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Exploring the Impact of Dynamic Managerial Capabilities and Supply Chain Orientation on Supply Chain Resilience: A Structural Equation Modeling Approach

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ABSTRACT

Many researchers, as well as the practitioner community, have become interested in the increased sensitivity to destructive events resulting from both the internal and external environments in the supply chain. Dynamic capabilities theory (DCT) and supply chain resilience (SCR) are relatively new concepts that have recently garnered a lot of interest from academics and industry professionals. The purpose of this research is to examine, from the standpoint of dynamic capabilities theory, the relationship between supply chain resilience and supply chain orientation. The study uses survey data collected from 184 manufacturing firms. Senior managers from these companies responded to the questionnaire's questions. Structural equation analysis indicates a positive relationship between resilience and dynamic managerial skills. Further, the structural analysis finds a positive relationship between supply chain orientation and resilience. However, the hypothesis of the moderating role of supply chain orientation is not supported.

Keywords: Resilience, Disruptions, Supply Chain Management, Supply Chain Resilience, Supply Chain Orientation, Structural Equation Model
JEL Classifications: M10, M11, M14, Q01, Q56

1. INTRODUCTION

Complex networks of businesses, known as supply chains, are vulnerable to various disruptive events, which can lead to unforeseen disruptions. The pandemic outbreak (COVID-19) represents a specific case of supply chain risk in terms of duration, high uncertainty, and the spread of ripple effects (Ivanov, 2020). More than 56% of companies suffer from some type of supply chain disruption every year; it is thus unsurprising that businesses are now finally starting to pay attention to supply chain resilience (Business Continuity Institute [BCI], 2019). By the end of February, at least 86% of supply chains had been impacted by the COVID-19 pandemic as pointed out by Chartered Institute of Procurement and Supply (CIPS, 2020). Supply chain breakdowns during the pandemic exposed vulnerabilities in the global economy that offered lessons to executives looking to build during the recovery phase. In response, businesses had to ascend to adopt new strategies for minimizing risk and maintaining operations. As the situation develops and companies adapt their supply chain strategies, they are positioned to withstand future disruptions. The International Conference on Industry of the Future and Smart Manufacturing says that "As of the end of May, the performance metrics had soared to 97%" (ISM, 2020). Decreased production capacity, delays in order fulfillment, and reduced revenues are some of the consequences of the disruptions (CIPS, 2020). After the extensive impact of the pandemic, businesses are reflecting on fundamental strategic elements that are essential to success in today's business environment. Firms nowadays are aware that cost efficiency, superior quality, and quick investment returns are not sufficient strategic components (Colicchia and Strozzi, 2012).

Now businesses must include adaptability, resilience, and innovation in their operational concepts. Organizations will now need to see themselves in a stance of readiness to deal with

unpredictability whilst also building out first-mover methods for dealing with the continuing volatility of markets. This implies that the traditional way of doing business must be reinvented, as companies must think outside of the box to succeed over the long run. Despite growing recognition, the ability of organizations to adequately respond to disruptions remains a growing focus (Carvalho et al., 2012; Katsaliaki et al., 2021; Li et al., 2021). Researchers have created multiple frameworks and instruments that allow organizations to detect supply chain risks and implement strategies to reduce their impact. The findings of previous research have initiated an intense discourse on the development of supply chain resilience and agility as an appropriate response to unexpected events coming from the environment (Yu et al., 2023; Negri et al., 2021; Yin and Yu, 2022; Alvarenga et al., 2023).

The supply chain resilience management (SCRM) literature provides very useful information and hands-on recommendations for organizations trying to improve their risk management in the fast-paced and globalized world. Companies with robust capabilities to respond to disruptions can limit their impact and recover faster. What will this preparation involve? It will include solid backup plans, clear communication strategies, and the ability to adapt and innovate as challenges arise. Implementing a considerable emphasis on strong response capabilities enables companies to better withstand challenges, as it allows them to stay in business in the long run. There is a great body of research related to what enables resilience and theoretical models for context-specific planning and adaptation to disruptive events, but it should be noted that resilience is a multidimensional concept and complex phenomenon. It is shaped by factors such as personality, social networks, economic resources, information and services, and environmental factors. Identifying how these elements interact with one another is central to developing tactics that have the potential to enhance resilience in difficult times. It should be noted that supply chain orientation is distinct from supply chain management. According to Mentzer et al. (2001), a company becomes supply chain-oriented based on its understanding of the strategic and systematic dimensions associated with managing the diverse flows in the supply chain. In other words, a supply chain-oriented business realizes that each component of the supply chain is linked together, and every decision can have ramifications for how well each area and the entire system operates. Using this philosophy, the company is able to refine processes, reduce expenses, increase productivity, and finally offer more value to customers. Liao et al. (2010) demonstrated that a company's supply chain can play an important role in several key performance areas, including cost, quality, and timeliness. With the highly ambitious global market today, companies are discovering more efficient supply chain management, and a happy customer is the primary objective. Supplier and retail partners need to coordinate effectively to maintain low costs, maintain product quality, and meet delivery deadlines.

