
Supply Chain Resilience During Economic Crisis: A Case of Construction SMEs in a Developing Country

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Abstract

The ability of supply chains to cope with unexpected disruptions and quick recovery while maintaining normal operations is referred as the supply chain resilience in supply chain management. Supply chain resilience refers to an organization's ability to effectively handle unpredictable situations or disruptions, both from within and outside the organization while efficiently using its existing resources. This study shows that SMEs in supply chain resilience are variables and that the ability to face disruptions is very low. The study aimed to determine how collaboration, entrepreneurial orientation, internal integration, outsourcing, and vulnerability affected supply chain resilience for the construction of Small and Medium scale Enterprises (SMEs) in a developing nation, during an economic crisis. The population in the study is all 195 Construction SMEs which is registered under National Enterprise Development Authority. This study is purely concentrated on using qualitative data. For the sampling technique authors used the purposive sampling method and data collection was conducted through eight structured interviews. The data has been analyzed using thematic analysis. Discussions were also carried out on other related strategies such as content analysis which means determining the inclusion of specific words, themes, and concepts in a given qualitative data set that can be combined with the above main variable to ensure a successful outcome; however, later they were diminished.

Keywords: Economic Crisis, Supply Chain resilience, Construction SMEs, Supply Chain Disruptions

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01. Introduction

The past literature on supply chain management (SCM) that was referred to build up the conceptual framework here prioritizes resolving disruptions that occur to unplanned and unexpected scenarios in the Supply Chain (SC) platform in the present globalized environment (Gligor et al., 2019; Al-Hakimi & Borade, 2020; Al-Hakimi et al., 2022). According to Hohenstein et al. (2015), the organization's operational and financial performance will steadily deteriorate if these disturbances are not managed. While researchers Al-Hakimi et al. (2022) elaborated various techniques to figure out how to mitigate the effects of these disruptions they also figure out how to increase resistance to SC disturbances. Moreover, authors Ivanov and Das (2020) assert that the global pandemic that has significantly disrupted SCs has made the core concept of supply chain resilience more apparent. To learn more about this, Bhatia, Lane, and Wain (2013) have examined the statement that the concept of supply chain resilience is a major focus of awareness among academics and scholars in the SC area. This is supported by a study that was conducted using initiatives from Accenture and the World Economic Forum. The analysis will determine that supply chain resilience practices are crucial for more than 80% of business performances.

As a result, Covid 19 and the global economic crisis have had an impact on the number of small and medium-sized businesses that contribute to the global economic downturn. So, Samsudeen, Thelijagoda, and Sanjeetha (2021) noted that SMEs in Sri Lanka will be seen as important contributors to economic growth (EG). Since SMEs currently face serious consequences, as Manathunge et al. (2021) emphasize, they are very important for the success of the economy due to significant effects that cause SC processes to be disrupted by the Covid 19 pandemic. According to Shafi, Liu, and Ren (2020), the majority of SMEs in the nation are vulnerable to interruptions due to resource limits that these organizations acquire as a result of the epidemic and the current economic crisis.

Regarding the construction sector of Sri Lanka following its independence, the local government invested highly in its construction sector to support the country's economic development. With that during the 80s and 90s period, the construction sector went through a significant transformation as the private sector experienced drastic growth leading to an increase in the overall competition of the industry. Furthermore, following the end of the civil war, a surge of investments led to an unprecedented boom in the construction industry, which played a crucial role in driving the country's GDP growth. However, in recent decades, the industry has experienced various disruptions, with its growth being impacted by numerous factors. While labor shortages and scarcity of certain construction materials were major issues in the past, the current economic crisis introduced a whole new set of problems that require government involvement to see an end.

