

Mitigating Supply Chain Disruptions in Enhancing South Companies Sustainability

Dhurka Sivalingam, Nazimah Hussin

Azman Hashim International Business School, Universiti Teknologi Malaysia, Kuala Lumpur, Malaysia

Email: dhurka@graduate.utm.my, nazimah.kl@utm.my

To Link this Article: <http://dx.doi.org/10.6007/IJARBS/v14-i11/23516> DOI:10.6007/IJARBS/v14-i11/23516

Published Date: 02 November 2024

Abstract

Supply chain disruptions significantly impact a company's operations and financial performance, leading to production delays, increased costs, and lost revenue. This research aims to explore how South Company, an electrical component manufacturer, handles supply chain interruptions to attain operational resilience and financial stability. This study employs a mixed-methods approach, integrating both qualitative and quantitative research procedures to address these issues. Quantitative data were obtained from secondary sources to determine the frequency and financial impact of supply chain disruptions. Semi-structured interviews with key personnel from company's purchasing, manufacturing, and IT departments provided qualitative data. Using NVivo software, the analysis utilized regression, correlation, and descriptive statistics. The main objectives were to measure workforce stability and evaluate the efficacy of current mitigation techniques. Findings show that inventory stockpiling and multiple sourcing greatly increased supply chain resilience, while prudent financial management lessened the impact of interruptions. Quantitative metrics analysis indicated significant improvements in workforce resilience and stability. This study emphasizes a proactive and varied approach to supply chain risk management and offers insights into effectively integrating resilience methods and financial performance measures to address modern supply chain challenges.

Keywords: Supply Chain Disruptions, Manufacturing Industry, Financial Impact, Mitigation Strategies, Resilience.

Introduction

The industrial sector relies heavily on robust supply chains to ensure the efficient movement of labor, finished goods, and raw materials. However, the sustainability and competitiveness of companies can be adversely affected by various risks, including supplier errors, natural disasters, and logistical issues, leading to significant financial losses. This study examines the challenges faced by electrical manufacturing, an electrical component manufacturer, in coping with severe supply chain disruptions. It investigates effective financial mitigation techniques aimed at enhancing resilience against these shocks, grounded in resilience theory

and supply chain risk management (SCRM). The literature identifies several sources of supply chain disruptions, such as legislative changes, labor shortages, political unrest, technology failures, and transportation problems, all of which disrupt the flow of raw materials and finished goods, affecting production operations and market supply (Ageron, Gunasekaran, & Spalanzani, 2020). Technological breakdowns and workforce shortages are particularly detrimental, significantly degrading supply chain performance and efficiency (Ali et al., 2017). Despite extensive research, there remains a notable gap in understanding the intersection of supply chain resilience and financial performance, particularly in the context of workforce disruptions and other dynamic market challenges. This study is structured around key research objectives: assessing the impact of workforce disruptions on employee performance and organizational resilience; identifying performance indicators for supply chain flexibility; measuring the effectiveness of contingency plans; and evaluating financial outcomes related to disruptions. This approach not only contributes to theoretical advancements in supply chain management but also offers actionable insights for firms like electrical manufacturing to improve their operational and financial resilience. By integrating resilience tactics with financial performance indicators, this study strategically differentiates from previous studies and proposes an integrated framework for addressing modern supply chain issues. In an increasingly complex and volatile business environment, organizations can reduce losses, enhance operational efficiency, and sustain long-term profitability by understanding the financial consequences of disruptions and implementing appropriate policies.

Literature Review

Sustainable supply management is crucial to overcoming supply chain disruptions and it was demonstrated by Ageron, Gunasekaran, and Spalanzani (2020), who stressed the significance of sustainability as a way of staying prepared for the long-term impending times. This is a standpoint echoed by Ali, Mahfouz, and Arisha (2017), further stress the need for a systematic approach to building supply chain resilience, which South Company could adopt to minimize disruptions and ensure continuous operations. One similar suggestion is that the South Company adopt a theoretical approach in this way of local supply chaining. Bag and Pretorius (2020), study how the digitization and circular manufacturing help ensure sustainability, the application of artificial intelligence, and the Internet of things (IoT) in the decision-making support process to predict changes and use production methods which are not harmful to the environment. This can be done with the techno-economic analysis programs. Scenarios can also be useful for the company as Klibi and Martel (2012), explain how they could integrate them to mitigate the risks and create a more definitive sustainable supply chain strategy. Last but not least, Tang and Musa (2011), put stress on the need of solving risk issues in the supply chain. They also have some advice on the options of how the company can put together things to make it more resilient and more sustainable. Thus, the company can use the findings to facilitate the development of a stronger, and environmentally friendly supply chain.