Organizations can gain a significant advantage and improve overall performance in a dynamic business environment by increasing the flow of goods and information across the supply chain. As shown in a 2008 report from the World Economic Forum, the potential for disruption of supply chains today ranks with systemic financial risk, food security, and energy security as one of four major emerging issues. At the same time, intensive competition has pushed organizations to focus on improving customer value, product quality, cutting costs, and boosting overall performance (Stecke and Kumar, 2009; Carvalho et al., 2012; Das et al., 2021). Disruptions in the flow of materials have also affected procurement systems and supply chains, creating challenges for many organizations (Singh et al., 2019; Xu et al., 2020; Hendricks & Singhal, 2005; Baek et al., 2020). Procurement in the disruptive supply chain must adopt new strategies to improve their response for quick and cost-efficient systems to unpredictable changes in outstanding environmental turbulence. Supply chain risk is classified into operational risk and disruption risk (Fahimnia et al., 2018; Ivanov, 2020; Xu et al., 2020). Operational risk represents common disturbances during supply chain operations, such as order time and movements in demand, while disruption risk relates to mostly low-frequency but high-impact events (Hosseini et al., 2019). However, supply chain resilience makes it possible for the business to adapt or endure shocks, allowing it to bounce back swiftly from unforeseen setbacks (Wieland, 2021). Supply chain resilience is poorly understood, with limited studies on organizational antecedents and outcomes. Current models lack theoretical justification and are evolving. Gaps include the complexity of cause-effect relationships, the interaction between antecedents and consequences, and the need for empirical testing (Ponomarov, 2012).

The following are some contributions of this study to the existing development of literature in the area of supply chain resilience, risk management, and organizational adaptability. First, it extends the theoretical discourse on supply chain resilience through the combined application of resource based view (RBV) and the dynamic capabilities perspective in tandem with supply chain orientation that generates a new framework that describes how organizations can develop resilience proactively to minimize the disruptions. While previous literature on resilience most commonly deals with the notion that resilience is a reactive capability, we consider resilience a strategic approach that can be managed in an ongoing dynamic process and shaped by managerial decisions and firm-specific capabilities. Second, this study empirically examines how supply chain orientation, resilience, and dynamic managerial capabilities work together, filling a gap in the literature in which resilience has largely been studied in isolation or without much of a theoretical foundation. Through this lens, the study proposes dynamic managerial skills as the essential mediating factors determining the extent to which firms are able to utilize their assets and resources, modify their strategies, and confirm or adjust their need for operational continuity in response to disruptions. This creates a more nuanced understanding of the processes by which firms develop resilience, particularly against high-impact, low-frequency events like the COVID-19 pandemic. Building on existing research, this study provides a more comprehensive understanding of the relationship between resilience and supply chain orientation. Specifically, we examine how dynamic managerial skills act as an intermediary factor in this relationship. Although dynamic managerial skills have not been widely studied, they are essential for businesses seeking to remain competitive. These skills help organizations

adapt to shifting market conditions, drive innovation, and lead teams effectively. By highlighting their importance, our research contributes valuable insights to the field. Businesses that invest in developing these skills among their managers are better equipped to navigate challenges and seize opportunities in today's fast-paced and unpredictable business environment.

The next part of the study includes a review of the literature and the formulation of hypotheses. We then present the technique used in the study. The next part reports the study's findings, followed by a conclusion and recommendations for further research. The final section reports the results of the study's robustness test.

2. LITERATURE REVIEW

2.1. Resilience

A variety of academic fields have investigated the idea of resilience. A fundamental characteristic of many materials and systems, elasticity has a wide range of applications and ramifications in disciplines including biology, engineering, physics, and economics. A system's ability to adapt to changes is referred to as its resilience (Holling, 1973). The ability of an organization to endure in unstable environments can be characterized as resilience from an organizational standpoint (Ates and Bititci, 2011). Ecological resilience and engineering resilience are two commonly used but fundamentally distinct notions of resilience (Novak et al., 2021). Engineering resilience is concerned with a system's stability when it is close to an equilibrium or stable state and its capacity to recover from a shock by returning to that state; systems that are more resilient recover more quickly than those that are less resilient (Holling, 1996; Wieland, 2021). Instead of depending exclusively on reactive responses to disruptions, resilience engineering highlights the value of proactive steps to develop and improve system resilience. Surveys show that firms address disruptions most commonly with increased safety stock, dual or multi-sourcing, and better forecasting (Katsaliaki et al., 2021).

Organizations can improve their capacity to endure and bounce back from a variety of challenges by better anticipating and adapting to unforeseen events and by understanding the underlying factors that contribute to resilience. The growing number of disruptions in global supply chains is the main reason for the increased importance of resilience in the supply chain. Considerations for conceptualizing elasticity in literature can be made from a number of angles. Proactive aspects of elasticity have been the subject of research to date (Jüttner and Maklan, 2011; Pal et al., 2014). Prior to gaining popularity in supply chain circles after 2000, the idea of resilience was studied in a variety of fields. This was prompted by important works published in 2004 and 2006 by Christopher, Peck, and Sheffi. The ability of the supply chain to adapt to lessen the likelihood of running into random disruptions, resist the spread of disruptions by maintaining control over structure and functions, and react quickly and effectively to overcome disruptions and restore the supply chain to a strong operational state is what Kamalahmadi and Parast (2016, p. 121) define as elasticity or resilience.

2.2. Dynamic Managerial Capabilities

Researchers' attention has been shifting lately toward dynamic managerial skills, specifically in the area of strategic management. This shift in emphasis has allowed researchers to gain a clearer understanding of how managers can successfully govern their organizations toward success as they adapt to rapidly shifting environments. With evolving industry requirements, the demand for managers with dynamic skills will only increase, which means that any professional must keep themselves informed and sharpen their strategic management skills. On the other hand, the increasing focus on the evolutionary aspect of resources and the ability of the firm to adjust to changes in the environment has emphasized the development of dynamic capabilities (Teece and Pisano., 1994) and consequently added importance to the resource-based approach (Barney, 1991). Furthermore, different writers distinguish between resource-based and dynamic capabilities. In an environment that is changing quickly and is unpredictable, the resource-based approach was thought to be static and unable to explain firms' competitive advantage (Augier and Teece, 2008). In their foundational article, Teece et al. (1997, p. 516) define dynamic skills as "the firm's capability to integrate, build, and modify external and internal competencies to tackle environments that change very quickly." The word "dynamic" emphasizes how important it is to keep up with skill updates in order to adjust to immense changes in the business environment (Augier and Teece, 2008; Eisenhardt and Martin, 2000). During periods of market volatility and rapid technological advancement, these capabilities are especially in demand. A proper new adaptation, integration, and redefinition of organizational skills, resources, and functional competencies will be internal and cross-organizational when aiming for flexibility in changing environments. This is due to the concept of dynamic capabilities (Teece et al., 1997).