However, in 2021, the construction value-added in the country increased by 1.9%, recovering from a contraction in 2020, although raw material shortages hindered full recovery. Building material imports increased, and the credit granted by banks for construction activities grew, but the third wave of the pandemic and disruptions to SCs affected construction activities adversely. Supply-side disturbances, particularly the short supply of key raw materials such as cement, steel, and tiles, hindered the industry's full potential. Mining and quarrying activities grew by 2.8% in 2021, benefiting from the recovery which is compared to the contraction in 2020's construction activities. Sri Lanka's construction sector has been responsible for many

engineering marvels since ancient times. At present, Sri Lanka can produce some thoroughly astonishing creations around the island. After the civil war, the industry experienced significant growth, with high-end residential housing, commercial and office space, and infrastructure projects being developed. Sri Lanka's construction industry grew by over 20% in 2014, twice as fast as the country's GDP growth of just over 7% annually. The industry accounted for 9.6% of the country's GDP in 2014, a larger proportion than the most other Asian countries.

1.1. Research Problem

This research study aims to investigate the problem of “What are the factors affecting supply chain resilience during economic crisis related to construction SMEs in a developing country?” that occurred in 2022 with the use of qualitative data. The problem statement highlights the insufficient amount of research regarding the variables with the use of qualitative data. This research could be essential because the economic crisis experienced in Sri Lanka has had a far-reaching impact on multiple sectors of the economy. Furthermore, the impact of the post-pandemic economic crisis Sri Lanka experienced was higher than the rest of the world. A combination of inflation, foreign reserve shortages, economic mismanagement, and political instability are some of the factors which led the island to its bankruptcy. Moreover, scholars: Sugathadasa, Perera, and Liyanage (2020) implied that the study regarding supply chain resilience in the Sri Lankan context has received limited attention and the research would contribute to the existing literature as well. Authors have identified that there is limited research that has focused on the impact of supply chain resilience on construction SMEs during the economic crisis as well.

02. Literature Review

2.1. Supply Chain Resilience and SMEs

SMEs perform a significant impact on the Sri Lankan economy and are identified as a key source of employment and economic growth. SMEs have a substantial impact on the nation's GDP and employ a large percentage of the country's workforce (Samarasinghe et al., 2021). In addition, SMEs often operate in local communities and can help stimulating economic activities in these areas. The Covid-19 pandemic has further complicated the difficulties encountered by small and medium-sized enterprises (SMEs), particularly in emerging nations.

Moreover, it is impossible to overestimate the significance of SMEs in the modern economy. SMEs have been crucial in promoting economic development and growth, encouraging innovation, and generating job opportunities. Globally, economists are aware of the vital role which SMEs play in economic development and the necessity of fostering and supporting their expansion in financial reporting procedures and performance of small and medium-sized businesses (SMEs) in Sri Lanka's Jaffna district. These businesses provide new doors for economic growth, help new businesses get off the ground, and generate employment possibilities.

SMEs also play a key role in the country's export sector, with many SMEs producing products to export for foreign nations. This helps to diversify the Sri Lankan economy and generate foreign exchange. In Sri Lankan context, SMEs are considered a critical contributor to the

economic development of the country. Hence, findings interrelated with supply chain resilience among SMEs remain preferably limited (Mishra & Singh, 2022). This study suggests that a broader concept such as supply chain resilience limits the exploration of many untouched areas that can negatively or positively affect SMEs. They imply that future studies which can concentrate on monitoring, preventing, and controlling SC disruptions are developing strategies to improve SMEs according to the authors' study.

2.2. Supply Chain Resilience and Collaboration

Collaboration is defined as a way of working together in which parties work together to share resources and accomplish shared objectives. Collaboration in SC fosters a real-time information exchange, enhances cooperative planning, and enables parties to create synergies (Scholten and Schilder, 2015). Collaboration in supply chain management refers to groups of enterprises working together to enhance their performance as a whole and accomplish common goals. The literature indicates that cooperation can occur in a variety of ways, including information exchange, group planning, and coordinated decision-making. Further, collaboration may aid businesses in increasing productivity, cutting expenses, and raising the caliber of their output.

Supply chain resilience refers to an organization's ability to recover quickly from disruptions or changes that may occur within its supply chain network. Collaboration in supply chains involves the exchange of information and resources between organizations to improve the efficiency and effectiveness of the overall supply chain. A resilient supply chain can withstand unexpected events such as natural disasters, economic shocks, or geopolitical risks, and still continue to deliver products and services to customers on time and with high quality. According to a study by Christopher and Peck (2004), supply chain resilience involves four key dimensions: robustness, redundancy, flexibility, and agility.

