

Linking Supply Chain Performance, Supply Chain Resilience, and Organizational Recovery Capability: A Proposed Conceptual Model

Kok Beng Loh

Graduate School of Business, Universiti Sains Malaysia, Penang, Malaysia
Corresponding Author Email: kb-loh@hotmail.com

Cheng Ling Tan

Graduate School of Business, Universiti Sains Malaysia, Penang, Malaysia, Department of
Information Technology & Management, Daffodil International University, Dhaka,
Bangladesh

To Link this Article: <http://dx.doi.org/10.6007/IJARBS/v14-i11/23535> DOI:10.6007/IJARBS/v14-i11/23535

Published Date: 05 November 2024

Abstract

Purpose: This research attempts to propose a conceptual model of whether supply chain resilience and organizational recovery capability constitute direct antecedents to supply chain performance. The study is based on the dynamic capability theory. **Design/methodology/approach:** The literature-based review is drawn up to link supply chain performance, supply chain resilience and organizational recovery capability to create a conceptual framework. **Findings:** This conceptual paper suggests that supply chain resilience has a positive direct and indirect impact on supply chain performance. It proposes that as the level of supply chain resilience increases, so does the level of organizational recovery capability, leading to improved supply chain performance. Additionally, the paper suggests that organizational recovery capability plays a mediating role in the relationship between supply chain resilience and supply chain performance. **Research limitations/implications:** The research on the organizational recovery capability and determining variables towards the supply chain performance of small and medium-sized manufacturing enterprises is still limited despite ample evidence demonstrating the performance of these businesses. **Practical implications:** This concept can provide practitioners with insights into the advantages of organizational recovery capability and supply chain resilience for supply chain performance, and it may serve as a basis for further empirical research. **Originality/value:** The study underlines that organizational strategies should be designed with organizational recovery capability as supply chain resilience alone is inadequate for organizations to attain competitive advantage.

Keywords: Resilience, Organizational Recovery Capability, Supply Chain Performance

Introduction

In recent years, various unpredicted events, such as natural disasters and other crises, have had a negative impact on businesses, putting risk for many enterprises in volatile markets. Additionally, issues with supply and demand have made global supply chain networks to more susceptible to disruptions. The post-Covid-19 pandemic, which notably impacted the global economy and caused a recession, the US-China trade war, the confrontation between Russia and Ukraine, and the continuous tension between Palestine and Israel are among them (Duong, Vo, Carvalho, Sampaio, & Truong, 2022). As a result, the supply chain performance is greatly impacted, leading to a significant number of businesses being forced to close, while others are still in the process of recovering. Zsidisin, Petkova, and Dam (2016), indicate that supply chain errors can result in a reduction of shareholder wealth as a consequence of the disruptions they cause. Although supply chain performance in the existing literature prior to the Covid-19 pandemic was measured using a wide range of performance indicators, such as cost, customer response, and activity time (Sezen, 2008), Juan, Li, and Hung (2022), operationalize supply chain under disruption during the pandemic with return on assets; return on investment; sales growth; market share; production and inventory costs.

Previous research indicates that an organization's ability to recover determines how quickly its performance regains resilience (Lotfi & Saghiri, 2018). According to Riley, Klein, Miller, and Sridharan (2016), organizations that can enhance their recovery capability will notably improve their performance, especially in terms of their supply chain. Resilience in the supply chain is described as the capacity to quickly resume operations to the pre-disruptive condition or an improved state in the supply chain performance research (Piprani, Mohezar, & Jaafar, 2020). Examples of output measures in supply chain performance include sales volume, profit, and customer satisfaction (measured by timely deliveries, fill order rates, and speed of responses) (Sezen, 2008). Others have changed Beamon (1999)'s performance metrics by grouping supply chain performance under several headings, like customer service and customer efficiency (Um, Lyons, Lam, Cheng, & Dominguez-Pery, 2017).

Organizational recovery capability was not used as a mediator in any prior empirical study that studied supply chain performance and resilience according to a search across many databases, including Emerald, ScienceDirect/Elsevier, Springer, Taylor & Francis, Sage and Wiley. Studies examining resilience's potential benefits for cost savings, quality enhancement, prompt delivery of goods, adaptability, and recovery speed could not be located. As a result, the focal point of the inquiry revolves around the interplay between supply chain resilience and organizational recovery capability and their combined impact on supply chain performance.

According to Juan, Li, and Hung (2022), supply chain resilience is characterized as a dynamic capability made up of proactive and reactive capabilities. Establishing a robust and resilient supply chain network is essential for companies to recover swiftly and maintain uninterrupted operations, thereby minimizing their susceptibility to disruptions (Pettit, Croxton, & Fiksel, 2013; Sheffi, 2005). Drawing from the previously mentioned points, this conceptual paper seeks to bridge a knowledge gap by developing a comprehensive framework that explains the role of supply chain resilience in expediting organizational recovery capability. Furthermore, it aims to explore how organizational recovery capability can subsequently enhance supply chain performance.

Literature Review*Supply Chain Performance*

Organizations and supply chains can suffer losses reaching hundreds of millions of dollars due to delayed responses to disasters (Pettit, Croxton, and Fiksel, 2013). For example, an inadequate reaction to a fire in the Ericsson supplier facility led to \$400 million in damages (Norrman & Jansson, 2004). On the other hand, Nokia was able to gain a competitive advantage during the same period by promptly addressing a factory fire involving the same supplier. Nokia achieved this by finding ways to navigate through the disruption caused by a shortage of Integrated Circuit (IC) components (Sheffi & Rice, 2005). The ability of organizations to swiftly respond to external influences and reallocate resources in order to overcome shortcomings is crucial. The firm and its supply chains possess unique capabilities for recovering from disruptions. Business networks and ecological systems are examples of systems that can rapidly rebound from calamities (Chowdhury & Quaddus, 2016).

According to Ponomarov and Holcomb (2009), to reduce the probability of disruptive events, manufacturing activities and supply chains should be as prepared as possible before a disruption occurs. The ability to adjust and bounce back is also necessary for manufacturing processes and supply chains to lessen the impact of disruptions and recover from them (Christopher & Peck, 2004; Ponomarov & Holcomb, 2009). Poor response and restoration capabilities put manufacturing operations and supply chains at risk if the required level of preparedness is not raised, which has a negative impact on the costs and revenues of the supply chain as a whole (Ponomarov & Holcomb, 2009).