This study is on the managerial perspective of dynamic capabilities that enable managers to cope with changing conditions and strengthen the ability of the organization to resist disruptive events. It focuses particularly on how managers gain these dynamic skills through experience, training, and continuing education. With recognition of the role of adaptability and flexibility in the present business scenario, managers must know how to lead their organizations toward success amidst uncertainty and complexity.

According to Martin (2011), one particular kind of dynamic capability is dynamic managerial capability. This perspective expands our understanding of dynamic skills by highlighting the critical role managers play (Helfat and Martin, 2014). Dynamic managerial capabilities allow leaders to detect, generate, link, merge, and efficiently leverage resources, which are critical elements to guarantee the existence and prosperity of SMEs, whether nationally or internationally (Boudlaie et al., 2020; Hernandez-Linares et al., 2020). These skills are essentially exclusive to managers and are critical for organizational success. The key to success in these roles lies in the mastery of soft skills, which entails the capability to handle change, rapid decision-making, and team management toward the firm's objectives. Other components of cross-functional management skills include excellent communication, problem-solving, and strategic planning skills. The best managers tend to share certain qualities that enable

them to effectively manage different challenges and lead their teams to success so that they can innovate and thrive.

Research on dynamic managerial capabilities has primarily centered on the role of social capital, human capital, and managerial knowledge in the micro-foundations of these capabilities (Helfat and Martin, 2014). The manager's role involves perceiving and exploiting opportunities and transforming the resource base (Teece, 2007). There are two kinds of skills in organizations (Helfat and Winter, 2011; Protegerou et al., 2011): operational skills, which help companies carry out daily tasks, and dynamic capabilities, focused on change and developing operational skills. Developed internally, dynamic capabilities are high-order strategic organizational processes (Zollo and Winter, 2002). Teece (2016) emphasizes that managers are the backbone of dynamic skills. Dynamic capabilities are essentially dependent on trajectories and strategic processes and are the backbone of learning (Eisenhardt and Martin, 2000; Zollo and Winter, 2002). Teece (2007) asserts that dynamic skills depend on efforts to discover, exploit, and reconfigure assets and competencies that enable companies to adapt to environmental demands. According to Helfat and Martin (2014), Jones et al. (2005), Malik (2009), Jerez-Gomez et al. (2005), Liao et al. (2007), managerial (Lane et al., 2006), and innovative are a few examples of dynamic capabilities that can be highlighted. Managerial human capital, managerial social capital, and managerial knowledge are the three main factors of dynamic managerial skills (Martin, 2011; Adner and Helfat, 2003). Teece (2012) points out that "although some elements of dynamic capabilities may be related to the organization, the ability to evaluate and describe changes to asset configuration (both within the organization and outside it) rests on the shoulders of top management." Researchers suggest that the skills exerted in smooth or stable processes are level-headed; in contrast to strategic changes, firms need to rely on dynamic first-level skills to stay competitive (Qaiyum and Wang, 2018). According to Kevill et al. (2020), the conceptualization of dynamic capabilities as both routine and non-routine has implications for positioning in the debate about the heterogeneity of dynamic skills across different organizations. Dynamic capabilities are different from ordinary skills, which include best practices for performing administrative, operational, and governance functions (Teece, 2014). While common skills maintain consistency, reliability, and continuity during the production of the organizational product, dynamic capabilities generate the innovations and modifications needed to create new markets or adapt to environmental demands (Helfat and Winter, 2011).

Dynamic capabilities studies are concerned with identifying factors that contribute to the adaptation of organizations to environmental requirements. Rosenbloom (2000) emphasizes the importance of leadership in the field of dynamic managerial skills. Adner and Helfat (2003), who then attached great importance to managerial skills in dynamic capabilities research, defined them as the skills with which managers create, integrate, and reconfigure the resources and competencies of the organizations that manage them. Helfat et al. (2007) later define dynamic managerial capabilities as managerial skills for creating, growing, or changing an organization's resource base. As we pointed out, in recent years researchers have increasingly been examining the evolution of dynamic managerial skills over time — with a particular focus on the strategic management realm of academia. As a result, we are now able to learn more about managers in the modern era adapting to change at a pace rarely experienced before and effectively leading organizations in an increasingly dynamic world. Since the world of work is always going to change, the demand for strategic management abilities will always grow, which means that learning those skills will never be effortless for experts in this field. The increasing importance of the evolutionary dimension of resources, namely, a company's ability to adapt its resource base in response to environmental transformations, has resulted in dynamic capabilities (Teece, 1997), and thereby raises the importance of the resource-based view (Barney, 1991). Moreover, various authors differentiate between dynamic capabilities and resource-based approaches. The resource-based perspective was viewed as static and unable to account for firms' competitive advantage in a fast-moving and unpredictable context (Augier and Teece, 2008). In their foundational report, Teece et al. (1997, p. 516) define dynamic capabilities as "the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments. The word "dynamic" implies that skills need to be continuously updated to react to drastic changes in the business environment (Augier and Teece, 2008; Eisenhardt and Martin, 2000). When research cites relevant skills to succeed in and outside of our economy, one can bet those skills will lend themselves well in times of market instability and rapid technological change. Dynamic capabilities refer to the ability of an organization to adapt, integrate, and even reconfigure its internal and external competencies to be flexible at multiple levels (Teece et al., 1997).

