Article

The Impacts of Supply Chain Capabilities, Visibility, Resilience on Supply Chain Performance and Firm Performance

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Abstract: This study explores the significance of two determinants: Supply Chain Capabilities and Supply Chain Visibility, in the intricate interplay among Supply Chain Resilience, Supply Chain Performance, and Firm Performance. A dataset comprising 221 participants from Vietnamese garment manufacturing firms was gathered and subjected to analysis using the PLS-SEM approach, revealing insights into the modeled complex relationships. The research findings reveal that visibility significantly influences supply chain resilience; while the hypotheses of a positive impact of supply chain visibility and supply chain resilience on firm performance have been rejected. Interestingly, these findings underscore the significant influence of indirect relationships mediated by factors, such as supply chain resilience and supply chain performance. Hence, this study bridges a gap in the existing body of literature and offers practical implications for supply chain management, particularly concerning performance measurement challenges in this sector. The article suggests that the Vietnamese garment supply chain could enhance supply chain and firm performance by focusing on supply chain capabilities and visibility.

Keywords: supply chain capabilities; supply chain visibility; supply chain resilience; supply chain performance; firm performance; Vietnamese garment sector

1. Introduction

Throughout the last few decades, supply chain management (SCM) has concentrated on bolstering firm performance through the reinforcement of both upstream and downstream linkages (Kashiwagi and Iwasaki 2023). Moreover, earlier research has highlighted firm performance as a primary objective, and it has been established that supply chain resilience (SCR) can significantly bolster firm performance (FP) (Alkhatib and Momani 2023; Li et al. 2022). This recognition of the importance of SCR has generated substantial interest from both managers and researchers. Ensuring business stability and growth is one of the most effective strategies for businesses to gain a competitive advantage (Huang et al. 2023). The ability to adapt and endure changes was put to the test when the COVID-19 pandemic disrupted supply chain operations (Ivanov 2022). Simultaneously, each sector has grappled with concerns regarding the resilience of supply chain performance (SCP) (Nayal et al. 2022; Tarigan et al. 2021). More importantly, the concept of capabilities offers valuable insights into identifying the necessary supply chain capabilities (SCC) required to enhance resilience (Brusset and Teller 2017; Queiroz et al. 2021). Furthermore, there is an increasingly pressing need to explore the relationship between SCP and its underlying capabilities.

Several scholars have emphasized the significance of capability and resilience as critical aspects of supply networks (Chowdhury et al. 2019; Naghshineh and Carvalho 2022). The COVID-19 pandemic has had profound and widespread effects on various aspects of the supply chain, encompassing logistics, transportation, and distribution, leading to substantial adverse outcomes (Sarkar et al. 2022). The triumph of the supply chain hinges

on the resilience and capacity of firms to confront these challenges (Gani et al. 2023). Firms require guidance in discerning which capabilities and levels of visibility influence supply chain resilience, thereby optimizing value chain operations (Baah et al. 2022; Bahrami and Shokouhyar 2022; Liao and Kuo 2014). Consequently, it becomes imperative to explore how supply chain resilience and firm performance intersect. As suggested by Ben-Daya et al. (2022), the monitoring of individual components often pertains to downstream elements of the supply chain, encompassing subassemblies, finished products, and the analysis and enhancement of buyer–supplier relationships (Ben-Daya et al. 2022). Furthermore, even contemporary definitions of supply chain resilience advocate for an approach centered on capability and visibility (Maharjan and Kato 2022; Rahman et al. 2022). Supply chain visibility (SCV) entails the automation of supply chain processes to achieve optimal efficiency (Bahrami and Shokouhyar 2022). Recent research has underscored the potential benefits that can arise from the implementation of SCV in augmenting the operational efficiency and overall performance of companies (Kamble et al. 2020; Messina et al. 2022).

To investigate the complex correlations among these constructs, we focus on the Vietnamese garment supply chain in this research. Notably, the garment industry has emerged as a significant sector in Vietnam, with garments constituting a major share of exports (Huynh 2022). Recently, Vietnam has become a prominent global garment exporter (Chi 2022; Thi Nong 2022). This context serves as a driving force for our investigation, and our research objectives revolve around probing the connections between two critical facets of supply chain resilience (SCR): supply chain capabilities and supply chain visibility. The authors aim to understand their impacts on supply chain performance and firm performance, with a specific focus on the context of Vietnam's garment industry. Thus, we will answer the main research questions as follows:

RQ1: How do supply chain capabilities and visibility influence supply chain resilience, supply chain performance, and firm performance in the Vietnamese garment industry?

RQ2: How does supply chain resilience influence supply chain performance and firm performance in the Vietnamese garment industry?

RQ3: How does supply chain performance influence firm performance in the Vietnamese garment industry?

This study significantly addresses a gap in the current literature by providing insights into the interconnected and synergistic aspects of SCC and SCV viewpoints. Primarily, the research examines the interrelation between SCC and SCC with SCR. Additionally, the investigation delves into how SCR relates to and influences SCP and FP. Subsequently, the study concludes by highlighting its contributions and offering recommendations for future research endeavors.

2. Literature Review

In recent years, multiple authors have claimed the significance of supply chain capabilities and visibility as crucial factors and have provided valuable theoretical and practical insights (Agarwal et al. 2022; Anwar 2022). However, the interplay among the integrated components of SCC, SCV, and SCR remains largely unexplored. To maintain a competitive advantage amidst turbulent times, organizations must invest in enhancing their capabilities and implementing supply chain visibility (Agrawal et al. 2022; Chowdhury et al. 2019). Nonetheless, there is inconsistency in defining the concepts of SCC, SCV, and SCR. For instance, some scholars primarily focus on SCR the resource-based view (RBV) theory and suggest that SCC and SCV are necessary elements of SCR, contributing to improved SCP (Naghshineh and Carvalho 2022; Zhao et al. 2023). In contrast, other studies take a different perspective, treating SCC and SCV as determinants that could affect SCR (Hong et al. 2019; Messina et al. 2022; Qader et al. 2022). Moreover, conventional assessments of SCC and SCV are insufficient for addressing the full complexity of the relationships among them with supply chain resilience, supply chain performance, and firm performance (Zhao et al. 2023).