Supply Chain Management Performance

One of the primary issues facing academics who study supply chain literature is evaluating the system's effectiveness (Beamon, 1999). The supply chain involves multiple parties, including manufacturers, distributors, suppliers, and customers, which makes evaluating its performance difficult. To address this, the company has developed various performance measurements, or supply chain management performance metrics, to assess if a supply chain can help an organization achieve both short- and long-term goals. The literature review identified three primary supply chain management performance indicators: supply chain delivery flexibility, client service speed, and inventory price (Deshpande, 2012).

When applied correctly, supply chain management improves an organization's performance. Increasing income, cutting down on product defects, and reducing costs are some of the key advantages of supply chain management (Shin, Collier, & Wilson, 2000). It has been demonstrated that market and company shares are directly related to business profitability. Client satisfaction in relation to supply chain management's short- and long-term goals, as well as performance on the financial and market fronts, were the defined measures for gauging the success of the business. Market share, return on total assets, and annual sales growth are used to gauge the state of the markets and supply chain management finances (Tan, Kannan, Handfield, & Ghosh, 1999). Measures of the client satisfaction factor include the total cost of the product to the customer, compliance with quality standards set by the client, understanding of the client's needs, keeping repeat business, and matching organizational objectives with the client's needs (Fečiková, 2004). Businesses attaining competitive advantages have made supply chain performance increasingly important (Simchi-Levi, Kaminsky, & Simchi-Levi, 2000).

Measurements of Supply Chain Performance

A meta-analysis of prior supply chain performance research revealed that a wide range of performance indicators, including cost, customer response, and activity time, were employed in earlier supply chain modelling studies (Sezen, 2008). Most prior research has utilized cost as a basic supply chain performance parameter since it was easier to include in quantitative models. The most commonly utilized metrics in supply chain literature are expenses or a combination of expenses and costless performance indicators (e.g., customer responsiveness and flexibility). Lead time, quality level, fill rate, chance of stock outs, ability of the company to alter production, and ability to introduce new products are examples of non-cost performance indicators. Inventory and operating expenses are examples of cost metrics (Piprani, Mohezar, & Jaafar, 2020).

Beamon (1999), claimed that the strategic goals of an organization can conflict with the implementation of such simple, narrowly focused performance measurements. It is imperative that the supply chain performance monitoring process and mechanism consider any significant trade-offs between various goals. This claim is supported by the framework Beamon (1999), developed for selecting supply chain management performance metrics. This framework recognized the three areas of performance measurements, which are flexibility, resource, and output, as critical components of a strategy for assessing supply chain performance. The effectiveness of the supply chain was subsequently assessed by other scholars using these (Sezen, 2008). Resource measures are used to attain cost-effective aims, such as lowering manufacturing, warehouse, and logistics expenses. An output measure is the fulfilment of customer service goals, such as response times, item quality, delivery timeliness, client complaints, and client contentment. Product quantity, mix, and capacity adjustments are all related to flexibility measures and can be made to better meet the needs of the consumer. Others have altered Beamon's (1999), performance indicators by grouping them into categories such as customer service and customer efficiency (Um, Lyons, Lam, Cheng, & Dominguez-Pery, 2017).

Flexibility is the ability to adjust. It is important to think about how supply networks can adjust to changes in volume, mix, delivery schedules, and items. As a result, volume, mix, dispatch, and new item creation are among the criteria of flexibility. The main focus of resource metrics is the efficiency with which a supply chain system employs its resources. Return on investments, inventory levels in the supply chain, and costs related to using different resources are some metrics used to assess resources. Examples of output measures include sales volume, profit, and customer satisfaction (gauged by prompt deliveries, order fill rates, and response times) (Sezen, 2008).

By incorporating the non-costs performance, the effects of supply chain resilience on daily production and supply chain operations may be better understood (Huo, 2012; Qi, Huo, Wang, & Yeung, 2017). Supply chain resilience is proposed to be an antecedent of supply chain performance which is discussed further in the hypothesis development section. These performance indicators were represented by managerial views instead of accounting measurements due to the limits of the available financial data. Furthermore, the fact that these indicators are more historically oriented limits the ability to forecast future outcomes (Ittner & Larcker, 1998).

Three performance criteria are used in this study to gauge supply chain performance. The customer service performance (output) and cost efficiency performance (resource) metrics are taken from Um, Lyons, Lam, Cheng, and Dominguez-Pery (2017). The flexibility performance is based on Yu, Jacobs, Salisbury, and Enns (2013), Chavez, Gimenez, Fynes, Wiengarten, and Yu (2013), and Hallgren and Olhager (2009).

Supply Chain Resilience

According to studies by Abeysekara, Wang, and Kuruppuarachchi (2019), and Yu, Jacobs, Chavez, and Yang (2019), organizational changes can have detrimental effects on finances and operations. Some businesses fail and disappear from the market because they are unable to bounce back from such disruptive events. Thus, disruptions in the supply chain put companies, particularly small and medium-sized enterprises, in danger and negatively affect their operations (Blackhurst, Dunn, & Craighead, 2011). Organizations need to develop resilient abilities in order to handle shocks and the complexity and volatility they bring, according to Brandon-Jones, Squire, Autry, and Petersen (2014). Therefore, an organization's resilience determines its ability to deliver value to clients even in the face of disruptions. According to the resource-based view approach, organizations that invest in resources and develop skills (such as resilience) enhance their positioning advantage while also overcoming the liabilities of uncertainties and vulnerabilities. This guarantees that consumers obtain timely, flexible, and reliable goods and services in the case of an interruption. According to Asamoah, Agyei-Owusu, and Ashun (2020), resilience is a quality that strengthens supply chains by enabling them to recover from setbacks and successfully change course when there are disruptions, guaranteeing the continuous creation of value for clients.

Supply chain resilience was created using a unified dynamic capability view structure to explain the strategies used by a company to achieve its performance and also competitive advantage by having the varieties of companies' resources, both physical and virtual (societal, technical, physical, economical, organizational, and reputational) (Teece & Pisano, 1994). According to Wernerfelt (1984), this framework formed the basis of the resource-based view. This is due to the fact that dynamic capabilities, which are made up of a variety of coordinated, integrated activities as well as tactical procedures, enable businesses to modify their approaches in order to sustain their competitive advantage, capitalize on new resource configurations, and adjust to a constantly changing environment (Teece, Pisano, & Shuen, 1997; Eisenhardt & Martin, 2000; Teece, 2007). Abeysekara, Wang, and Kuruppuarachchi (2019), assert that in order to minimize vulnerabilities in an uncertain environment, organizational supply chains must be structured for dynamic capabilities in the same way.