The study opens up a dimension of dynamic capabilities, but from a managerial perspective, and illustrates how it helps leaders adapt to a changing world and builds organizational resilience to avoid disruptions. More specifically, the study looks at how managers can develop these skills through training, experience, and continuous learning. Through flexibility and adaptability in the rapid pace of business today, managers are better prepared to handle uncertainty and complexity and thus secure long-term success for their enterprises. Dynamic managerial capabilities are also known as a type of dynamic skill (Martin, 2011); they highlight the importance of managers to organizational effectiveness (Helfat and Martin, 2014). These aptitudes allow managers to recognize, generate, integrate, and utilize resources, which are determinants for the sustainability and development of small and medium-sized enterprises (SMEs) at local and global levels (Boudlaie et al., 2020; Hernández-Linares et al., 2020). Dynamic managerial capabilities are finally the specific capabilities that enable managers to successfully direct their organizations, improve innovation, and overcome obstacles. These skills involve the ability to adapt to changing situations, make quick decisions, and effectively lead a team toward achieving organizational goals. Dynamic managerial capabilities also include strong communication, problem-solving, and strategic planning abilities. Managers who possess these skills are often able to navigate complex challenges and drive innovation within their teams.

Research on dynamic managerial skills has primarily centered on the role of social capital, human capital, and managerial knowledge in the micro-foundations of these skills (Helfat and Martin, 2014). The manager's role involves perceiving and exploiting opportunities and transforming the resource base (Teece, 2007a). There are two kinds of skills in organizations (Helfat and Winter, 2011; Protegerou et al., 2011): operational skills, which help companies carry out daily tasks, and dynamic skills, focused on change and developing operational skills. Developed internally, dynamic skills are high-order strategic organizational processes (Zollo and Winter, 2002). Teece (2016) emphasizes that managers are the backbone of dynamic capabilities. Dynamic capabilities are essentially dependent on trajectories and strategic processes and are the backbone of learning (Eisenhardt and Martin, 2000; Zollo and Winter, 2002). Teece (2007) asserts that dynamic capabilities depend on efforts to discover, exploit, and reconfigure assets and competencies that enable companies to adapt to environmental demands. According to Helfat and Martin (2014), Jones et al. (2005), Malik (2009), Jerez-Gomez et al. (2005), Liao et al. (2007), managerial (Lane et al., 2006), and innovative are a few examples of dynamic skills that can be highlighted. Managerial human capital, managerial social capital, and managerial knowledge are the three main factors of dynamic managerial skills (Martin, 2011; Adner and Helfat, 2003). Teece (2012) points out that "although some elements of dynamic capabilities may be related to the organization, the ability to evaluate and describe changes to asset configuration (both within the organization and outside it) rests on the shoulders of top management." Researchers suggest that the skills exerted in smooth or stable processes are level-headed; in contrast to strategic changes, firms need to rely on dynamic first-level skills to stay competitive (Qaiyum and Wang, 2018). According to Kevill et al. (2020), the conceptualization of dynamic capabilities as both routine and non-routine has implications for positioning in the debate about the heterogeneity of dynamic skills across different organizations. Dynamic capabilities are different from ordinary skills, which include best practices for performing administrative, operational, and governance functions (Teece, 2014). While common skills maintain consistency, reliability, and continuity during the production of the organizational product, dynamic skills generate the innovations and modifications needed to create new markets or adapt to environmental demands (Helfat and Winter, 2011). Dynamic capabilities studies are concerned with identifying factors that contribute to the adaptation of organizations to environmental requirements. Rosenbloom (2000) emphasizes the importance of leadership in the field of dynamic managerial skills. Adner and Helfat (2003), who then attached great importance to managerial skills in dynamic capabilities research, defined them as the skills with which managers create, integrate, and reconfigure the resources and competencies of the organizations that manage them. Helfat et al. (2007) later defines dynamic managerial capabilities as managerial skills for creating, growing, or changing an organization's resource base.

2.3. Orientation to the Supply Chain

According to Ponomarov (2012), the management of a supply chain is not the same as its orientation. When a business understands "the strategic, systematic implications of the tactical activities involved in managing the different flows in the supply chain," it has a supply chain orientation, according to Mentzer et al. (2001). Ponomarov (2012) claims that a single company possesses a supply chain orientation, but this presumes the existence of the complete supply chain from the point of origin to the point of consumption, where the participants are interconnected through a complex web of relationships.

Establishing supply chain orientation necessitates that businesses foster cultural components with supply chain participants, including trust, organizational compatibility, engagement, top management support, and cooperative norms (Mentzer et al., 2001). According to Stank et al. (2005), supply chain orientation is a methodical way of looking at the chain as a whole. It's also a collaborative strategy that aims to coordinate operational and strategic skills while keeping the customer in mind. According to Esper et al. (2010), supply chain orientation is a reflection of an intra-organizational managerial philosophy that includes behavioral norms that promote interconnected exchange as well as a common belief system about supply chain management. Stated differently, a company's attitude towards the supply chain encompasses its propensity to establish and preserve collaborative connections within the supply chain (Mentzer et al., 2001; Min and Mentzer, 2004). Trust (Ganesan, 1994), engagement (Morgan and Hunt, 1994), organizational compliance (Bucklin and Sengupta, 1993), cooperative norms (Cannon and Perreault, 1999), and top management support (Min, 2007) are second-degree dimensions that are indicative of supply chain orientation.