Aiming to provide noteworthy insights from this study, we will explore the influence of SCC and SCV as the determinants. Hence, the authors propose a research framework focused on exploring the complex relationships among SCC, SCV, SCR, SCP, and FP (as presented in Figure 1).
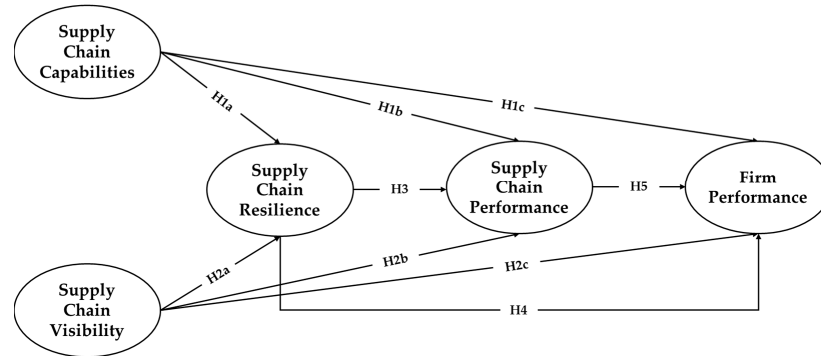

Figure 1. The Proposed Research Framework.

2.1. Identification of the Related Factors

2.1.1. Supply Chain Capabilities

The concept of supply chain capabilities has been defined from various perspectives. For instance, SCC has been described as specific capabilities that enable the efficient and effective execution of all activities within a supply chain (Asamoah et al. 2021; Mandal et al. 2016). Additionally, Hong et al. (2019) refer to these capabilities as a combination of management and organizational abilities, encompassing not only internal capabilities but also cooperation and information exchange capabilities among organizations (Hong et al. 2019). However, only a limited number of existing studies have focused on the SCC concept from the perspective of effectively harnessing resources. In this study, the authors consider SCC constructs as an organization's capacity to effectively recognize, utilize, and integrate both internal and external resources to facilitate various activities within the supply chain (Asamoah et al. 2021; Gani et al. 2023; Hong et al. 2019). Supporting this perspective, Queiroz et al. (2021) emphasize that to achieve significant supply chain performance, firms must cultivate fundamental capabilities (Queiroz et al. 2021).

Thus, according to the RBV theory, this study suggests that the garment industry should focus on SCC constructs as elements owned or managed by an organization (Abeysekara et al. 2019; Zhao et al. 2023). In detail, numerous scholars have conducted research on SCC and have identified several potential practical implications (Hautala-Kankaanpää 2022; Saqib and Zhang 2021), including dual sourcing, shipping processes, and enhanced supply chain performance (Ekanayake et al. 2021). For example, Liao et al. (2022) found a direct relationship between SCC and operational performance (Liao et al. 2022). Hence, the authors would consider some firm's supply chain capabilities, including operational, optimization, relationship, and standardization, as the items of the SCC factor, which also assists enterprises in anticipating and mitigating supply chain disruptions (Gani et al. 2023; Hong et al. 2019; Zhao et al. 2023).

2.1.2. Supply Chain Visibility

Supply chain visibility is closely linked to the sharing of information within a supply chain (Messina et al. 2022). Sunmola et al. (2023) have defined SCV as the solution to help the supply chain achieve a comprehensive and transparent view of its operations, spanning from the initial stage to the final stage (Sunmola et al. 2023). This includes the effective dissemination of significant and valuable information among the various stakeholders involved in the supply chain, leading to improved supply chain performance (Gani et al. 2023; Qader et al. 2022; Sunmola et al. 2023). SCV is essential for enhancing efficient supply chain management because it enables businesses to respond to changes, reduce uncertainty, and enhance overall performance (Kamble et al. 2020; Qader et al. 2022).

SCV constitutes a pivotal element in the recipe for successful supply chain collaboration, ensuring that all stakeholders engaged in the supply chain have access to pertinent information regarding its activities (Messina et al. 2022). The integration of intra-firm processes, such as the introduction of new products or innovations in the sales process in e-commerce through technology, can facilitate transparent operations across the entire chain (Roy 2021). As a result, all partners can collaborate more effectively in planning and execution (Agrawal et al. 2022; Baah et al. 2022).

2.1.3. Supply Chain Resilience

SCR involves agile planning and proactive forecasting to swiftly respond to risk management (Phan et al. 2023a; Qader et al. 2022). According to Sturm et al. (2023), resilience is a multifaceted concept in the supply chain context, yet it remains a pivotal capability for organizations (Sturm et al. 2023). The concept of SCR encompasses various interpretations, one of which revolves around the capacity to adapt to shifting circumstances, address unforeseen disturbances, and reinstate normal operations (Mubarik et al. 2021; Qader et al. 2022). Alternatively, SCR might also denote the ability to transition toward a more favorable state (Agarwal et al. 2022; Alkhatib and Momani 2023). In the present context, resilience pertains to an organization's or industry's capacity to overcome disruptions (Novak et al. 2021). It underscores a system's ability to endure, adapt, and evolve while maintaining its structure and functionality (Sarkar et al. 2022). Numerous academic studies have demonstrated a connection between SCR and the enhancement of firm performance (Novak et al. 2021). Thus, the authors will approach the concept of SCR by considering issues such as the ability to promptly restore, maintaining a specified level of interconnectivity, and sustaining a certain level of activity during a disruption (Mubarik et al. 2021; Qader et al. 2022).