Resilience has been linked in organizational studies to crisis management, disasters, high-reliability organizations, and positive organizations as necessary skills for communities, organizations, and groups exposed to external disasters like natural disasters and unpredictable environments (Kantur & đşeri-Say, 2012). When it comes to the unexpected day-to-day operations of today's unpredictable business climate, personnel must respond in the same way as organizations must in times of crisis and disaster (Mallak, 1998). Organizations are invariably vulnerable to a range of hazards in the turbulent and disorganized business environment characterized by fierce rivalry, exacting clients, and intricate and interconnected business processes. The organization must respond to a changing environment that calls into question the organization's resilience in this setting by

being flexible, adaptive, and creative. Resilience has thus been seen by researchers as a concept essential to organizational persistence in chaotic, unpredictable, and irregular circumstances. Organizations that possess resilience are equipped to handle adversity and establish protocols that enable prompt and corrective measures, making resilience a fundamental requirement for the organization (Kantur & İşeri-Say, 2012).

Resilience has also been the subject of extensive discussion in the literature on crisis and disaster management. Resilience is the ability to bounce back from unexpected hazards by adjusting to them as soon as they become apparent, according to Wildavsky (1988). While resilience is vital when the pre-event condition has a certain degree of preparedness and readiness, this idea focuses on unpredictable events and the post-event scenario. Consequently, the concept refers to controlling in order to anticipate disturbances and adapt to sudden, unexpected surprises (Tierney, 2003). Resilience must be viewed as both an artistic endeavor and a collection of scientific objectives, according to Kendra and Wachtendorf (2003). Resilience is the ability to bounce back from a negative state and return to the starting state, according to (Freeman Hirschhorn and Triad 2003).

According to these conceptualizations, resilience entails being ready for disruptive events beforehand, responding quickly afterwards to ensure a timely and efficient recovery, and having the capacity for creative, impromptu restarting. Hence, in order to restore the pre-event condition, there is a need for both effective preparation and response capacity, as well as an innovative response capability on the part of the involved group to strengthen the structure or entity even more than it was before the event (Kantur & İşeri-Say, 2012). The relationship between supply chain resilience and organizational recovery capability is discussed further in the hypothesis development section.

Supply Chain Resilience Dimension

A resilient supply chain helps firms quickly adjust to any unforeseen changes and resume operations by rearranging and merging the organizations' current assets and talents. The concept of supply chain resilience in the literature is not consistent (Hohenstein, Feisel, & Hartmann, 2015). For instance, supply chain resilience is defined by Sheffi (2005), as the network's or system's capacity to quickly return to normal operation following a disturbance. According to a revised study by Brandon-Jones, Squire, Autry, and Petersen (2014), supply chain resilience is the ability of an organization to quickly manage any supply chain risks and quickly resume normal operations following an incident. Even if supply chain resilience was covered in a number of ways, the general consensus seemed to be the same. As a result, the ability to immediately restart activities to the pre-disruptive condition or an improved state is defined as resilience in the supply chain in the current study (Piprani, Mohezar, & Jaafar, 2020).

How well-prepared a company's supply network is to tolerate unforeseen disturbances is measured by supply chain resilience. The ability of an organization to respond to the disruption and bounce back is also a factor. The term "a consequential condition that seriously jeopardizes the regular conduct of business of the impacted supply chain organizations" (Zsidisin, Panelli, & Upton, 2000; Barroso, Machado, & Machado, 2011) describes the supply chain disturbance, to which it is closely related. Researchers describe resilience (Peck, 2005) as an organization's capacity to recover quickly from supply chain disruptions or quickly adjust

to them. Supply chain resilience, according to researchers like Fiksel (2006), is a company's ability to grow by effectively recovering from supply chain disruptions and effectively adapting to them. Supply risk management was the approach used in the past to handle supply chain disruptions. However, according to Mubarak et al. (2021) these conventional methods of risk assessment and management were still inadequate to deal with unforeseen circumstances. Supply chain resilience closed this gap and raised the concept of risk management to a new level.

It is vital to acknowledge that supply chain resilience comprises an organization's capability to change with its environment as well as its ability to adapt (Hamel & Välikangas, 2003; Gunasekaran, Subramanian, & Rahman, 2015). Having the "ability to recover" is not enough. Resilient supply chains also bounce back from setbacks and problems faster and more effectively. According to Mubarik et al (2021), supply chain resilience refers to an organization's capacity to both respond to and recover from supply chain disturbances.

According to the literature analysis above, many researchers define resilience in different ways for their particular studies. This study centres on how industrial processes and supply chains recovered and performed as an organization following the exceptional incident such as the Covid-19 pandemic. Resilience, according to Lotfi and Saghiri (2018), is the ability to maintain desired results in the face of adversity. This study operationalizes resilience as the supply chain's capacity to adapt, plan, respond, and recover from unanticipated occurrences by preserving operations continuity when it possesses the highest level of performance and structure control.

Supply Chain Resilience Elements

Organizational resilience is the capacity of a company to effectively manage its human resources while also having a solid plan in place to handle supply chain interruptions (Liu & Lee, 2018; Ambulkar, Blackhurst, & Grawe, 2015). Reducing product diversification can increase supply chain resilience for more effective and efficient business production (Zhu, Chou, & Tsai, 2020). Resilience is the ability of an organization to manage its supply chain such that regular operations may continue after a disruption (Tarigan, Siagian, & Jie, 2021). Durability must be considered in an organization's supply chain resilience based on the number of items sent as well as the average delivery distance (Li, Dong, Jin, & Kang, 2017). Ivanov, Sokolov, and Käschel (2013), state that redundancies, continuous monitoring, and visibility technologies can all be used to evaluate the resilience of the supply chain. Supply chain resilience is determined by a number of factors, including the ability to tolerate disruption, adjust quickly to change, respond quickly to unforeseen circumstances, and maintain a high level of situational awareness (Liu & Lee, 2018). The following study metrics are used to assess supply chain resilience: (1) The company has a reserve stock in case of an epidemic; (2) Production capacity is prioritized during a pandemic; (3) The company can continue to meet customer demands in the face of a pandemic; and (4) The company continues to evolve quickly in spite of a pandemic (Tarigan, Siagian, & Jie, 2021).

Organizational Recovery Capability

Riley, Klein, Miller, and Sridharan (2016), are aware that certain risks associated with the supply chain can appear out of nowhere. The same goes for managers who might disregard warning signs entirely. In each case, identifying someone occurs after the event begins. In

these situations, managers have to put in the effort to understand the conditions surrounding a threat in order to formulate an appropriate response. Increasing a company's capability for recovery can positively affect performance (Riley, Klein, Miller, & Sridharan, 2016).