Additionally, collaboration can assist businesses in building the flexibility and redundancy that are essential to a resilient supply chain. Flexibility refers to the supply chain's capacity to quickly adjust for changing conditions, whereas redundancy refers to the supply chain's ability to duplicate important components, processes, or resources in order to minimize the impact of interruptions.

2.3 Supply Chain Resilience and Entrepreneurial Orientation

Entrepreneurial orientation (EO) has been identified as having a positive impact on the supply chain of an organization in various research articles. According to Al-Hakimi, Borade, and Saleh (2022), the impact of entrepreneurial orientation on business performance is considered a highly significant factor and EO is defined as a strategic orientation that identifies new opportunities and offers distinct products that differentiate from competitors, which helps the business become more resilient in the face of environmental uncertainty and unexpected disruptions. A study by Delfmann, Albers, and Gehring (2010) found that EO positively impacts the overall supply chain performance of a firm.

2.4 Supply chain resilience and Internal Integration

According to Steven and Hotlan (2022), Internal integration enables real-time data and knowledge exchange between all functional areas, including marketing, purchasing, production, warehousing, finance, research and development, and information technology, as well as synchronization of logistics activities. According to numerous studies, the firm can perform better and gain a competitive advantage by integrating various business operations (Ganbold et al., 2020; Steven & Hotlan, 2022). Additionally, it is realized that all departments and various functional divisions within the organization must collaborate to work as a single unit to fulfill client requests (Tarigan, Siagian, & Jade 2020).

According to Gruzauskas and Vilkas (2017), the planned internal integration in data collection, information processing, and use may be related to supply chain resilience. Information exchange is essential for firms to improve supply chain resilience (Tarigan, Siagian, & Jie, 2021). Hosseini, Ivanov, and Dolgui (2019) discuss the internal integration of employee information sharing as a way for enhancing management that increases supply chain resilience. As a management support strategy, internal integration of information exchange among staff members can enhance supply chain resilience. Thus, decision-making was assisted by internal integration thanks to cohesive processes and systems.

2.5. Supply Chain Resilience and Outsourcing

Because outsourcing is a frequently used business tool by SMEs in today's volatile and competitive market, understanding the concept is crucial. This outsourcing concept makes it easier for enterprises to create effective SCs (Manathunge et al., 2022). Yaseen et al. (2020) looked into how outsourcing affects the supply chain resilience in the automobile industry in one study. This study found that supply chains may become more convoluted and obscured as a result of outsourcing, making it more difficult for companies to respond to disturbances. The study also shows that outsourcing may increase supply chain flexibility, aiding businesses in their capacity to react to unforeseen circumstances.

The benefits that SMEs experience are crucial for authors to understand when trying to understand the outsourcing notion. According to Smogavec and Peljhan (2017), there are a few benefits, including increased efficiency and flexibility when performing operations, a decrease in cost due to outsourcing partners' performance being superior to that of SMEs, a reduction in the number of staff needed to perform operations, and a reduction in the need for financial investments in the company's assets. When SMEs employ this outsourcing strategy, it indicates that they heavily rely on their suppliers or outsourced partners.

2.6. Supply Chain Resilience and Vulnerability

There have been numerous studies linking supply chain vulnerability with supply chain resilience. Hence, many scholars argue that developing supply chain resilience is essential to mitigating the negative effects of supply chain vulnerabilities. These studies have explored various aspects of supply chain vulnerability, such as the causes, consequences, and management strategies for addressing supply chain vulnerabilities. They have also examined the relationship between supply chain vulnerability and supply chain resilience, highlighting the importance of developing resilient supply chains that can withstand unexpected

disruptions. Some examples of such studies include Pettit, T. J., Fiksel, J., & Croxton, K. L. (2019).