2.2. Theoretical and Hypotheses Development

2.2.1. The Effect of Supply Chain Capabilities

Numerous studies have highlighted a correlation between SCC and SCR (Agarwal et al. 2022; Mandal et al. 2016; Nayal et al. 2022). SCC entails the cooperation of multiple parties with the objective of resource sharing and collective achievement of shared goals (Naghshineh and Carvalho 2022). Meanwhile, Agarwal et al. (2022) demonstrated that SCR refers to a supply chain's capacity to effectively prepare for unforeseen disruptions, respond to disturbances, recover, and maintain control over structure and performance, drawing from multidisciplinary perspectives (Agarwal et al. 2022). Moreover, businesses lack the necessary internal resources, making it impractical to develop these resources on their own. Consequently, collaborative efforts within supply chains become crucial to ensure the continual availability of resources (Aman and Seuring 2023). Nayal et al. (2022) assert that enhancing a firm's operational capabilities can lead to improved overall performance (Nayal et al. 2022). Additionally, Mandal et al. (2016) concluded that linking SCC with SCR offers a way to conceptualize the intricacies of cause-and-effect interactions within supply chains (Huang et al. 2023; Mandal et al. 2016). In light of the aforementioned discussions, we propose the following hypothesis.

H1a. *Supply chain capabilities are positively associated with supply chain resilience.*

Supply chain capabilities encompass an organization's adeptness at effectively identifying, leveraging, and incorporating both internal and external information and resources to facilitate the optimal functioning of the supply chain (Asamoah et al. 2021). As mentioned by Tigga et al. (2021), two significant components contributing to SCP are production flexibility and information interchange (Tigga et al. 2021). Anwar (2022) delved into the links between SCP from a firm-oriented perspective, particularly concentrating on the interplay between SCC and SCP (Anwar 2022). As a result, SCC has emerged as the central focal point for SCP within a competitive business landscape. Further discoveries underscored that the supply chain's capacity exhibited a more pronounced impact on supply chain performance in some previous studies (Anwar 2022; Tigga et al. 2021). Consequently, this study investigates the correlation between SCC and SCP as follows.

H1b. *There exists a positive correlation between supply chain capabilities and supply chain performance.*

The integration of resources throughout the supply chain process is imperative for improving effective supply chain capabilities (Irfan et al. 2019). The potential enhancement of a firm's performance through a cost advantage over competitors can be attributed to its supply chain capabilities (Bahrami and Shokouhyar 2022). Furthermore, supply chain capabilities act as a catalyst for transforming resource-related inputs into improved firm performance (Saqib and Zhang 2021; Tigga et al. 2021). Baah et al. (2022) examined the causal linkages between SCC practices and firm performance (Baah et al. 2022). Organizations can leverage an integrated supply chain system to combine complementary resources and enhance organizational effectiveness (Liao and Kuo 2014; Qrunfleh and Tarafdar 2014). Consequently, the enhancement of SCC is widely acknowledged to exert a substantial impact on the overall performance of firms (Ekanayake et al. 2021). Therefore, this research proposes the following hypothesis.

H1c. *A positive correlation exists between supply chain capabilities and firm performance.*

2.2.2. The Effect of Supply Chain Visibility

Supply chain visibility (SCV) ensures transparency within the supply chain by enabling the smooth flow of information in all directions (Kalaiarasan et al. 2023; Sodhi and Tang 2019). Moreover, SCV streamlines organizational processes, leading to smoother operations (Min et al. 2019). When disruptions occur, a supply chain can quickly rebound to a higher level of performance if all members within the chain have adequate visibility (Baah et al. 2022; Kraft et al. 2022). Ali et al. (2017) suggest that SCV acts as a strategic warning system, giving firms sufficient time to align their supply chain partners and mitigate the disruptive impact (A. Ali et al. 2017), for example, by promptly addressing customer inquiries, monitoring and overseeing customer orders, and enhancing post-sale support quality (Das and Hassan 2022). In essence, a positive correlation exists between the level of SCV and SCR (Mandal et al. 2016). Moreover, boosting SCV can expedite recovery and the restoration of optimal performance levels (Huang et al. 2023; Mandal et al. 2016). Hence, we propose the following hypothesis.

H2a. *Supply chain visibility significantly impacts supply chain resilience.*

As noted by Ye et al. (2022), SCV holds a significant role in fostering collaboration and enhancing performance within the supply chain (Ye et al. 2022). Roy (2021) suggests that by granting all supply chain participants access to more data, a unified demand prediction could be formed (Roy 2021). This, coupled with a proportional restoration rule, could aid in swiftly restoring inventory levels after a disruption (Baah et al. 2022; Ye et al. 2022). Strengthening the buyer-supplier relationship through visibility and collaboration subsequently reinforces the resilience of the supply chain (Namdar et al. 2018). The overarching aim of SCV is to elevate the overall performance of enterprises, facilitate decision-making, and fortify the resilience and sustainability of the supply chain network (Kalaiarasan et al. 2023). Through the establishment of effective external connections, businesses can amplify visibility, thereby augmenting SCP (Baah et al. 2022; Ye et al. 2022). Consequently, this study posits a positive correlation between SCV and SCP.

