executive buy-in, limited supplier diversity metrics, and challenges in supplier development. On the other hand, enablers include leadership support, strong collaboration, and clear diversity goals. The study highlights how executive support and well-defined diversity objectives can significantly enhance the effectiveness of supplier diversity programs. For instance, leadership commitment to diversity initiatives can drive the necessary resources and strategic focus to overcome barriers. The study recommends that aerospace firms address these barriers and leverage enablers to enhance the effectiveness of their supplier diversity initiatives. By doing so, companies can improve their supply chain resilience through more inclusive and diverse supplier networks. This approach not only strengthens the supply chain but also promotes a more equitable and innovative business environment.

Garcia (2022) empirical investigation focuses on the impact of cultural diversity within supplier networks on supply chain resilience in global manufacturing companies. Employing a crosssectional analysis of survey data from multinational manufacturing firms, the study finds that cultural diversity among suppliers positively influences supply chain adaptability, innovation, and risk management capabilities. The research shows that culturally diverse suppliers bring different perspectives and problem-solving approaches, which enhance the overall agility and resilience of the supply chain. For instance, culturally diverse teams are more likely to generate innovative solutions to supply chain disruptions, improving overall resilience. The study advocates for multinational firms to embrace and leverage cultural diversity within their supplier networks to bolster their overall supply chain resilience. By fostering an inclusive environment that values diversity, companies can build more robust and adaptable supply chains. This not only enhances resilience but also drives innovation and competitive advantage in the global market.

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: While Brown (2019) provides significant insights into the impact of supplier diversity programs on supply chain resilience within the automotive sector, there is a lack of exploration into how these programs specifically foster innovation and problem-solving capabilities across different types of disruptions. The study focuses primarily on the diversification of supplier bases but does not delve deeply into the specific mechanisms through which diverse suppliers contribute to resilience through innovative solutions. Similarly, Smith (2020) emphasizes the benefits of supplier collaboration in the electronics manufacturing sector but does not extensively cover the unique challenges and strategies involved in managing diverse supplier partnerships in high-tech environments where rapid technological changes occur. Johnson (2021) highlights the effectiveness of supplier development programs in the pharmaceutical industry, yet there is a gap in understanding how these programs can be tailored to different types of suppliers (e.g., small vs. large, local vs. global) to maximize their impact on supply chain resilience.

Contextual Gaps: Martinez (2018) examines the relationship between supplier diversity and supply chain risk management in the food and beverage sector, but there is limited discussion on how these dynamics play out in other highly regulated industries, such as pharmaceuticals or aerospace. The study provides a foundation for understanding the role of diverse suppliers in managing food safety and demand fluctuations but does not explore how similar strategies can be adapted to other sectors with different regulatory environments and risk profiles. Clark (2019) investigates the impact of supplier diversity certification on supply chain resilience in retail but lacks a comprehensive analysis of how these certifications influence resilience in industries with more complex supply chains, such as aerospace or electronics manufacturing. Furthermore, Nguyen (2020) identifies barriers and enablers of supplier diversity programs in the aerospace sector, yet there is a need for a more detailed examination of how these factors vary across different types of aerospace companies (e.g., commercial vs. defense).

Geographical Gaps: Most of the studies, including Brown (2019), Smith (2020), and Johnson (2021), focus on industries within developed economies. There is a significant gap in understanding how supplier diversity programs and their impact on supply chain resilience are perceived and implemented in developing economies. Martinez (2018) and Clark (2019) provide insights relevant to the U.S. market, but there is a lack of comparative studies that examine how supplier diversity initiatives function in different geographical contexts, such as Asia, Africa, or South America. Additionally, Garcia (2022) highlights the role of cultural diversity in global manufacturing but does not address regional differences in the implementation and success of supplier diversity programs. This geographical gap indicates a need for research that explores the unique challenges and opportunities for supplier diversity programs in diverse economic and cultural settings, providing a more global perspective on their impact on supply chain resilience.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Supplier diversity programs play a pivotal role in enhancing supply chain resilience by promoting the inclusion of diverse suppliers, which leads to a more robust and flexible supply network. These programs not only reduce dependency on single sources but also bring in unique perspectives and

innovative solutions that enhance a company's ability to respond to disruptions. Empirical studies across various industries, including automotive, electronics, pharmaceuticals, and retail, consistently demonstrate that supplier diversity contributes to improved risk management, increased flexibility, and enhanced overall supply chain performance. However, there are still gaps in understanding the specific mechanisms through which supplier diversity impacts resilience, particularly in different geographical and industrial contexts. Addressing these gaps through further research will provide a more comprehensive understanding of how to effectively implement and leverage supplier diversity programs to build more resilient supply chains. Ultimately, embracing supplier diversity is not only a strategic move to mitigate risks and enhance supply chain agility but also a commitment to fostering innovation and sustainable business practices.

Recommendations

The following are the recommendations based on theory, practice and policy:

Theory

Expanding conceptual models to integrate supplier diversity as a key variable influencing supply chain resilience is essential for advancing theoretical understanding in this area. Future research should explore the diverse mechanisms through which supplier diversity impacts resilience, such as fostering innovation, enhancing risk mitigation, and improving supply chain agility. Additionally, conducting cross-sector comparative studies can help refine these theoretical frameworks and make them more universally applicable across different industries and geographical regions. Longitudinal research that tracks the long-term effects of supplier diversity initiatives will provide deeper insights into the sustained impacts and evolution of these programs. By addressing these theoretical gaps, scholars can develop more robust and comprehensive models that accurately capture the dynamic interplay between supplier diversity and supply chain resilience.

Practice

Companies should focus on developing robust metrics to measure the effectiveness of supplier diversity programs, ensuring these metrics go beyond diversity quotas to include performance indicators such as supply chain responsiveness, risk mitigation, and innovation outcomes. Investing in comprehensive supplier development programs is crucial for building the capabilities of diverse suppliers, which involves providing training, financial support, and collaborative opportunities. Enhancing supplier development ensures that diverse suppliers can meet the company's quality and performance standards, thereby strengthening the overall supply chain. Additionally, fostering collaborative relationships between companies and their diverse suppliers through regular communication, joint problem-solving initiatives, and integrated planning processes can significantly enhance supply chain adaptability and resilience. These practices will enable companies to create more robust and responsive supply networks capable of withstanding disruptions.

Policy

Governments and industry regulators should incentivize companies to adopt and expand supplier diversity programs through mechanisms such as tax benefits, grants, or recognition awards for demonstrating significant commitment and results. Establishing standardized certification processes for diverse suppliers is also important to ensure consistency and reliability across industries, helping companies identify and partner with certified diverse suppliers more effectively. Furthermore, promoting public-private partnerships can support supplier diversity initiatives by facilitating knowledge sharing, providing funding for supplier development, and promoting best practices across sectors. These policy measures will create an enabling environment for supplier diversity programs to thrive, driving broader adoption and leading to more resilient and inclusive supply chains. By implementing these recommendations, policymakers can play a pivotal role in fostering more equitable and innovative business ecosystems.

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