Riley, Klein, Miller, and Sridharan (2016), state that certain supply chain hazards are discovered after an incident has started. In order to create a suitable response when a hazard arises, managers must make an effort to understand the circumstances surrounding it. Companies think that increasing their capability for recovery will enable them to operate more effectively (Riley, Klein, Miller, & Sridharan, 2016). Since there hasn't been much research done on this strategy, organizational recovery capability has been chosen as the study's main focus. This technique has been shown to be highly beneficial in both previous pandemics and future crisis scenarios.

Dalziell and Mcmanus (2004), propose that utilizing pre-existing responses to handle disruptive occurrences could serve as a tool for recuperating from unfavorable situations. Organizational recovery is defined in Lotfi and Saghiri's (2018), study as the amount of time it takes for performance to recover after being impacted by resilience (Lotfi & Saghiri, 2018).

Organizational Recovery Capability as a Mediator

The ability of an organization to bounce back from setbacks and resume regular operations is enhanced by a robust supply chain network. According to Pettit, Croxton, & Fiksel (2013) and Sheffi (2005), this could have an impact on how well companies function. According to Gunasekaran, Subramanian, and Rahman (2015), there is ample evidence in the literature that a company's losses would increase in proportion to the time it takes to respond to turbulence. According to Blackhurst, Craighead, Elkins, & Handfield (2005), the reasoning behind this is that the company's performance can suffer as a result of these disruptions. Therefore, organizational recovery capability may act as a mediator between supply chain resilience and performance.

The selection of organizational recovery capability as a mediator between supply chain resilience and performance is based on the discussion of the recent past, established theoretical models, and empirical findings from researchers. Haines (2006), and Carvalho, Duarte, and Machado (2011), said that one of the resilience objectives is to restore the system within a reasonable amount of time and money while maintaining the expected standards of an interrupted system as defined by maintenance and a specific standard of excellence. Time to completion and cost are two resilience success measures.

Since previous studies were not completely analyzed the mediating role of organizational recovery capability regarding the relationship between resilience and supply chain performance, organizational recovery capability was selected as a mediator to fill the gap.

Underlying Theories

Organizational performance in the context of the supply chain is a consequence of the study showing that dynamic capabilities foster resilience and organizational recovery capability. The resource-based view of the organization or business provides insightful information on how competitive advantage is generated inside businesses and sustained over time (Ponomarov & Holcomb, 2009). In summary, the resource-based view observes that firms obtain a

competitive edge through the acquisition of dynamic capabilities and resources that are uncommon, highly costly, and difficult to duplicate and replace (Barney, 1991). Consequently, identifying and enhancing one's talents is one of the main objectives for companies implementing a resource-based perspective (Day, 1994).

Dynamic capabilities enhance firm performance in a variety of ways. They support the resource-picking and capability-building rent-generating mechanisms (Makadok, 2001); they create market change (Eisenhardt & Martin, 2000); they match the resource base with changing environments (Teece, Pisano, & Shuen, 1997); and they enhance inter-firm performance (Gudergan, Devinney, Richter, & Ellis, 2012).

Supply chain resilience consisting of proactive and reactive capabilities is defined as a dynamic capability (Juan, Li, & Hung, 2022). According to Teece, Pisano, and Shuen (1997), dynamic capabilities enable sustained high performance. Gains in the market could result from combining this with resilience's capacity for swift response. According to Yu, Jacobs, Chavez, and Yang (2019), resilience helps companies manage change in a dynamic way so that operations can be brought back to their previous or even higher performance levels.

Literature Gaps

Supply Chain Resilience and Supply Chain Performance

It was determined by Lotfi and Saghiri (2018), that there is a lack of empirical research examining the impact of resilience on performance outcomes and that the academic literature on resilience and supply chain performance measurements is still in its early stages. A review of multiple databases, including Emerald, ScienceDirect, Springer, Taylor & Francis, Sage and Wiley, reveals a dearth of research. It was not possible to find any studies that looked at how resilience could help with cost reduction, quality improvement, timely delivery of goods, flexibility, or recovery speed. Resilience measures therefore require exact definitions. Although future writings will examine this, Christopher and Peck (2004), conclude that resilience affects people's performance in tasks connected to quality or cost. The authors Pettit, Fiksel, and Croxton (2010) have made progress in creating a resilience framework and helpful managerial tools that can improve performance. However, they stress the importance of obtaining empirical evidence to back their hypotheses.

Organizational Recovery Capability in the Relationship between Supply Chain Resilience and Supply Chain Performance

Even after looking across multiple databases, there aren't enough studies on organizational recovery capability. Previous research has not thoroughly investigated the mediating role of organizational recovery capability in the relationship between supply chain resilience and performance. Likewise, the main emphasis of earlier research was on the direct relationship between supply chain resilience and performance.

The integration of organizational recovery capability and supply chain resilience is anticipated to enhance supply chain performance through the mediating role of organizational recovery capability. Specifically, after searching multiple databases, including Emerald, ScienceDirect, Springer, Taylor & Francis, Sage and Wiley, a study finds that no previous empirical research combined and examined supply chain resilience with the function of organizational recovery capability as the mediator.

Hypotheses Development and Proposed Research Framework

Direct Relationship

Supply chain resilience and supply chain performance

Supply chain resilience shows an organization's ability to respond to changes in the external environment and has an effect on business success (Liu & Lee, 2018). Following a disruption, Hohenstein, Feisel, and Hartmann (2015), reviewed the literature and discovered a correlation between improved organizational performance and faster turnaround times. Increased supply chain resilience makes it easier to recognize potential risks and hazards, facilitating the allocation of resources and planning ahead for interruptions.

Supply chains are strengthened by resilience, which enables them to bounce back from setbacks and successfully adjust how they operate to maintain value creation for clients (Asamoah, Agyei-Owusu, & Ashun, 2020). Serious repercussions from organizational upheavals can include lost revenue and operational efficiency (Abeysekara, Wang, & Kurupparachchi, 2019; Yu, Jacobs, Chavez, & Yang, 2019). When such disruptive events are not recovered from by the supply chain, businesses fail and disappear from the market. Therefore, disruptions in the supply chain put companies, particularly small and medium-sized enterprises (SMEs), at risk and negatively affect their operations (Blackhurst, Dunn, & Craighead, 2011). In order to handle disruptions and the complexity and volatility they bring, companies need to develop resilient capabilities, according to Brandon-Jones, Squire, Autry, and Petersen (2014). Therefore, an organization's resilience determines its ability to provide value to customers in the face of disruptions with reference to supply chain performance. Consequently, the first hypothesis is as follows:

H1: Supply chain resilience relates positively to supply chain performance.