H2b. *Supply chain visibility is positively associated with supply chain performance.*

The implementation of SCV holds the potential to significantly enhance the efficiency of commercial operations related to manufacturing (Mubarik et al. 2021). According to Dubey et al. (2017), leveraging a firm's technological resources to establish SCV among its members can profoundly impact sustainability performance (Dubey et al. 2017). They highlighted that firm performance benefits from the visibility fostered through interactions, connectivity, and information sharing (Dubey et al. 2017). Simultaneously, supply chain collaboration and adaptability serve as pivotal precursors to SCP during disruptions (Juan et al. 2022). Incorporating visibility could offer distinct advantages in

boosting firm performance (Baah et al. 2022). Additionally, establishing interconnect-edness among partners is essential to elevate the level of visibility within the supply chain. Srinivasan and Swink (2018) uncovered that the absence of agility in making swift decisions within firms renders access to supplementary information ineffectual (Srinivasan and Swink 2018). Considering the preceding discussion, the following hypothesis is postulated.

H2c. *Supply chain visibility is positively associated with firm performance.*

2.2.3. The impact of SCR on SCP and FP

The interconnection between resilience practices and performance in the supply chain is intricate, with the potential for reciprocal positive or negative effects (Ali et al. 2023; Sturm et al. 2023). Previous research has contributed evidence to enhance our comprehension of the links between SCR and SCP by dissecting resolution options and undertaking comprehensive studies (Novak et al. 2021; Sturm et al. 2023). Consequently, resilience plays a pivotal role in enabling SCP, acting as a preventative measure against disruptive events and supporting the achievement and sustained maintenance of satisfactory performance levels (Dubey et al. 2017; Novak et al. 2021). Additionally, earlier studies have unveiled a positive correlation between SCP and organizational performance (Dubey et al. 2017; Sturm et al. 2023). As a result, SCR and SCP can be perceived as a crucial linkage, aiding in formulating a strategic path (Alkhatib and Momani 2023). Therefore, the following hypothesis is proposed:

H3. *Supply chain resilience is positively associated with supply chain performance.*

Firm performance is gauged by employing indicators, such as reductions in final operating costs, and non-financial variables, such as firm value and market share (Ali et al. 2023). This study marks the inaugural empirical exploration of the correlation between SCR and firm performance. The implementation of SCR has been observed to exert a notable influence on operational robustness and efficiency (Mandal et al. 2016). Consequently, SCR can be identified as a determinant that impacts firm performance and serves as a critical indicator of a firm's supply chain resilience qualities (Ivanov 2022; Rahman et al. 2022). Importantly, SCR also functions as a type of organizational resource, aiding organizations in adapting to their circumstances to achieve sustained growth (Liu et al. 2018). In light of the preceding discussion, the following hypothesis was formulated:

H4. *Supply chain resilience is positively associated with firm performance.*

2.2.4. Relationship between SCP and FP

Previous empirical studies have consistently presented evidence of the positive impact of SCP on firm performance (Qader et al. 2022). Certain authors have suggested that delving into how operational activities and capabilities contribute to SCP in shaping supply chain networks holds significant importance (Ali et al. 2023). Therefore, given the diversity of variables and measures for operational performance, a range of models and theories from prior studies have elaborated on hypothesized relationships between SCP and FP (Ali et al. 2023). For instance, Sturm et al. (2023) put forward the notion that resource theories establish a connection between SCC, resilience, and their applicability in investigating the association between SCP and FP (Sturm et al. 2023). Performance indicators offer insight into a company's accomplishments in achieving its objectives (Ali et al. 2023). Hence, the authors propose the exploration of innovative linkages between SCP and firm performance, as encapsulated in the following hypothesis:

H5. *There exists a positive correlation between supply chain performance and firm performance.*

3. Research Methodology

3.1. Questionnaire Design

The questionnaire scales employed in this study were drawn from prior scholarly sources, as outlined in Table 1. All responses in this research were evaluated using a Likert scale that ranged from 1 to 5. The Likert scale provides a quantifiable measure for the survey study, which is a widely utilized tool in quantitative research for gauging perspectives and attitudes on various topics (Do et al. 2020; Phan et al. 2023b). To ensure precision, a pre-testing phase was conducted in Vietnam, involving interviews with experienced practitioners. This pre-testing aimed to identify and address any issues related to the survey's structure and phrasing. Following the pilot test, updated questionnaires featuring multi-item scales were crafted. Participants in the study were provided with an explanation of supply chain expertise.

Table 1. Identification of study variables.

Constructs	Items	Descriptions	Resource
Supply chain capabilities (SCC)	SCC1	The organization is equipped to simplify supply chain procedures and possesses the capability to eliminate redundant or superfluous processes.	(Asamoah et al. 2021; Gani et al. 2023; Hong et al. 2019)
	SCC2	The organization maintains positive relationships with both customers and partners.	
	SCC3	The organization offers superior quality products and efficient delivery capabilities.	
	SCC4	The organization possesses the ability to standardize and unify products.	
Supply chain Visibility (SCV)	SCV1	Main suppliers inform firm of their inventory availability	(Baah et al. 2022; Mubarik et al. 2021; Qader et al. 2022)
	SCV2	The frequent updating of the supplier inventory information is significant.	
	SCV3	Vendor stock reports are reliable.	
	SCV4	Firms receive shipment alerts in advance from our suppliers.	
	SCV5	The information the firm receives from vendors regarding advance shipments is timely and accurate.	
Supply chain resilience (SCR)	SCR1	The firm could promptly restore its initial condition following any form of disruption.	(Mandal et al. 2016; Mubarik et al. 2021; Qader et al. 2022)
	SCR2	During disruptions, our firm can maintain a specified level of interconnectivity among its constituents.	
	SCR3	The firm can be able to maintain a certain level of activity during the disruption.	
Supply chain performance (SCP)	SCP1	Supply chain can enhance production and inventory cost.	(Chowdhury et al. 2019; Juan et al. 2022; Liao et al. 2022)
	SCP2	Supply chain can assist us in enhancing timely product delivery.	
	SCP3	Supply chain helps firm meet client needs.	
	SCP4	Supply chain may boost revenue.	
Firm performance (FP)	FP1	Operating costs down	(Ali et al. 2023; Liao and Kuo 2014; Qrunfleh and Tarafdar 2014)
	FP2	Enhance the company's overall competitive position	
	FP3	Increase product sales growth rate	
	FP4	Increase market share of products	