Organizations concentrate their efforts on certain aspects of supply chain orientation, such as norms, compliance, benevolence, commitment, and trustworthiness (Min, 2004; Min et al., 2007). According to Doney and Cannon (1997), trustworthiness is the degree to which an organization is competent and serious, whereas kindness is the degree to which it is genuinely interested in the state of the exchange partner and driven to pursue shared rewards. Exchange partners' interacting behaviors and rules of engagement are shaped by commitment (Spekman and Carraway, 2006). In order to comply, exchange partners must approximate their corporate cultures and management styles (Min, 2004). In this context, "compatibility" refers to non-conflicting, rather than entirely similar, cultures (Scholz, 1987). One important requirement of the exchange is that neither partner imparts the objectives or requirements of the other; rather, both parties recognize that flexibility and shared responsibility are the keys to the greatest success (Cannon and Perreault, 1999). Buyers, rivals, suppliers, logistics processes, and supply chain orientation variables are examples of supply chain orientation constructs (Hult et al., 2008). According to several sources (Esper et al., 2010; Mentzer, 2001b; Patel et al., 2013), they have both structural and strategic dimensions.

2.4. Theoretical Framework and Development of Hypotheses

It is recommended that managers cultivate dynamic capabilities and capacities, as well as a supply chain orientation philosophy, to enhance their ability to anticipate and address events that could disrupt the supply chain. A theoretical framework is a collection of overarching theoretical ideas and the hypothesized theoretical

relationships among them (Miles, 1994; Willis, 2007). It aids in the researcher's boundary-setting, question-forming, and design (Blake, 2014; Zahra, 2007).

The research and integration of ideas from various theoretical perspectives, primarily focused on the approach of dynamic skills to increase knowledge regarding their impact on boosting organizational resilience, form the theoretical framework of this paper. We have not found any research examining the connection between supply chain orientation and moderate resilience and dynamic managerial skills in the body of current literature. Supply chain managers' decisions are crucial in establishing supply chain flexibility and, thus, resistance to disturbances (Sawyerr and Harrison, 2019).

This is so that a supply chain orientation can effectively use dynamic managerial capabilities to respond to challenges and disruptions and guarantee that the entire supply chain is aligned toward a common goal of resilience (Ambulkar et al., 2014). Additionally, resource dependence theory suggests that during times of uncertainty, firms with strong relationships can better access and leverage their partners' resources, helping them maintain performance and stability (Fynes et al., 2004). The first source supports this argument by highlighting how a flexible orientation plays a crucial role in shaping the relationship between supply chain agility, resilience, and dynamic managerial capabilities. In other words, a strong supply chain orientation enables organizations to effectively apply dynamic managerial capabilities, ultimately enhancing supply chain resilience. This is especially crucial in various supply chain performance contexts and stages. The second source also highlights how crucial it is to comprehend particular resources and capabilities to build supply chain resilience. It implies that a focus on supply chain disruptions, combined with infrastructure for risk management and resource reconfiguration, can help build company resilience. Furthermore, to comprehend the relationship between resources, capabilities, and performance in terms of supply chain resilience and robustness, the third source emphasizes the necessity of a contingent resource-based view perspective. According to Ponomarov (2012), supply chain orientation is a moderating variable that has a statistically insignificant correlation with resilience, but supply chain management skills and resilience are positively correlated. According to Dubey et al. (2019), cooperation between supply chain participants is essential to fostering resilience because it lowers the likelihood of disruptions through information sharing, communication, trust, and supply-side decision-making.

The performance of organizations can be negatively impacted by supply chain disruptions, but supply chains can be made more resilient to reduce the risk that these disruptions pose (Christopher and Peck, 2004; Ponomarov and Holcomb, 2009; Wieland and Wallenburg, 2013; Ambulkar et al., 2014; Brusset and Teller, 2017). This study's primary goal is to demonstrate the theoretical and practical connections between supply chain resilience, dynamic skills, and supply chain orientation. Studies on dynamic skills and how they affect a firm's resilience are plentiful, but there are relatively few on the relationship between resilience and dynamic managerial skills. The results of the study by García-Valenzuela et al. (2023) indicated a favorable and significant influence of the majority of dynamic capabilities—detection, absorption, coordination, and innovation—on organizational resilience. According to the conceptual study by Jiang et al. (2019), dynamic skills offer a mechanism that helps tourism industry organizations adapt to unanticipated changes in the environment by transforming routines, allocating resources, and using them. The authors' theoretical model, which is based on the perspective of processes, demonstrates how an organization uses dynamic skills to enable the transformation of current operational routines into new routines that are resilient to disruptive events. Yu et al. (2019) conducted a study that examined the relationship between dynamism and financial performance, disruption orientation, and resilience. The study developed a conceptual model and tested it using data from a survey of 241 Chinese companies and the structural equation model. The study's findings demonstrated that the dynamism of the supply chain influences how supply chain disruptions are oriented and how the supply chain regenerates. To assist these organizations in constructing resilience and regeneration, the authors of the systematic literature review (Chih et al., 2022) compiled the best practices used by construction industry organizations during previous economic downturns. These evidence-based tactics, which have worked well in the past during crises, can be used by organizations to sense and reconfigure their internal and external environments, develop a suitable response to perceived threats or opportunities, and realign their resources and competencies to increase their capacity to withstand future disruptions.