A supply chain's susceptibility to potential disruptions that can impair its capacity to satisfy client requests is known as its vulnerability. Natural disasters, man-made disasters, geopolitical crises, cyberattacks, and supplier insolvency are just a few examples of disruptions. Inadequate risk management, a poorly designed supply chain, a lack of visibility, and a lack of redundancy can all lead to vulnerability (Manuj & Mentzer, 2008) as well.

03. Methodology

This research investigates factors affecting the supply chain resilience of construction SMEs during the economic crisis in a developing country. However, the amount of exact construction SMEs operating within the country is unknown but the data obtained from National Enterprise Development Authority (NEDA) is the nearest to the exact value. As a result, the authors have continued the study based on NEDA data. Furthermore, the study focuses on qualitative data. So, the study's methodology is abductive since it aims to establish a new theory and reasoning in which specific predictions are generated from the theory while testing an existing theory by using hypotheses. Also, this research study employs a mono-method qualitative methodological choice.

Moreover, researchers have already conducted structured based interviews with the respondents while using the purposive sampling method. The interview guide was prepared through the information from the reference to past literature. According to that, authors have conducted eight interviews with top-level management employees from the SME construction sector firms which are registered under the NEDA. The authors expected to complete twelve interviews for the time period. But after conducting eight interviews, the authors were able to identify that most of the firms are trying their level best to become more resilient in the period of economic crisis. The authors were able to determine the interview saturation point as a result of performing the eight interviews. Eight interviews were taken into account which included both physical and Zoom platform interviews. The interviews took longer than 35 minutes to complete. The primary reason why the authors used the Zoom platform is that the majority of respondents had busy schedules and were unable to provide a precise time during business hours.

Manual thematic analysis has been used to analyze the data. To accomplish the objective of the study, the authors of the study reportedly conducted a thematic analysis to support the conceptual framework that was developed from the initial literature. The second purpose of the study is to discover the elements influencing supply chain resilience during economic crisis connected to construction of SMEs in a Developing Country. This method of discovering thematic analysis is widely used since it enables researchers to look into a broad range of issues and subjects that are connected to the study. Researchers Braun and Clarke (2006) mentioned in their analysis that while employing qualitative analysis, authors should first identify topics pertinent to the study while also creating codes. Themes are recognized as things that summarize what is significant in light of the data and are connected to the degree of pattern in the questions posed to respondents while generating responses in line with the data set.

04. Results and Discussions

By interviewing eight SME construction firms, the authors were able to derive twelve codes for the study.

These themes were extracted from existing literature that were carried out with similar variables as included in this study. For each variable, the authors were able to build up corresponding codes according to the themes developed by Madhavika et al. (2022). Then each variable was further studied in depth with the support of different existing literature as follows - Goail and Al-Hakimi, (2021) for Entrepreneurial Orientation, Tarigan, Siagian, and Jie, (2021) for Internal Intergration, Manathunge et al. (2021) for outsourcing, and Wedawatta, Ingirige, Jones, & Proverbs (2011) for vulnerability.

Codes	Respondents							
	R1	R2	R3	R4	R5	R6	R7	R8
Code 1: SCR Implementation	✓	✓	✓	✓	✓	✓	✓	✓
Code 2: Recovering from Disruptions	✓		✓	✓	✓		✓	✓
Code 3: Information Sharing	✓	✓	✓	✓	✓	✓	✓	✓
Code 4: Expert's Direction and Consultation	✓		✓		✓	✓	✓	✓
Code 5: New Market Opportunities	✓		✓	✓	✓		✓	✓
Code 6: Risk-Taking Ability	✓	✓		✓	✓		✓	✓
Code 7: Customer Feedback		✓	✓	✓	✓		✓	
Code 8: Interconnection Between Departments	✓	✓	✓	✓	✓	✓	✓	✓
Code 9: Supply Chain Performance	✓	✓		✓	✓		✓	✓
Code 10: External Parties' Involvement	✓	✓		✓	✓	✓	✓	
Code 11: Sensitive Organizational Functions	✓		✓		✓	✓	✓	
Code 12: System Changes	✓	✓	✓	✓	✓		✓	✓

After reviewing the codes, the researchers were able to derive the themes that are related to the study as follows.