3.2. Data Collection

This work is quantitative research, which considers the Vietnamese garment industry as a case study to explore the complex relationships as represented in the proposed framework (Figure 1). The authors employed the PLS-SEM approach to examine the established relationships in this study. PLS-SEM was chosen for its capability to forecast intricate mod-

els (Hair et al. 2019; Phan et al. 2023b). The utilization of PLS-SEM allows for predicting the effects of dependent variables and is suitable for scenarios with small sample size requirements (Do et al. 2020; Zeng et al. 2021). Additionally, the primary aim of this research was to predict the complex relationship within the supply chain of the Vietnamese garment industry. Thus, the selection of PLS-SEM was deemed the most appropriate methodology for conducting the analysis (Hair et al. 2019; Qader et al. 2022). Notably, Hair et al. (2019) and Phan et al. (2023a) affirm that the PLS-SEM approach has gained significant recognition among scholars due to its comprehensive and adaptable nature (Hair et al. 2019; Phan et al. 2023b). Consequently, this study employed the SmartPLS 4.0.9.5 tool to empirically identify the elements associated with the interconnected approach. The survey gathered responses from 300 participants working in the Vietnamese garment industry, specifically holding positions of deputy managers or senior staff. These participants possessed knowledge about the supply chain and had a minimum of two years of experience in supply chain management or logistics fields within Vietnamese garment companies. Consequently, the usable sample size for analysis consisted of 221 respondents due to significant data gaps or incompleteness. Detailed information about the respondents is presented in Table 2.

Table 2. Demographic summary.

Demographic Characteristics		Frequency	Percentage
Gender	Male	117	46.6%
	Female	104	41.4%
Education	Undergraduate degree	116	46.2%
	Master's degree	97	38.6%
	PhD	8	3.2%
Years of experience	3–5 years	123	49.0%
	5–7 years	75	29.9%
	over 7 years	23	9.2%
Position	CEO/MD	5	2.0%
	Senior manager	9	3.6%
	Junior manager	16	6.4%
	Supervisor	191	76.1%

4. Results Analysis

The assessment of the measuring model's convergent and discriminant validity was conducted by analyzing the loadings and cross-loadings of the indicators, as depicted in Table 3. The indicators establish their discriminant validity by displaying a higher loading on the intended construct compared to any other variable (Hair et al. 2019; Khan et al. 2019). Moreover, it signifies convergent validity when the values range from 0.720 to 0.851 and all factor loadings exceed 0.7 (Hair et al. 2019).

Table 3. Standardized factor loadings.

Component	Outer Loadings	Cronbach's α	AVE	CR
Supply chain capabilities (SCC)	0.727–0.881	0.841	0.681	0.895
Supply chain visibility (SCV)	0.721–0.839	0.867	0.655	0.904
Supply chain resilience (SCR)	0.772–0.836	0.740	0.658	0.852
Supply chain performance (SCP)	0.762–0.851	0.828	0.661	0.886
Firm performance (FP)	0.784–0.848	0.833	0.666	0.888

Figure 2 and Table 3 present the results of the PLS-SEM analysis carried out on the research model. Convergent validity pertains to the consistency of measurement across different operationalizations (Campbell and Fiske 1959; Hair et al. 2019). According to Table 3, the items that are predominantly above 0.7 and the composite reliability (CR) have been determined to be greater than 0.7 (Hair et al. 2019; Sarstedt et al. 2021). The standard errors and t-values of the path coefficients were assessed using bootstrapping (Hair et al. 2019; Khan et al. 2019). The average variance extracted (AVE) has been found to be greater than 0.6 and within the acceptable threshold (Do et al. 2020; Hair et al. 2019; Phan et al. 2023b).
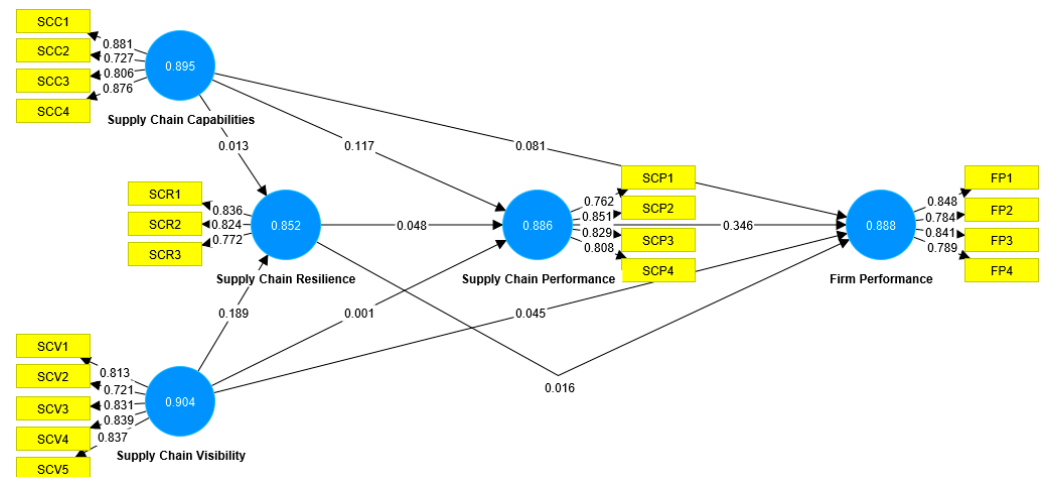

Figure 2. The evaluation of measurement model.