This study has demonstrated that endeavors to enhance supply chain resilience should not be limited to the improvement of organizational supply chain resilience antecedents but should involve individual-level factors and managerial antecedents (Nikookar et al., 2019). Research findings from Yao and Meurier (2012) indicate that supply networks with resilience capability are more adept at responding to emergencies. According to research by Martinelli et al. (2018), social capital and dynamic skills are crucial for enhancing resilience. Furthermore, depending on the time frame of the natural disaster, different dynamic skill categories (re-connection, perception and interpretation, learning, and knowledge integration) and social capital contribute differently to entrepreneurial resilience. In addition to offering an integrated conceptual framework and conducting an empirical test of the relationship between study constructs, the current study expands upon the theory of dynamic skills. According to a study by Kevill et al. (2020) on the subject, managers' time allocation practices form the fundamental basis for dynamic managerial skills in microenterprises. If managers neglect to set aside time to apply these skills, it can lead to vulnerability. Several studies highlight and provide evidence for the value of managerial human capital in businesses. Wright et al. (2013) study highlights the beneficial effects of complementary and diversified managerial human capital on the performance of the business. According to a study by Buil-Fabregà et al. (2017), managers who possess dynamic managerial skills are better

equipped to handle occasionally unpredictable changes in the marketplace and can recognize them sooner. Subsequently, with the aid of dynamic capabilities and supply chain orientation theory as a theoretical lens, we develop a conceptual model (Figure 1) and a set of hypotheses on the relationship between managerial dynamic capabilities and resilience with respect to supply chain orientation as a moderator.

H_1: Dynamic managerial capabilities and resilience are positively correlated.

H_2: Resilience and supply chain orientation are positively related.

H_3: The association between resilience and dynamic skills is moderated by supply chain orientation.

3. METHODOLOGY

The literature has been updated to reflect each of these constructs by identifying and including variables pertinent to research questions. The survey method is used in this study. The first sample consisted of 2540 randomly selected manufacturing companies that were listed in the kosovo business registration agency (KBRA). Three constructs—dynamic managerial capabilities, supply chain orientation, and resilience—have been identified as the primary independent, dependent, and moderating variables based on the pertinent literature. These variables were then used to generate the survey's questions, which were then developed further. Data are gathered through Google Forms and telephone. Based on the KBRA register and companies that carry out value-added activities along the supply chain, the data is gathered. The majority of survey participants are operational and supply chain management professionals (CEOs, presidents, managers, directors, etc.) who possess a solid understanding of the study's concepts. Table 1 shows the distribution of the sample based on size, type of enterprise, working experience, and position of respondents. Manufacturers are included in the study unit. The survey was carried out in 2023 between January and April. A total of 2540 surveys were sent to the respondents; of those, 195 were returned completed; the remaining 15 were deemed incomplete and were removed. 184 questionnaires in total were used for the study, which translates to a response rate of 7.24%. Using the body of existing literature, the four constructs used in the study were operationalized. Supply chain orientation has been measured based on a reflective five-construct scale (Mentzer et al., 2001; Min et al., 2007). Data from the survey can be found in Appendix section of the study (Appendix).

The specific constructs included the following: trust, commitment, cooperative norms, organizational compatibility, and top management support. The test of reliability composite scale of supply chain orientation indicates a value of Cronbach's alpha = 0.933. The resilience construct is retrieved from the study of Ambulkar et al. (2014). The Corrêa et al. (2018) measurement scale has been utilized to operationalize the development of dynamic managerial skills. Three components make up this measuring tool: managerial expertise, a network of relationships, and human capital. Four dimensions, each with a Likert scale ranging from 1 to 7, are used to operationalize the elasticity. According to Ambulkar et al. (2014), dimensions assess a company's capacity to maintain high situational awareness, adjust quickly to disruptions in the supply chain, and deal with changes brought on by those disruptions. The confirmatory factor analysis (CFA) composite index value was greater than the eligibility threshold of 0.86.

3.1. Data Analysis

3.1.1. Preliminary analysis

Validity and reliability are the two most crucial qualities that an assessment tool needs to have, according to Suryabrata (2014). Concurrently, Yudha (2020) claimed that construct and content validity comprise the validity of the assessment tool. Using (i) composite reliabilities and item loadings, (ii) convergent validity (AVE), and (iii) discriminant validity, the measuring model's suitability for all constructs was assessed. The fact that all outer loadings were above the 0.70 threshold, the composite reliability as determined by Dillon-Rho Goldstein, and the values of Cronbach's α exceeded the 0.60 threshold demonstrated the reliability of the items (Sarstedt et al., 2017). Furthermore, the convergent validity values of every construct exceeded the 0.50 threshold. A variable's normal distribution can be estimated using the Kolmogorov-Smirnov and Shapiro-Wilk tests. Samples under 50 can be tested using the Shapiro-Wilk test, which can also be applied to samples of up to 2000. A variable with a normal distribution has a test limit of 0.05; if this value is exceeded, the variable is not normal. All variables have a normal distribution, according to the Shapiro-Wilk test, except for the supply chain's orientation, which has a test value of <0.05. The analysis will make use of logarithmic transformation for greater precision. Using SPSS Amos 21 software, the data was examined using the structural equation model (SEM). This model is an example of a confirmatory approach to data analysis, where the hypothesized model is statistically tested to evaluate the prediction's validity and the degree to which the suggested model is consistent with the sample data. Before analyzing the coefficients, one needs to determine how well the structural equation model fits the data. A measuring device's consistency level serves as a gauge for its dependability.

Construct reliability was assessed using Cronbach's alpha and composite reliability. Typically, the Cronbach α reliability coefficient is employed to assess the dependability of a measurement tool. According to O'Leary-Kelly and Vokurka (1998), an instrument is deemed to have good reliability if its α value is equal to or higher than 0.7. Table 2 depicts the results of Cronbach alfa, convergent, and discriminant validity. The managerial knowledge index was 0.832, the relationship network was 0.804, and the composite human capital reliability index was 0.874. The Cronbach alpha values were deemed acceptable since they were above 0.7 (0.898). Cronbach's alpha for the resilience construct is about the threshold, $\alpha = 0.779$. Cronbach's alpha for management cognition is 0.757, for human capital, $\alpha = 0.752$, and for relationship networks, $\alpha = 0.488$. The overall Cronbach alpha for DC is $\alpha = 0.769$.