Supply chain Resilience and Organizational Recovery Capability

Carvalho, Azevedo, and Cruz-Machado (2012), came to the conclusion that supply chains need to implement new tactics in order to improve their ability to react swiftly and affordably to sudden shifts in the markets and the increasing degree of volatility. They also made a connection between these capabilities and the competitiveness and performance of the company. A conceptual framework proposed by Carvalho, Azevedo, and Cruz-Machado (2012), enables the relationship between a company's competitiveness and performance and the robustness of its supply networks. Christopher and Peck (2004), developed a strategic taxonomy for the design of resilience in the supply chain, and it is closely related to visibility, acceleration, and speed, such as the rate of recovery. For supply networks to be less detrimental during a crisis, they need to be more resilient, flexible, and able to handle unexpected disruptive events (Azevedo Cruz-Machado and Carvalho, 2012).

The SARS pandemic in Asia (2003), the terrorist incident in New York (2001), and Hurricane Katrina in the United States (2005), were the crises that Wagner and Bode (2008), looked at before 2008. These events had an impact on supply chains and were research topics. After ten years of businesses constantly encountering increased pressure from global competitors, Wagner and Bode (2008), concluded that supply networks are becoming increasingly vulnerable. Given the increase in disruptive events and the susceptibility of global supply chains, it is imperative to closely monitor a company's resilience and risk management practices (Wagner & Bode, 2008). Weick and Sutcliffe (2007), define resilience ability as having three core competencies: (i) the capacity to mitigate effects and maintain supply chain

operations; (ii) the capacity to bounce back quickly; and (iii) the capacity to learn from the event and progress from previous resilience periods.

One of the resilience objectives, according to Haines (2006), and Carvalho, Duarte, and Machado (2011), is to restore the expected standards of an interrupted system, as defined by a maintenance level and a certain quality, within an acceptable time and budget. Therefore, it is imperative to consider the following hypothesis in relation to resilience:

H2: Supply chain resilience relates positively to organizational recovery capability.

Organizational Recovery Capability and Supply Chain Performance

Negative financial and service implications are the two main repercussions that supply chain disruptions can have on enterprises. The financial effect is the amount spent as a result of the disruption. Because companies cannot concentrate as deeply on meeting consumer demand during disturbances as they would in a normal operating environment, services commonly fail during disruptions (Macdonald & Corsi, 2013). The goal of the healing process is to minimize these consequences and the expenses that go along with them. One way to measure a company's success is by how quickly it completes its comeback. Both cost and service quality are impacted by speed. The longer it takes to heal completely, the higher the cost of the entire recovery process is going to be (Macdonald & Corsi, 2013).

The promptness with which managers recognize an event or disturbance is critical. According to Macdonald and Corsi (2013), recovery cannot be fully achieved until the supply chain is returned to its initial state. Above all, companies take longer to recover from disruptions. Instead, after a disruption, they will perform poorly for a minimum of two years (Calvo, Olmo, & Berlanga, 2020). Effective risk management in the supply chain helps firms experience fewer disruptions and react to them faster (Singhal, Agarwal, & Mittal, 2011).

As stated by Riley, Klein, Miller, and Sridharan (2016), some supply chain hazards are discovered after an incident has commenced. When a threat arises, managers need to make an effort to understand the circumstances around it so that they can plan a suitable response. Companies believe that improving their capability to recover will improve performance (Riley, Klein, Miller, & Sridharan, 2016). Thus, the third hypothesis is this:

H3: Organizational recovery capability relates positively to supply chain performance.

Indirect Relationship - Mediating Effects

The Mediating Role of Organizational Recovery Capability

The organization needs to build a resilience capability in high volatile and uncertain times in order to handle unforeseen occurrences, recover from disasters, and promote future events (Duchek, 2020). It is difficult to manage supply chain interruption, according to Kumar and Anbanandam (2020). Resolving supply chain disruptions requires foreseeing organizational capabilities including reaction, recovery, and preparation. Furthermore, according to Duchek (2020), in order to sustain supply chain performance, businesses need to be able to react quickly to unfavorable situations and possess creative expertise.

Given how often uncertainties and disruptions arise, there is a possibility of supply chain risk (Fiksel, Polyviou, Croxton, & Pettit, 2015). Traditional supply chain risk management

strategies, such as risk identification, control, and avoidance, have been contested by Heckmann, Comes, and Nickel (2015). But using these conventional approaches is becoming more difficult and ambiguous due to the increase in complexity, interconnection, and unpredictability (Simchi-Levi, Kaminsky, & Simchi-Levi, 2000). Ponomarov and Holcomb (2009) claimed that supply chain resilience aims to reduce the impact of such disruptions by having preparedness, reaction, and recovery capabilities.

An organization's capacity to bounce back from disruptions fast and resume operations is enhanced by a robust supply chain network. This might have an impact on how successfully companies operate (Pettit, Croxton, & Fiksel, 2013; Sheffi, 2005). Previous studies have shown that a company's losses would increase in proportion to the amount of time it takes to respond to supply chain disruptions (Gunasekaran, Subramanian, & Rahman, 2015). On the other hand, the quicker a company responds to chaos, the fewer disruptions it may have, which could have a negative effect on the efficiency of its supply chain (Blackhurst, Craighead, Elkins, in Handfield, 2005), which leads to the formulation of the final hypothesis:

H4: Organizational recovery capability mediates the relationship between supply chain resilience and supply chain performance.

Figure 1 shows that the conceptual framework that is developed to examine the relationships among supply chain resilience, organizational recovery capability and supply chain performance based on dynamic capabilities theory.