Materials and Methods

The research methodology integrates both qualitative and quantitative approaches to explore the financial impact of supply chain disruptions on electrical manufacturing and identify effective mitigation strategies. The quantitative data provided statistical evidence and a broad overview, while the qualitative data contributed context and rich insights to the findings. Combining these methods enabled a deeper understanding of the intricate supply chain interruptions and their financial effects on the manufacturing industry. Ethical criteria

were adhered to throughout the research procedure to safeguard the rights and welfare of participants.

Qualitative Method

Semi-structured interviews were conducted with key personnel from company's purchasing, production, and IT departments. The interview guide explored themes including supply chain structure, impact of disruptions, current mitigation practices, and the effectiveness of existing strategies. Interviews highlighted a strong and strategic global supply system. The obtained data was transcribed verbatim and examined thematically to identify recurring themes and patterns.

Quantitative Method

A secondary data design gathered quantitative data on the frequency, nature, and financial impact of supply chain disruptions. Direct observations of training sessions, participants' feedback surveys, and interviews with trainees were conducted. NVivo software was used to perform descriptive statistics, correlation analysis, and regression analysis to understand the relationships and impacts of various factors on the financial performance of companies facing supply chain disruptions.

Results and Discussion

The intervention aimed at bolstering resilience in electrical manufacturing's supply chain yielded insightful data reflecting the effectiveness of implemented strategies and areas for further improvement. The results presented utilize quantitative and qualitative metrics to demonstrate the progress electrical manufacturing has made in enhancing its supply chain resilience.

Detailed Analysis of Intervention Outcome

The intervention's effectiveness is further detailed in Table 1, which outlines the key findings and implications for each focus area. The integrated approach of combining human resources and technology played a crucial role in strengthening the operational model post-intervention. Future strategies for continuous improvement include adopting AI and blockchain technologies, highlighting a commitment to adaptability and innovation in the face of future market dynamics and challenges.

Effectiveness of Risk Mitigation Strategies

Table 1

Overview of the improvements and strategic directions taken

Focus Area	Key Findings	Implications
Enhanced Supply Chain Resilience	Dual-sourcing and inventory stockpiling	Improved readiness for disruptions
Financial Impact Mitigation	Financial review and resource allocation	Reduction in financial losses from disruptions
Risk Management and Mitigation	Risk categorization and prioritization	Development of a preparedness culture
Workforce Stability	HR initiatives and workforce engagement	Higher employee satisfaction and productivity
Future Strategies for Continuous Improvement	AI, blockchain, and skills enhancement	Preparedness for future market dynamics and challenges
Integration of Human Resources and Technology	Role of technology and HR in resilience	Strengthened operational model post-intervention

The risk mitigation strategies, including dual-sourcing and inventory stockpiling, significantly enhanced electrical manufacturing’s readiness to handle disruptions. Financial review and careful resource allocation reduced financial losses. Risk categorization and prioritization fostered a culture of preparedness, enabling the company to manage high-impact risks more effectively. HR initiatives and workforce engagement improved employee morale and stability, leading to higher productivity and satisfaction.

Assessment of Adaption Measurement

This section discusses the results derived from the quantitative analysis performed to evaluate the impact on electrical manufacturing’s Workforce Stability Index (WSI). The integration of the results from Section 3.1 demonstrates how the effectiveness of the risk mitigation strategies directly correlates with improved workforce stability, showcasing the interlinked nature of operational improvements and human resource stability.

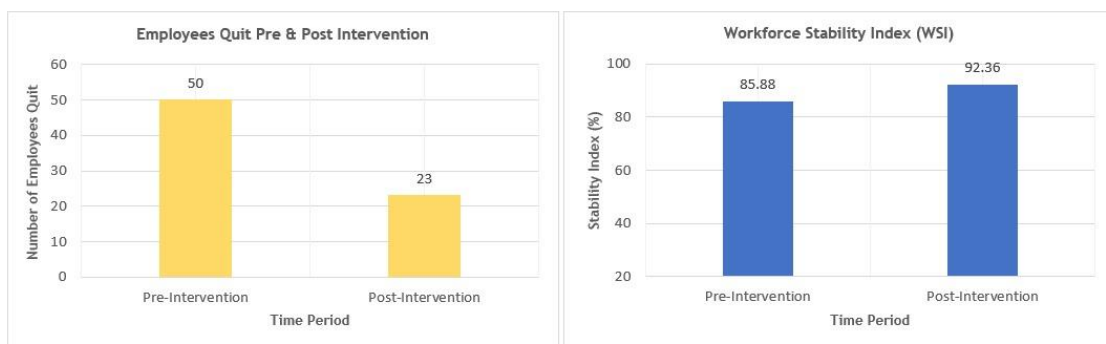


Figure 1. Workforce Stability Index (WSI)