Convergent validity of scale items was estimated using average variance extracted (Fornell and Larcker, 1981). The average variance-extracted values were above the threshold value of 0.5 (Fornell and Larcker, 1981), except for the DC2, DC7, DC8, and

Table 1: Sample descriptive (n=184)

Basic information	Categories	Frequency	Percentage
Size (Employes)	<100	39	21.2
	101-300	60	32.60
	301-500	49	26.63
	501-1000	22	11.95
	More than 1000	14	7.60
	Total	184	
Type of enterprise	Individual firm	15	8.15
	Limited Liabilities Company	132	71.74
	Partnership	6	3.26
	Shareholder Company	31	16.85
	Total	184	
Working experience	<1	54	29.35
	1-3	68	36.96
	3-5	47	25.54
	More than 5	15	8.15
	Total	184	
Position of repondents	Senior executive	62	33.7
	Senior manager	51	27.72
	Managers	35	19.02
	First-line managers	21	11.41
	Others	15	8.15
	Total	184	

Table 2: Reliability and Validity analysis

Items	Factor loadings	Alpha	Composite relability	AVE
Dynamic capabilities		0.769	0.67	0.51
DC1	0.483			
DC3	0.620			
DC4	0.548			
DC5	0.744			
DC6	0.872			
DC10	0.654			
Supply chain orientation		0.933	0.94	0.6
SO1	0.838			
SO2	0.674			
SO3	0.844			
SO4	0.830			
SO5	0.846			
SO6	0.781			
SO7	0.775			
SO8	0.622			
SO9	0.819			
SO10	0.579			
SO11	0.836			
Resilience		0.779	0.74	0.65
R1	0.801			
R2	0.701			
R3	0.899			

Table 3: Regression weights: (Group number 1 - Default model)

Model link	Estimate	S.E.	C.R.	P Label
SCR<--DCM	2.275	1.053	2.160	0.031
SCR<---SCO	1.594	0.756	2.108	0.035
SCR<---DCM_SCO	−0.300	0.166	−1.802	0.072

DC9 items of the dynamic capability measure and the R4 items of resilience, which were excluded from further analysis in order to improve the fit of the model. Therefore, the convergent validity

Table 4: Hypothesized Relationship between constructs

Hypothesized relationship		Estimates	Result
Dynamic mangerial capabilities			
Pozitive	Resilience	0.31	Supported
Supply chain orientation			
Pozitive	Resilience	0.35	Supported
Dynamic mangerial capabilities_ supply chain orientation			
Moderation	Resilience	No moderation effects	

Figure 1: The conceptual model

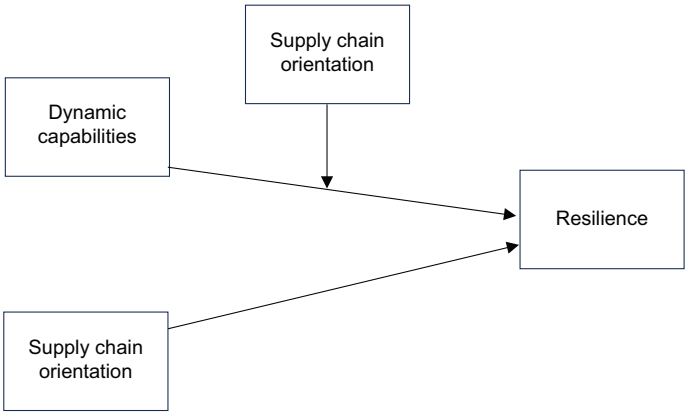
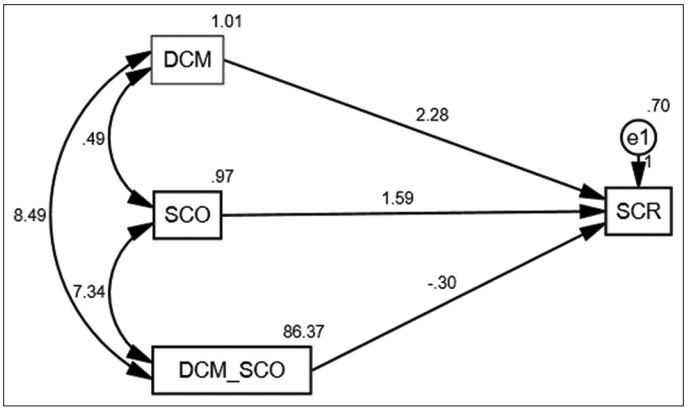


Figure 2: Structural equation model



is under the accepted range, and the scale measure used for this study represents a good measure.

Discriminant validity in the study was assessed using the Fornell and Larcker criterion. According to the Fornell and Larcker criterion, discriminant validity is established when the square root of AVE for a construct is greater than its correlation with the other constructs in the study.

4. ANALYSIS AND DISCUSSION

One can conclude that the study's first hypothesis is supported after examining the data from the structural equation modeling. The study's initial hypothesis is reinforced by the data analysis of the structural equation. Dynamic managerial capabilities and resilience have a positive and significant relationship ($P < 0.031$) at a significance level of $P < 0.05$. As shown in Figure 2 we see

the path from dynamic managerial capabilities (DMC) to supply chain resilience (SCR) was significant (P < 0.005), in the direction hypothesized, and strong (0.31). Other research papers reveal the influence of dynamic capabilities on the capacity of the supply chain to recover from disruptions (Martinelli et al., 2018; Nikookar et al., 2019; Wright et al., 2013).