Table 4 displays the inter-factor correlation matrix that was created to assess discriminant validity (Fornell and Larcker 1981; Sarstedt et al. 2021). The Fornell and Larcker (1981) criteria were utilized to gather strong evidence of appropriate discriminant validity. To meet this criterion, the square root of AVE is compared against all construct correlations. Specifically, the results indicate that discriminant validity is achieved using the Fornell–Larcker criteria. The independence of the dimensions is referred to as discriminant validity (Fornell and Larcker 1981; Lin et al. 2020).

Table 4. Fornell–Larcker criteria.

Constructs	FP	SCC	SCP	SCR	SCV
FP	0.816				
SCC	0.668	0.825			
SCP	0.757	0.766	0.813		
SCR	0.502	0.607	0.588	0.811	
SCV	0.602	0.935	0.744	0.679	0.809

This investigation aims to assess the hypotheses by determining direct and indirect effects. Consequently, the outcomes in Figure 3 and Table 5 represent the results of the structural model with direct impacts of each variable. As observed in Table 5, although most of the main hypotheses were supported (p-value < 0.05), the result analysis indicates the significant relationships among constructs due to their p-value less than 0.001, such as: H1b (SCC→SCP); H1c (SCC→FP); H2a (SCV→SCR); H3 (SCR→SCP); and H5 (SCP→FP). Meanwhile, three proposed relationships (H1a; H2b; and H4) were not accepted due to p-value > 0.05. Notably, hypothesis H2c proposed that SCC positively impacts supply chain resilience (SCV→FP), however, the outcome indicates that it is untrue due to the estimated value ($\beta = -0.409 < 0$) as represented in Table 5.
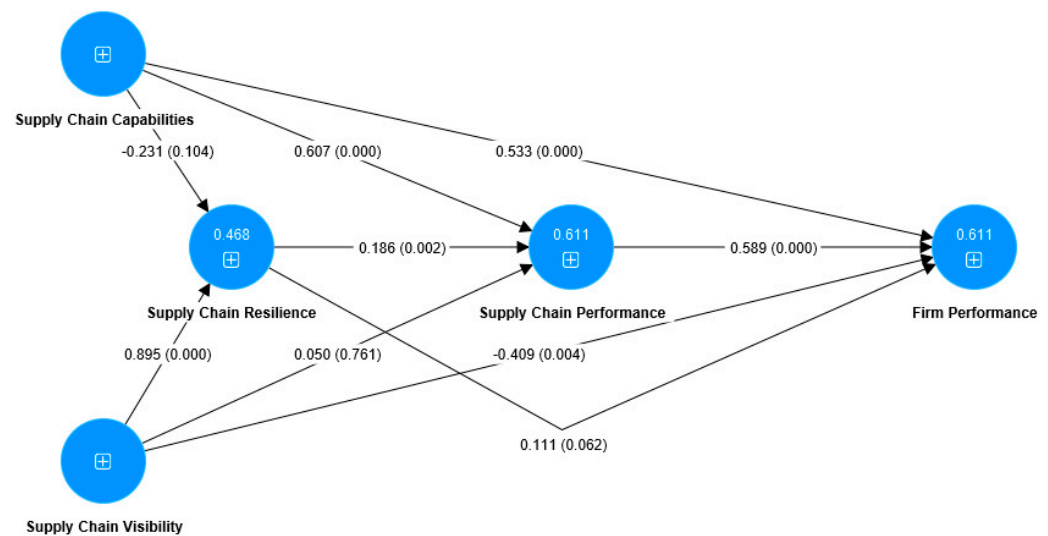
Figure 3. The structural model.

Table 5. Summary of hypothesis testing.

Hypothesis	Path Coefficient	*p*-Values	Decision
H1a: SCC→SCR	−0.231	0.104	Rejected
H1b: SCC→SCP	0.607	0.000	Accepted
H1c: SCC→FP	0.533	0.000	Accepted
H2a: SCV→SCR	0.895	0.000	Accepted
H2b: SCV→SCP	0.050	0.761	Rejected
H2c: SCV→FP	−0.409	0.004	Rejected
H3: SCR→SCP	0.186	0.002	Accepted
H4: SCR→FP	0.111	0.062	Rejected
H5: SCP→FP	0.589	0.000	Accepted

In accordance with the proposed research framework (refer to Figure 1), the authors focus on the roles of two determinants: SCC and SCV. Only SCV positively impacts SCR in the initial stage (H2a). Nevertheless, the outcomes only confirm the direct positive relationship of SCC with SCP (H1b), while the hypothesis H2b (SCV→SCP) has been rejected. Moreover, in our article, when considering SCR as a mediator, we have identified a relationship between SC, SCV, and SCP (refer to Table 6). This indicates that within complex relationships, SCR could help establish the crucial roles of SCV and SCC factors. These findings also provide significant evidence for overcoming disruptions in the context of the Vietnamese garment industry.

Table 6. Summary of indirect relationship testing.