The figure illustrates the changes in electrical manufacturing's metrics from pre-intervention to post-intervention. Each bar represents the score before and after the interventions, showcasing the effectiveness of the measures implemented in these different dimensions of the company's operations.

Limitations

Generally, the research was able to provide valuable information to the management about dealing with the risks, but was facing some obstacles that would prevent the general application of the findings in South Company. The relatively small size of the sample could be a constraint for the generalizability of the findings, in particular for the case when there more challenging and diversified supply chain related issues are on the doorstep. Along with this, the study's narrow focus on company's specific context may not be comprehensive enough to cover the diversity of challenges that South Company is faced with. The short duration of the study being the main cause, the research was not able to look at the long-term impacts that would be a critical issue for South Company in its efforts of the deployment of sustainable, long-term strategies for the mitigation of supply chain disruptions. The study's single point of view was a strength as well as a weakness. On the positive side, it was able to concentrate on data analysis of the successful interventions pre and post implementation, allowing for deep insights that would otherwise be clouded by the vast amount of information. The focus of the research primarily could be said to lessen the universality of the results, yet it was able to offer information on tactics for the safe and cohesive functioning of company. Empirically, the study underlined the risk reduction and increased resistance to changes following strategic interventions, thus, as a result of the adaptation of the measures, South Company too, learns to manufacture the necessary items and improve the work status.

Results and Discussion

The improvements implemented at electrical manufacturing have yielded encouraging results, including considerable gains in workforce stability and organizational resilience. The findings of this study emphasize the importance of a proactive and diversified approach to controlling supply chain disruptions. By strategically integrating resilience tactics with financial performance indicators, electrical manufacturing has improved its operational efficiency and sustained long-term profitability. This study adds important perspectives to the discussion of improving supply chain management and personnel optimization tactics in the industrial sector. Key findings include the effectiveness of dual-sourcing and inventory stockpiling in enhancing readiness for disruptions and the positive impact of financial review and resource allocation on reducing financial losses.

Acknowledgement

This work was partly supported by the grant "The Effectiveness of Capsim Business Simulation in Talent Development Program" [Cost Center No.: R.K130000.7655.4C613].

References

- Ageron, B., Gunasekaran, A., & Spalanzani, A. (2020). Sustainable supply management: An empirical study. *International Journal of Production Economics*, 140(1), 168-182.
- Ali, A., Mahfouz, A., & Arisha, A. (2017). Analyzing supply chain resilience: Integrating the constructs in a concept mapping framework via a systematic literature review. *Supply Chain Management: An International Journal*, 22(1), 16-39.
- Bag, S., & Pretorius, J. H. C. (2020). Relationships between industry 4.0, sustainable manufacturing, and circular economy: Proposal of a research framework. *International Journal of Organizational Analysis*, 28(1), 127-145.
- Bode, C., & Wagner, S. M. (2015). Structural drivers of upstream supply chain complexity and the frequency of supply chain disruptions. *Journal of Operations Management*, 36(1), 215-228.
- Ivanov, D., Dolgui, A., Sokolov, B., Ivanova, M., & Kalinina, O. (2017). Integrated risk management in supply chains: A dynamic modeling framework. *International Journal of Production Research*, 55(7), 2176-2192.
- Kamalahmadi, M., & Parast, M. M. (2016). A review of the literature on the principles of enterprise and supply chain resilience: Major findings and directions for future research. *International Journal of Production Economics*, 171(1), 116-133.
- Klibi, W., & Martel, A. (2012). Scenario-based supply chain network risk modeling. *European Journal of Operational Research*, 223(3), 644-658.
- Tang, C. S., & Musa, S. N. (2011). Identifying risk issues and research advancements in supply chain risk management. *International Journal of Production Economics*, 133(1), 25-34.