The data strongly supported the hypothesis that dynamic managerial capabilities are an antecedent to supply chain resilience. The Table 3 shows relationship between supply chain orientation (SCO) and supply chain resilience (SCR), as proposed in Hypothesis 2, is also supported (P < 0.35). This finding is in line with other studies (Ponomarov, 2012; Yadav and Tripathi, 2024). However, there is no evidence to support the hypothesis that supply chain orientation (SCO) moderates the relationship between dynamic managerial capabilities (DMC) and supply chain resilience (SCR). The results show that the relationship is not as expected, as hypothesized, and is not statistically significant (P < 0.072). The hypothesized relationships and results are presented in Table 4. This finding could be explained by the complex relationship between dynamic managerial capabilities (DMC) and supply chain resilience (SCR), which could be impacted by other variables not included in the study. Additionally, limitations related to sample size or research methodology could have impacted the results. Further research is needed to explore these possibilities and gain a deeper understanding of how DMC, SCR, and SCO interact.

5. CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS

This study set out with the purpose of investigating the phenomenon of supply chain resilience at the firm level of analysis, as well as its antecedents and value-based outcomes. The main aim of this study was to test the relationship between dynamic capabilities and resilience under the moderating effect of supply chain orientation. This study builds on previous research through its emphasis on the role of dynamic capabilities in developing firm-level competencies, and it expands the theoretical reach of resource-based theory and its dynamic capabilities. While the positive relationship between dynamic capabilities and resilience is confirmed, the moderating effect of supply chain orientation is not supported. These empirical findings are particularly crucial for comprehending the essence of SCR and the characteristics that substantially enhance resilience at the organizational level. Furthermore, the significant importance of logistical capabilities as essential strategic resources is underscored, building upon prior studies in the field. Drawing upon dynamic capabilities theory, this study adds to other previous findings of the positive effect of dynamic capabilities on creating resilient supply chains (Jiang et al., 2019).

These findings suggest that companies with a strong focus on supply chain orientation and dynamic capabilities are better equipped to resist and recover from supply chain disruptions. Additionally, it highlights the importance of investing in dynamic capabilities to improve overall supply chain resilience. While the hypothesis regarding the moderating role of supply chain orientation was not supported, further research may be needed to better understand the interactions between these variables. First, this study contributes to the growing body of literature on supply chain sustainability and resilience. Second, the empirical results indicate that dynamic managerial capabilities and supply chain orientation are strong antecedents and predictive factors of resilience. Third, by understanding these relationships, organizations can design strategies and structures that enhance their resilience, especially in environments characterized by rapid change and disruption. This study offers many opportunities for future research. Future studies could explore other important capabilities for building supply chain resilience. Another research direction should be adding another variable to be included in the proposed theoretical model. Furthermore, could the results of this research be replicated under other contextual conditions? Lastly, regarding the methodology of the study, future studies could use triangulation and employ a variety of quantitative and qualitative methods.

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APPENDIX

Measurement of Supply Chain Orientation

Please indicate your agreements on items according to your perception about the external pressures that force your company to adopt SSCM practices with 1 representing "very disagree" and 7 representing "very agree".
Supply chain orientation constructs: Adapted from Mentzer et al. (2001); Min et al., (2007).

Measurement of supply chain orientation							
	Supply chain orientation (SCO)	**Strongly**	**Disagree**	**Neutral**	**Strongly**	**Agree**	
1.	We trust our key suppliers.	1	2	4	5	6	7
2.	We trust our key customers.	1	2	4	5	6	7
3.	We believe that our key suppliers trust us.	1	2	4	5	6	7
4.	We believe that our key customers trust us.	1	2	4	5	6	7
5.	Our organization places a high priority on maintaining relationships with our key suppliers.	1	2	4	5	6	7
6.	Our organization places a high priority on maintaining relationships with our key customers.	1	2	4	5	6	7
7.	Our objectives are consistent with those of our key suppliers.	1	2	4	5	6	7
8.	The culture of our firm is similar to the culture of our key supply chain partners.	1	2	4	5	6	7
9.	We view our supply chain as a value added piece of our business.	1	2	4	5	6	7
10.	Top managers reinforce the need of building, maintaining	1	2	4	5	6	7
11.	Top managers reinforce the need of sharing valuable	1	2	4	5	6	7

Firm's resilience scale measurement

Please indicate your agreements on items according to your perception about the external pressures that force your company to adopt SSCM practices with 1 representing "very disagree" and 7 representing "very agree".
Firm's resilience construct: Adapated from Ambulkar et al. (2014)

Firms resilience scale measurement								
FR1	We are able to cope	1	2	3	4	5	6	7
	with changes brought by the supply chain disruption	1	2	3	4	5	6	7
FR2	We are able to adapt to the supply chain disruption easily.	1	2	3	4	5	6	7
FR3	We are able to provide a quick response to the supply chain disruption	1	2	3	4	5	6	7
FR4	We are able to situational awareness at all times.	1	2	3	4	5	6	7

Dynamic capabilities scale measurement

Please indicate your agreements on items according to your perception about the external pressures that force your company to adopt SSCM practices with 1 representing "very disagree" and 7 representing "very agree".
Dynamic managerial capabilities: Adapted from Correa et al. (2018).

Dynamic capabilities scale measurement	
Variables	
Management Cognition	DC1: My father has a high level of education-that is, a college degree and Specialization.
	DC2: I did most of my elementary education at private schools.
	DC3: I spent most of my high school years at private schools
	DC4: I have always been part of a high social class-that is, I have always been part of economic classes A or B.
Human Capital Management	DC5: I have extensive experience with the products/services offered by the company I manage.
	DC6: I consider myself quite prepared to handle the clients of the company I run.
	DC7: I consider myself quite prepared to deal with suppliers of the company I run.
Relationship Networks	DC8: I realize that there is a relationship of trust between the members of my team.
	DC9: During elementary school, I was encouraged, to a large extent, by my teachers to think and act creatively.
	DC10: During high school, I was encouraged by most of my teachers to think and act creatively.