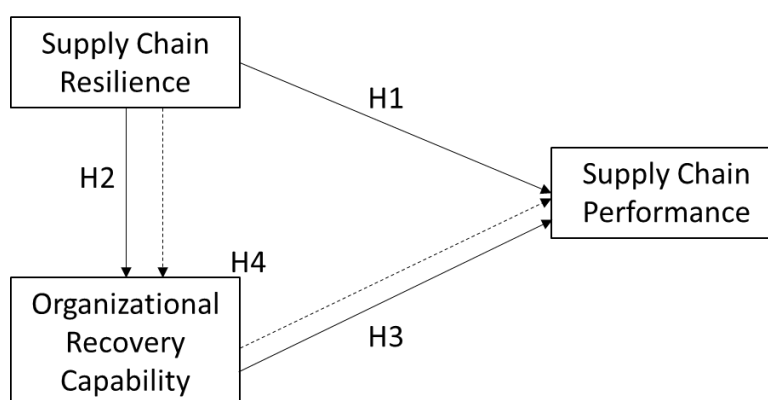


Figure 1: Conceptual Framework

Method

The choice of a topic pertaining to the supply chain domain is where this study begins. A review of the literature was conducted in order to gather data that will enable the writers to determine the actual state of affairs in the field of research. Selected publications from major databases, including Emerald, ScienceDirect, Taylor & Francis, Springer, Sage, and Wiley, are reviewed in order to compile the information. The suggested model makes it evident that the authors plan to look into how supply chain resilience affects supply chain performance. The organizational recovery capability's mediating role was also examined in order to bolster the suggested model. Every variable will be examined to determine whether it has a positive and significant impact on the performance of the supply chain.

The authors suggest using a questionnaire on managers of small and medium-sized manufacturing enterprises in Malaysia to examine the association between supply chain

resilience, organizational recovery capability and supply chain performance. According to Sekaran and Bougie (2010), sampling is a technique for selecting a sufficient number of appropriate population components for analysis in order to comprehend the sample's qualities and characteristics. The entire population of SME manufacturing enterprises is the target audience for this study. The organizational level, or SME manufacturing companies, is the analytical unit of this research study. Ten times the amount of variables in this study must be included in the smallest sample (Roscoe, 1975). The required total sample size is 129, as determined by the G*Power computation. Through the Federation of Malaysian Manufacturers (FMM) Directory of Malaysian Industries, a sampling frame can be obtained. A questionnaire survey is used to implement the sampling approach. The sample technique used is just random sampling. Every unit in the population has an equal chance of being chosen through a random selection procedure. Emails containing the questionnaires will be sent to the relevant organizations, and then another email will be sent to collect the completed forms. Since they are in charge of an organization's performance and recovery, managers in the supply chain and operations divisions make the most decisions in manufacturing enterprises, making them the most relevant respondents.

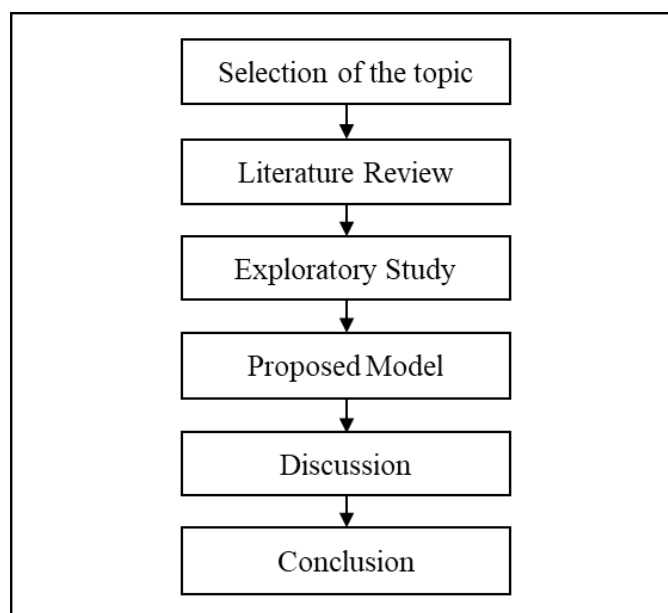


Figure 2: Research Process

Structural Equation Modeling (SEM) and the Statistical Package for Social Science (SPSS) will be used in this investigation. Basic statistical analysis of the data, including a normality check, an examination of missing data, and a descriptive analysis, will be carried out using SPSS. Data analysis will be conducted using Partial Least Square-Structural Equation Modeling (PLS-SEM).

Expected Findings

The review of the literature, this research establishes a conceptual framework that links supply chain resilience to organizational recovery capability and subsequently leads to improvement in supply chain performance, with organizational recovery capability being identified as a mediating factor. Supply chain performance and resilience should be positively correlated, according to the authors' expectations. Organizational recovery capability will be

evaluated for mediating effect in order to improve the relationship between supply chain resilience and supply chain performance.

Discussion

According to the study, a stronger supply chain can only be achieved by enhancing its resilience. Moreover, organizational supply chain resilience might further impact supply chain performance through organizational recovery capability, according to the mediation study. Organizational recovery capability is a critical component of supply chain performance enhancement. Improved supply chain performance will, therefore, result from efforts to strengthen the chain's resilience with organizational recovery capability.

The research on the organizational recovery capability and determining variables towards the supply chain performance of small and medium-sized manufacturing enterprises is still limited, despite ample evidence demonstrating the performance of these businesses. This concept can provide practitioners with insights into the advantages of organizational recovery capability and supply chain resilience for supply chain performance, and it may serve as a basis for further empirical research. The research's theoretical framework reflects unique connections that promote knowledge and open up new avenues for theoretical exploration. This illustrates how new this research is and how it advances theories and understanding.

Conclusion

The study underlines that organizational strategies should be designed with supply chain resilience and organizational recovery capability to attain a competitive advantage in supply chain performance. Supply chain performance must be improved through a mediating factor of organizational recovery capability in the relationship between supply chain resilience. Supply chain management and organizational studies have significantly benefited from this study's substantial contributions. Managers will gain a better understanding of how organizational recovery capability and supply chain resilience interact to affect supply chain performance.

Policymakers and managers can use the study's findings in a number of significant ways. The study's findings will help create a suitable plan that will increase the productivity and efficiency of the SME manufacturing sector. The area in need of attention might be concentrated on certain areas because research indicates that organizational recovery capability and supply chain resilience are the first steps in improving supply chain performance.