4.1. Adaptability of Supply Chain Resilience

After conducting the interviews, the authors have identified that in the construction sector, SMEs are trying to utilize this resilience concept for their organizations. In the early days, these firms didn't adapt to this resilience concept because in those days there is less a number of unexpected situations or disruptions that occurred. Meantime, the challenges that businesses

are faced are less in number also. But with the recent covid 19 pandemic and current economic crises in the country, most of the firms are looking to be more resilient in their field because day-by-day these firms are facing many disruptions and challenges. According to information obtained from two respondents, they have reacted similarly to the above statement. “Actually, you know the word resilience, and now it comes into play because it's a scientific word that refers to rebounding. In this economic crisis, everyone is aware of the positive side of resilience. The crisis affects not only the economy but also the social aspect, as we have seen in Sri Lanka.” So, these organizations have used several measures to use this supply chain resilience concept for their organizations to become safer in their continuous operations. “We cannot find relevant suppliers in Sri Lanka so at the moment with this crisis, we were always connected to the overseas suppliers. However, earlier we were dealing with limited selected suppliers. So that we have to know sort of big selection of suppliers right now. So, that's one of the major changes or major moves that we did during this period. By doing that we were able to know how to minimize I mean, minimize the delays towards the customers and become more resilient of supplying raw materials for our construction industry” according to another respondent.

Themes and codes derived from the Thematic Analysis					
Theme 1 – Adaptability of Supply Chain	Theme 2 – Supply Chain Collaboration	Theme 3 – Introducing Innovations	Theme 4 – Organizational Functions	Theme 5 – Involvement of Sub Contractors	Theme 6 – Potential Organizational Flaws
Codes	Codes	Codes	Codes	Codes	Codes
SCR Implementation	Information Sharing	New Market Opportunities	Customer Feedback	Supply Chain Performance	Sensitive Organizational Functions
Recovering from Disruptions	Expert's Direction and Consultation	Risk Taking Ability	Interconnection Between Departments	External Parties' Involvement	System Changes

4.2. Supply Chain Collaboration

When it comes to Collaboration, the authors have identified that most of the respondents are given more attention to this because Collaboration facilitates and is a critical role within the supply chain of the organization. Moreover, Collaboration will help to work successfully together in the organization to execute the plans successfully and to achieve common goals also. According to the responses of SMEs' construction sector top management, they have mentioned that information shared during this economic crisis is an essential factor that we all should consider. Without proper information sharing throughout the organization, it is difficult to maintain proper coordination among the related parties. The majority of the respondents who have come up with this indicates it through the statements: “Information sharing is one of the most important aspects of a business because without sharing the

information among the other parties, it is difficult to maintain proper communication between other parties” and “for this information sharing, actually we have openly discussed with the staff, we have taken actions so in that case, actually what we have done was we collaborated with the staff and workers by understanding the situation” according to one & in four respondent answers.

Most of the respondents have conducted management meetings, zoom meetings with the intention of how to become more resilient in this type of crisis by minimizing the unwanted and unnecessary expenses for the organization. For example, “a main point in the crisis was that we had to minimize our costs, right? The admin cost and operational cost are all there, right. So, we had a lot of meetings with our management team, and we discussed how to reduce operational costs”. According to information obtained from another respondent, “the getting meetings and to share information we had a lot of meetings like Zoom meetings, the group chats, right. So, sharing the information helps to reduce our main cost. So that's the way we reduce the operational cost, right.”

When it comes to the experts’ opinions and consultation researchers, they have understood that most of these construction firms can get the influence of the organizational and industry experts to become more resilient and overcome this crisis period without any huge loss or damage to their organization. “The consultants and engineers’ parties or the client parties are very mature and they are well-experienced in situations like this. It is the first time Sri Lankans facing a situation like this. That is actually what we have discussed with the experienced people and they have given some advice” according to one respondent. It also identified that rarely some firms haven’t got these expert opinions and consultation for their organization because the number of the firms that have been affected throughout this crisis period is high.