Relationships	Estimates	*p*-Values	Decision
SCC→SCP→FP	0.357	0.000	Support
SCV→SCP→FP	0.029	0.759	Not Support
SCR→SCP→FP	0.110	0.004	Support
SCC→SCR→SCP	−0.043	0.156	Not Support
SCV→SCR→SCP	0.167	0.006	Support
SCC→SCR→FP	−0.026	0.290	Not Support
SCV→SCR→FP	0.099	0.094	Not Support
SCC→SCR→SCP→FP	−0.025	0.150	Not Support
SCV→SCR →→ SCP →→ FP	0.098	0.007	Support

Importantly, regarding predicting firm performance, although the research did not discover a significant correlation between SCV and FP directly (H2c), the results reveal that SCP plays an essential mediating role in the relationships between SCC, SCR, and FP, exerting a positive influence. To elaborate, the two relationships, SCC→SCP→FP and SCR→SCP→FP, have *p*-values < 0.05, whereas hypothesis H4 was rejected (see Table 5). It is important to highlight the mediating roles of SCR and SCP, which have presented the positive effects of SCV on firm performance through special indirect relationships SCV→SCR→SCP→FP (*p*-value = 0.007 < 0.05).

5. Discussion

The findings reveal that the impact of two determinants, supply chain capabilities and supply chain visibility, is involved in complex correlations with SCR, SCP, and FP. Furthermore, based on the results, SCC and SCV demonstrate their influence on firm operations and supply chain activities. While the model's results and hypotheses were generally confirmed, not all of the presented hypotheses were supported.

First, regarding the impact of the SCC factor, the authors found that SCC and SCR are negatively correlated (H1a), which is inconsistent with the study by Mandal et al. (2016). They suggest that SCC is necessary for the development of SCR (Mandal et al. 2016). Meanwhile, the firm's SCC factors could enhance SCP and FP (H1b and H1c). These findings are supported by the suggestions of Liao et al. (2022) and Peng et al. (2016), who have argued that SCC is essential for improving SCP and FP (Liao et al. 2022; Peng et al. 2016). Furthermore, the research conducted by Agarwal et al. (2022) and Huang et al. (2023) demonstrates a similar connection to the findings of this study, highlighting the contribution of SCC to shaping supply chain resilience (Agarwal et al. 2022; Huang et al. 2023). Thus, the primary objective of strategic management is to facilitate the adaptation, integration, and restructuring of resources in order to meet the requirements imposed by the external environment (Asamoah et al. 2021; Gani et al. 2023). Moreover, supply chain capabilities utilize technology for error detection and reduction in manufacturing and in enhancing firm performance (Irfan et al. 2019; Min et al. 2019; Qrunfleh and Tarafdar 2014). According to the analysis, this result confirms that SCC is a set of capabilities that cannot support SCR in the case of the Vietnamese garment industries. One possible explanation could be that the firm's capability level may not have reached a sufficient threshold to significantly influence the entire supply chain resilience, which is inconsistent with the results of Gani et al. (2023). While they also examined the relationship between the firm's internal and external capabilities in emerging markets, their findings indicate that the firm's SCC has a positive impact on SCR (Gani et al. 2023).

Secondly, concerning the effect of SCV, this finding deviates from the existing literature where SCV positively influences SCR (H2a). This is particularly crucial as it demonstrates how SCV aids in disruption remediation, and development of SCR (Anwar 2022; Mubarik et al. 2021; Tigga et al. 2021). SCV has shown a negative impact on SCP (H2b), and this finding is consistent with that of Baah et al. (2022), who argued that SCV demonstrates information visibility to enhance SCP (Baah et al. 2022). Additionally, this study found no association between SCV and FP (H2c). This finding contrasts with several previous studies. They have stated that SCV positively impacts organizational performance (Saqib and Zhang 2021). In this article, SCV provides real-time information to the supply chain partners, offering supply visibility, market visibility, and demand visibility. Our study reveals that SCV can effectively improve SCR, which is in line with the previous study (Huang et al. 2023). Consistent with that, the study by Kalaiarasan et al. (2023) offers insights for manufacturing firms striving to enhance their predictive abilities and manage fluctuations through improved visibility (Kalaiarasan et al. 2023). Moreover, the findings of previous authors suggest the potential expansion of visibility to encompass internal and outbound flows (Kalaiarasan et al. 2023; Saqib and Zhang 2021). Therefore, supply chain resilience depends greatly on supply chain visibility in the context of the Vietnamese garment industry. More importantly, the study found a positive association between SCV

and SCR (H2a) and a negative association between SCV and SCP (H2b). However, Table 6 reveals a noteworthy finding: the mediating role of SCR, contributing to a positive effect of SCV on SCP (SCV→SCR→SCP). Notably, our analysis did not find a significant direct link between SCV and firm performance (FP). However, thanks to the mediating role of SCP and SCR, both SCC and SCV have a positive effect on FP through two indirect relationships: SCC→SCP→FP and SCV→SCR→SCP→FP (see Table 6).

Despite several previous studies demonstrating the positive influence of SCV on FP (Saqib and Zhang 2021), this study offers a differing opinion, which provides new insight into the existing literature. Significantly, our research provides evidence of the influence of SCR and SCP (H3). It is consistent with the findings of Chowdhury et al. (2019), who described the positive and significant correlation between SCR and SCP (Chowdhury et al. 2019). Prior studies have also provided evidence for understanding the association between SCR and SCP (Novak et al. 2021; Sturm et al. 2023). In fact, some empirical studies have revealed a direct correlation between SCR and FP, as evidenced by studies conducted by Abeysekara et al. (2019) and Chowdhury et al. (2019), but this study presents a contrasting opinion (Abeysekara et al. 2019; Chowdhury et al. 2019). In fact, the research challenge is the case of the Vietnamese garment industry. Thus, the authors discovered that there was no impact of SCR on FP in the direct relationship (H4). However, in the indirect relationship, SCP was identified as a mediating factor that helps SCR influence FP (SCR→SCP→FP). Despite supply chain resilience, it has not had a significant impact on garment firm performance. This phenomenon can be explained by the fact that Vietnamese enterprises need time for recovery and restructuring in response to new situations, so even if the supply chain has recovered, Vietnamese garment enterprises may experience little impact on firm performance directly. Hence, Vietnamese enterprises still need time to recover human and financial resources, which suggests that SCP plays a mediating role between SCR and FP. Meanwhile, the present investigation evaluated the correlation that exists between SCP and firm performance (H5). These findings align with the conclusions drawn in previous studies and emphasize the importance of communication, integration, and collaboration among all components (Ali et al. 2023; Sturm et al. 2023). In detail, improving supply chain performance enhances the efficiency and productivity of Vietnamese garment firms.