References

- Abeyssekara, N., Wang, H., & Kuruppuarachchi, D. (2019). Effect of supply-chain resilience on firm performance and competitive advantage: A study of the Sri Lankan apparel industry. *Business Process Management*, 25(7), 1673-1695.
- Ambulkar, S., Blackhurst, J., & Grawe, S. (2015). Firm's resilience to supply chain disruptions: Scale development and empirical examination. *Journal of Operations Management*, 33-34, 111-122.
- Asamoah, D., Agyei-Owusu, B., & Ashun, E. (2020). Social network relationship, supply chain resilience and customer-oriented performance of small and medium enterprises in a developing economy. *Benchmarking: An International Journal*, 27(5), 1793-1813.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.
- Barroso, A. P., Machado, V. H., & Machado, V. C. (2011). Supply Chain Resilience Using the Mapping Approach. In P. Li, *Supply Chain Management* (pp. 161-184). Rijeka: InTech.
- Beamon, B. M. (1999). Measuring supply chain performance. *International Journal of Operations & Production Management*, 19(3), 275-292.
- Blackhurst, J., Craighead, C. W., Elkins, D., & Handfield, R. B. (2005). An empirically derived agenda of critical research issues for managing supply-chain disruptions. *International Journal of Production*, 43(19), 4067-4081.
- Blackhurst, J., Dunn, K. S., & Craighead, C. W. (2011). An Empirically Derived Framework of Global Supply Resiliency. *Journal of Business Logistics*, 32(4), 374-391.
- Brandon-Jones, E., Squire, B., Autry, C. W., & Petersen, K. J. (2014). A Contingent Resource-based Perspective of Supply Chain Resilience and Robustness. *Journal of Supply Chain Management*, 50(3), 55-73.
- Carvalho, H., Duarte, S., & Machado, V. C. (2011). Lean, agile, resilient and green: divergencies and synergies. *International Journal of Lean Six Sigma*, 2(2), 151-179.
- Chavez, R., Gimenez, C., Fynes, B., Wiengarten, F., & Yu, W. (2013). Internal Lean Practices and Operational Performance The Contingency Perspective of Industry Clockspeed. *International Journal of Operations & Production Management*, 33(5), 562-588.
- Chowdhury, M. M., & Quaddus, M. (2016). Supply chain readiness, response and recovery for resilience. *Supply Chain Management: An International Journal*, 21(6), 709-731.
- Christopher, M., & Peck, H. (2004). Building the resilient supply chain. *International Journal of Logistics Management*, 15(2), 1-13.
- Dalziell, E. P., & Mcmanus, S. T. (2004). Resilience, vulnerability, and adaptive capacity: Implications for system performance. *International Forum on Engineering Decision Making (IFED)*, (p. 17). Stoos, Switzerland.
- Day, G. S. (1994). The Capabilities of Market-Driven Organizations. *Journal of Marketing*, 58, 37-52.
- Deshpande, A. (2012). Supply Chain Management Dimensions, Supply Chain Performance and Organizational Performance: An Integrated Framework. *International Journal of Business and Management*, 7(8), 1-19.
- Duchek, S. (2020). Organizational resilience, A capability-based conceptualization. *Business Research*, 13, 215-246.
- Duong, A. B., Vo, V. X., Carvalho, M. d., Sampaio, P., & Truong, H. Q. (2022). Risks and supply chain performance: globalization and COVID-19 perspectives. *International Journal of Productivity and Performance Management*.

- Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic Capabilities: What Are They? *Strategic Management Journal*, 21(10/11), 1105-1121.
- Fečiková, I. (2004). An index method for measurement of customer satisfaction. *The TQM Magazine*, 16(1), 57-66.
- Fiksel, J. (2006). Sustainability and resilience: toward a systems approach. *Sustainability: Science, Practice, & Policy*, 2(2), 14-21.
- Fiksel, J., Polyviou, M., Croxton, K. L., & Pettit, T. J. (2015). From risk to resilience: Learning to deal with disruption. *MIT Sloan Management Review*, 56(2), 79-86.
- Freeman, S. F., Hirschhorn, L., & Triad, M. M. (2003). Moral purpose and organizational resilience: Sandler O'Neill & Partners, in the aftermath of September, 11, 2001. *Annual Meeting of the Academy of Management*. New Orleans, LA.: Academy of Management.
- Gudergan, S. P., Devinney, T., Richter, N. F., & Ellis, R. S. (2012). Strategic Implications for (Non-Equity) Alliance Performance. *Long Range Planning*, 45(5-6), 451-476.
- Gunasekaran, A., Subramanian, N., & Rahman, S. (2015). Supply chain resilience: role of complexities and strategies. *International Journal of Production Research*, 53(22), 6809-6819.
- Haimes, Y. Y. (2006). On the Definition of Vulnerabilities in Measuring Risks to Infrastructures. *Risk Analysis*, 26(2), 293-296.
- Hallgren, M., & Olhager, J. (2009). Lean and agile manufacturing: external and internal drivers and performance outcomes. *International Journal of Operations & Production Management*, 29(10), 976-999.
- Hamel, G., & Välikangas, L. (2003). The Quest for Resilience. *Harvard Business Review*, 81(9), 52-63.
- Heckmann, I., Comes, T., & Nickel, S. (2015). A critical review on supply chain risk - Definition, measure and modelling. *Omega*, 52, 119-132.
- Hohenstein, N.-O., Feisel, E., & Hartmann, E. (2015). Research on the phenomenon of supply chain resilience: A systematic review and paths for further investigation. *International Journal of Physical Distribution & Logistics Management*, 45(1/2), 90-117.
- Huo, B. (2012). The impact of supply chain integration on company performance: an organizational capability perspective. *Supply Chain Management: An International Journal*, 17(6), 596-610.
- Ittner, C. D., & Larcker, D. F. (1998). Are nonfinancial measures leading indicators of financial performance? An analysis of customer satisfaction. *Journal of Accounting Research*, 36, 1-35.
- Ivanov, D., Sokolov, B., & Käschel, J. (2013). Adaptation-Based Supply Chain Resilience. *Supply Chain Safety Management*, 267-287.
- Juan, S.-J., Li, E. Y., & Hung, W.-H. (2022). An integrated model of supply chain resilience and its impact on supply chain performance under disruption. *The International Journal of Logistics Management*, 33(1), 339-364.
- Kantur, D., & İşeri-Say, A. (2012). Organizational resilience: A conceptual integrative framework. *Journal of Management & Organization*, 18(6), 762-773.
- Kendra, J. M., & Wachtendorf, T. (2003). Elements of Resilience After the World Trade Center Disaster: Reconstituting New York City's Emergency Operations Centre. *Disasters*, 27(1), 37-53.
- Kumar, P. S., & Anbanandam, R. (2020). Theory Building on Supply Chain Resilience, A SAP-LAP Analysis. *Global Journal of Flexible Systems Management*, 21, 113-133.