4.3. Involvement of Sub-contractors

The majority of the chosen SMEs in the construction sector are using outsourcing as a key component of their operations. Researchers have found that as a result of the economic crisis, many firms are prioritizing the outsourcing of their activities, while only a small number of organizations fail to use the outsourcing concept for their organizations. With outsourcing, businesses can reduce the number of employees they have, which lowers costs for the business. They can also maintain proper supply chain performance, increase productivity, be more flexible when performing tasks, and avoid spending more money on internal resources because operations are carried out by the third parties. The majority of respondents have concluded this as evidenced by their answers to such questions as: “Outsourcing is also one of the important aspects of our business, we consider price in the financial pathway. We measure it in terms of that, you know project-wise and quarterly, annually we measure all these financial things”.

It has been determined from the comments of just two respondents that some companies also reduce the use of outsourcing. The main cause, which was determined, is that during the crisis, people are unwilling to outsource their activities due to a shortage of funds and reserves. Instead, they prefer to run their businesses internally and anticipate a decrease in the amount of money that leaves the organization for the third parties. Because of this, firms participate in internal operations rather than outsourcing as a resilient technique. And few respondents have illustrated this in the following manner: “So, as a cardinal rule in the economic crisis, we never

went with outsourcing. Wherever possible, we always try to do it in-house. The main reason for this was that even our fleet and staff were redundant, so there was no point in outsourcing business when we were paying them more”.

4.4. Introducing Innovations

With the introduction of innovations for their organizations, the majority of SMEs in the construction industry were able to increase their resilience throughout this era of economic crisis. The introduction of innovation, new market opportunities, and the ability to take risks have all been noted by the authors as being crucial for the organization to become more resilient in the face of the current economic crisis. When considering the new market opportunities for the organization, respondents have detailed those concepts via means of phrases such as: “Our management formulated an Innovation Committee, which consists of young engineers and general managers, to come up with new innovation not only in production but also in processes. In this economic crisis, training and education are crucial, as human capital is essential for the survival of any country. We encourage innovation within our organization, and it is a continuous process. Innovations should be less costly and viable. Management must give directions to encourage innovation, whether it is a government body or private enterprise. We have encouraged officers and workers to come up with new innovative solutions, especially during this crisis period, and come up with new market opportunities”.

Furthermore, the majority of the companies are willing to take risks, even though the SMEs in the construction industry believed that it would be difficult for any form of organization to exist in the market without taking risks. This was another finding made by the authors throughout the interview process. The top management of the relevant organizations at the SC level commented on this based on the statements listed below. Two respondents have also shared the same opinion by stating “I think to perform continuously, we have to take the risk. Without having a risk, we can’t go ahead” & “Yeah actually, when doing business you have to take risks other than I mean you can do business without taking risk. So, it's a part and crucial of our company as well. So, you know by taking risks we have some what we think by taking risks we can maximize our gain also maybe profit also and vice versa. So, but we always try to take risks and by taking risks, we try to maximize our gains as well”.

05. Conclusion

This paper aimed to investigate the influence of collaboration, entrepreneurial orientation, internal integration, outsourcing, and vulnerability on the supply chain resilience of construction sector SMEs in Sri Lanka during the 2022 economic crisis. According to previous findings, authors identified these five components that are able to affect supply chain resilience. The study indicated power dynamics could potentially prevent the partnership mindset from being successfully adopted during an economic crisis. In this regard, it is asserted that the SCE will give this endeavor little weight unless tangible benefits can be realized. Furthermore, the partnering procedure has the potential to combine the experience and expertise of all parties involved in the contract, which could increase the construction industry's long-term sustainability. As a result of this research, it has been determined that cooperation, trust, and profit sharing are essential components of the productive working relationships needed to ensure the industry's survival during a time like this. Therefore, it can also be argued that increased efforts must be made to ensure that all contracting parties

subscribe to and uphold the true nature of the partnering philosophy given the SCE's overall significance to the construction industry.

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