Additionally, this study also explores several indirect relationships (see Table 6), particularly focusing on the impact of the SCV factor in the context of an emerging country, which is consistent with prior findings (Baah et al. 2022). These findings align with the conclusions of previous authors who highlighted the role of SCC and SCV in improving SCR (Ekanayake et al. 2022; Mandal et al. 2016). The study by Naghshineh and Carvalho (2022) underscores the significance of the capacity to generate SCR (Naghshineh and Carvalho 2022). The current literature has not accounted for the indirect impacts that these variables can have on improving SCP (Baah et al. 2022). Additionally, Tigga et al. (2021) identified SCC as a determinant impacting supply chain performance (Tigga et al. 2021). Although both SCR and SCP have a substantial effect on FP, supporting previous studies (Baah et al. 2022; Tigga et al. 2021). The findings underscore the importance of collaboration, given the significant impact of resilience in the Vietnamese garment supply chain.

6. Conclusions

In conclusion, our research makes a significant contribution by confirming the fundamental roles of SCC and SCV within the proposed research model. Moreover, it distinguishes between the mediating roles of SCR and SCP in the interplay among SCC, SCV, and FP. Consequently, this study outlines nine direct relationship hypotheses (as depicted in Table 5). This observation is supported by suggestions from Gani et al. (2023), who have considered supply chain capabilities as incorporating all of the firm's resources and indicated that SCR acts as a mediator between SCC and SCP (Gani et al. 2023). Importantly, the different points of this study reveal indirect correlations of SCC, and SCV to firm performance, particularly through two constructs SCR and SCP. Hence, building on the empirical findings, the study underscores the importance of prioritizing the roles of

SCC and SCV within the context of the Vietnamese garment industry. This investigation aimed to differentiate itself from prior research by offering fresh insights from an emerging market perspective.

6.1. Theoretical Implications

The current study contributes to the supply chain literature by confirming the connections between SCV, SCC, and SCR, as well as SCP and FP. However, SCV has been relatively neglected, especially within the context of a developing economy. Additionally, the significance of SCV as a crucial factor in resilience has not been adequately addressed in previous studies. Hence, this study offers three distinct theoretical contributions.

Firstly, the primary contribution of this investigation lies in the development of a research framework that enables the empirical exploration of the interconnections among SCC, SCV, SCR, SCP, and firm performance. Particularly, it offers a different perspective by exploring the role of two determinants SCC and SCV. This framework sets this research apart in the landscape of existing theories, particularly in emerging markets. Furthermore, this contribution holds the potential to advance SCP theory.

Secondly, the essential building blocks for the sustenance of a supply chain in the current dynamic environment are the supply chain capabilities. These elements not only provide theoretical insights but also guide managers in their endeavors to cultivate resources that can foster sustainable performance within the supply chain. Thirdly, this study provides empirical evidence of supply chain resilience within the context of developing countries. Furthermore, this study establishes that SCR mediates the relationship between SCC, SCV, and SCP, indicating that implementing SCP could enhance FP.

6.2. Practical Implications

This study underscores practical implications for the garment sector within an emerging economy, specifically Vietnam. The research offers valuable insights for managers to enhance core resources and thereby improve operational performance. These findings of this investigation also shed light on practical concerns regarding SCR, SSC, and their effects on company performance (Abeysekara et al. 2019). Moreover, in accordance with the research's findings, enhancing firm performance extends beyond the realms of SCC and SCV to encompass SCR and SCP. Previous scholarly inquiries have paid minimal attention to the intermediary influence of SCR and SCP (Nayal et al. 2022; Sturm et al. 2023). This study furnishes additional evidence to executives regarding the mediating roles played by SCR and SCP. Companies possess the capability to maintain operations during disruptions by promptly reinstating and preserving partnerships within the supply chain. Consequently, to tackle the challenges posed by the unpredictable business landscape, firms must consider supply chain performance and determine the appropriate resources for ensuring resilience.

Furthermore, this study contributes by highlighting SCC and SCV factors that contribute to achieving SCR, including inventory availability, delivery capabilities, and shipment information. As managers and supply chain controllers gain clear insights from this study about SCC and SCV in emerging markets, it ultimately aids in achieving firm performance through SCP. They should foster resilience to enhance SCP, consequently bolstering firm performance in the Vietnamese garment sector.

6.3. Limitations and Future Research

This present study has certain limitations and offers suggestions that can be further strengthened in future research. The study exclusively focused on the Vietnamese garment sector, specifically on two determinants: SCC and SCV, with the aim of evaluating the complex correlations among SCR, SCP, and FP in a transitional country. As a result, these research findings differ significantly from prior studies. To address these limitations, it is recommended that future research encompass specific and comparative studies involving other industries or economically distinct contexts. Additionally, greater consideration

should be given to various firm capabilities within the supply chain to address a potential limitation of this study. Another challenge in this study was the use of a purposive sampling strategy to collect data. Future studies should explore alternative sampling approaches to assess the robustness of the findings presented in this work and enhance the generalizability of these findings. Additionally, it would be beneficial to concentrate on exploring the various obstacles that hinder resilience and supply chain performance. Future research endeavors could discover the role of other mediating factors or concentrate on SCR and SCP in different contexts to further support the conclusions of this study.

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