- Li, R., Dong, Q., Jin, C., & Kang, R. (2017). A New Resilience Measure for Supply Chain Networks. *Sustainability* 2017, 9(1), 144.
- Liu, C.-L., & Lee, M.-Y. (2018). Integration, supply chain resilience, and service logistics providers. *The International Journal of Logistics Management*, 29(1), 5-21.
- Lotfi, M., & Saghiri, S. (2018). Disentangling resilience, agility and leanness: Conceptual development and empirical analysis. *Journal of Manufacturing Technology Management*, 29(1), 168-197.
- Makadok, R. (2001). Toward a synthesis of the resource-based and dynamic-capability views of rent creation. *Strategic Management Journal*, 22(5), 387-401.
- Mallak, L. A. (1998). Measuring resilience in health care provider organizations. *Health Manpower Management*, 24(4), 148-152.
- Mubarik, M. S., Naghavi, N., Mubarik, M., Kusi-Sarpong, S., Khan, S. A., Zaman, S. I., & Kazmi, S. H. (2021). Resilience and cleaner production in industry 4.0: Role of supply chain mapping and visibility. *Journal of Cleaner Production*, 292, 1-12.
- Peck, H. (2005). Drivers of supply chain vulnerability: an integrated framework. *International Journal of Physical Distribution & Logistics Management*, 35(4), 210-232.
- Pettit, T. J., Croxton, K. L., & Fiksel, J. (2013). Ensuring Supply Chain Resilience: Development and Implementation of an Assessment Tool. *Journal of Business Logistics*, 34(1), 46-76.
- Pettit, T. J., Fiksel, J., & Croxton, K. L. (2010). Ensuring supply chain resilience: development of a conceptual framework. *Journal of Business Logistics*, 31(1), 1-22.
- Piprani, A. Z., Mohezar, S., & Jaafar, N. (2020). Supply Chain Integration and Supply Chain Performance: The Mediating Role of Supply Chain Resilience. *International Journal of Supply Chain Management*, 9(3), 58-73.
- Ponomarov, S. Y., & Holcomb, M. C. (2009). Understanding the concept of supply chain resilience. *The International Journal of Logistics Management*, 20(1), 124-143.
- Qi, Y., Huo, B., Wang, Z., & Yeung, H. J. (2017). The impact of operations and supply chain strategies on integration and performance. *International Journal of Production Economics*, 185, 162-174.
- Riley, J. M., Klein, R., Miller, J., & Sridharan, V. (2016). How internal integration, information sharing, and training affect supply chain risk management capabilities. *International Journal of Physical Distribution & Logistics Management*, 46(10), 953-980.
- Roscoe, J. T. (1975). *Fundamental Research Statistics for the Behavioural Sciences* (2nd ed.). New York: Holt Rinehart & Winston.
- Sekaran, U., & Bougie, R. (2010). *Research Methods for Business: A Skill Building Approach* (5th ed.). Chichester, United Kingdom: John Wiley & Sons Inc.
- Sezen, B. (2008). Relative effects of design, integration and information sharing on supply chain performance. *Supply Chain Management: An International Journal*, 13(3), 233-240.
- Sheffi, Y. (2005). *The Resilient Enterprise: Overcoming Vulnerability for Competitive Advantage*. Cambridge: The MIT Press.
- Sheffi, Y., & Rice, J. J. (2005). A Supply Chain View of the Resilient Enterprise. *MIT Slogan Management Review*, 47(1), 41-48.
- Shin, H., Collier, D. A., & Wilson, D. D. (2000). Supply management orientation and supplier/buyer performance. *Journal of Operations Management*, 18(3), 317-333.
- Simchi-Levi, D., Kaminsky, P., & Simchi-Levi, E. (2000). *Designing and Managing the Supply Chain: Concepts, Strategies and Case Studies*. New York: Irwin McGraw-Hill.

- Singhal, P., Agarwal, G., & Mittal, M. L. (2011). Supply chain risk management: Review, classification and future research directions. *International Journal of Business Science & Applied Management*, 6(3), 15-42.
- Tan, K.-C., Kannan, V. R., Handfield, R. B., & Ghosh, S. (1999). Supply chain management: an empirical study of its impact on performance. *International Journal of Operations & Production Management*, 19(10), 1034-1052.
- Tarigan, Z. H., Siagian, H., & Jie, F. (2021). Impact of Internal Integration, Supply Chain Partnership, Supply Chain Agility, and Supply Chain Resilience on Sustainable Advantage. *Sustainability*, 13(10), 5460.
- Teece, D. J. (2007). Explicating Dynamic Capabilities The Natured and Microfoundations of (Sustainable) Enterprise Performance. *Strategic Management Journal*, 28, 1319-1350.
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533.
- Teece, D., & Pisano, G. (1994). The dynamic capabilities of firms: an introduction. *Industrial and Corporate Change*, 3(3), 537-556.
- Tierney, K. (2003). Conceptualizing and Measuring Organizational and Community Resilience: Lessons from the Emergency Response Following the September 11, 2001 Attack on the World Trade Center. *Third Comparative Workshop on Urban Earthquake Disaster Management*. Kobe, Japan: Disaster Research Center.
- Um, J., Lyons, A., Lam, H. K., Cheng, T., & Dominguez-Pery, C. (2017). Product variety management and supply chain performance: A capability perspective on their relationships and competitiveness implications. *International Journal of Production Economics*, 187, 15-26.
- Wagner, S. M., & Bode, C. (2008). An empirical examination of supply chain performance along several dimensions of risk. *Journal of business logistics*, 29(1), 307-325.
- Weick, K. E., & Sutcliffe, K. M. (2007). *Managing the Unexpected: Sustained Performance in a Complex World*. San Francisco: Jossey-Bass.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171-180.
- Wildavsky, A. (1988). *Searching for Safety* (1st ed.). New Brunswick, NJ: Transaction Publishers.
- Yu, W., Jacobs, M. A., Salisbury, W. D., & Enns, H. (2013). The effects of supply chain integration on customer satisfaction and financial performance: An organizational learning perspective. *International Journal of Production Economics*, 146(1), 346-358.
- Yu, W., Jacobs, M. A., Chavez, R., & Yang, J. (2019). Dynamism, disruption orientation, and resilience in the supply chain and the impacts on financial performance: A dynamic capabilities perspective. *International Journal of Production Economics*, 218, 352-362.
- Zhu, G., Chou, M. C., & Tsai, C. W. (2020). Lessons Learned from the COVID-19 Pandemic Exposing the Shortcomings of Current Supply Chain Operations: A Long-Term Prescriptive Offering. *Sustainability*, 12(14), 5858.
- Zsidisin, G. A., Panelli, A., & Upton, R. (2000). Purchasing organization involvement in risk assessments, contingency plans, and risk management: An exploratory study. *Supply Chain Management: An International Journal*, 5(4), 187-197.
- Zsidisin, G. A., Petkova, B. N., & Dam, L. (2016). Examining the influence of supply chain glitches on shareholder wealth: does the reason matter? *International Journal of Production Research*, 54(1), 69-82.