

“Supply chain agility enablers and SME performance: The roles of supply chain risk management performance and risk management culture”

AUTHORS	Mohammad Bargouthi 
	 Prashanth Bharadwaj 
	Framarz Byramjee 
ARTICLE INFO	Mohammad Bargouthi, Prashanth Bharadwaj and Framarz Byramjee (2026). Supply chain agility enablers and SME performance: The roles of supply chain risk management performance and risk management culture. <i>Problems and Perspectives in Management</i> , 24(4), 219–234. doi: 10.21511/ppm.24(4).2026.15
DOI	http://dx.doi.org/10.21511/ppm.24(4).2026.15
RELEASED ON	Tuesday, 27 October 2026
RECEIVED ON	Thursday, 26 March 2026
ACCEPTED ON	Monday, 28 September 2026
LICENSE	 This work is licensed under a Creative Commons Attribution 4.0 International License
JOURNAL	"Problems and Perspectives in Management"
ISSN PRINT	1727-7051
ISSN ONLINE	1810-5467
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”



NUMBER OF REFERENCES

64



NUMBER OF FIGURES

2



NUMBER OF TABLES

7

© The author(s) 2026. This publication is an open access article.



BUSINESS PERSPECTIVES



LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine
www.businessperspectives.org

Type of the article: Research Article

Received on: 26th of March, 2026

Accepted on: 28th of September, 2026

Published on: 27th of October, 2026

© Mohammad Bargouthi, Prashanth Bharadwaj, Framarz Byramjee, 2026

Mohammad Bargouthi, Ph.D. in Business Administration, Business Administration and Marketing Department, Business and Economics Faculty, Al-Quds University, Palestine. (Corresponding author)

Prashanth Bharadwaj, Ph.D., Dean, Professor, Department of Management, Eberly College of Business, Indiana University of Pennsylvania, USA.

Framarz Byramjee, Ph.D., Professor, Eberly College of Business, Indiana University of Pennsylvania, USA.

Mohammad Bargouthi (Palestine), Prashanth Bharadwaj (USA), Framarz Byramjee (USA)

SUPPLY CHAIN AGILITY ENABLERS AND SME PERFORMANCE: THE ROLES OF SUPPLY CHAIN RISK MANAGEMENT PERFORMANCE AND RISK MANAGEMENT CULTURE

Abstract

This study examines associations between three proactive enablers of supply chain agility, SME performance, and supply chain risk management performance, and assesses the mediating and moderating roles of supply chain risk management performance and risk management culture. Data were collected through an online survey using convenience sampling and analyzed via PLS-SEM. The study included 224 SMEs operating in the West Bank, Palestine.

The findings indicated that market sensing ($\beta = 0.358, p < 0.01$) and supply chain integration ($\beta = 0.318, p < 0.01$) were positively and significantly associated with SME performance. In contrast, strategic sourcing ($\beta = 0.050, p > 0.05$) was not significant. Market sensing ($\beta = 0.383, p < 0.01$), strategic sourcing ($\beta = 0.311, p < 0.01$), and supply chain integration ($\beta = 0.321, p < 0.01$) were positively and significantly related to supply chain risk management performance. Supply chain risk management performance ($\beta = 0.626, p < 0.01$) was significantly related to SME performance. The results showed no moderating effect of risk management culture on the relationships between the three supply chain agility enablers and supply chain risk management performance ($p > 0.05$). Supply chain risk management performance significantly mediated the relationships between all three enablers and SME performance, with full mediation for strategic sourcing and partial mediation for supply chain integration and market sensing. Moreover, the model explains 77.3% of the variance in SME performance ($R^2 = 0.773$) and 61.3% of the variance in supply chain risk management performance ($R^2 = 0.613$).

Keywords

market sensing, strategic sourcing, supply chain integration, supply chain agility, supply chain risk management performance, risk management culture

JEL Classification

M11, D81, M21

INTRODUCTION

Global supply chains operate amid continuous change and uncertainty. However, over the past decade, supply chains have faced unprecedented disruptions resulting from the COVID-19 pandemic, geopolitical conflicts, and natural disasters, leading to supply chain disruptions, heightened levels of uncertainty and increasing supply chain risks that have directly affected firm performance and operational continuity (Arvis et al., 2026; Azadegan et al., 2020; Ivanov, 2021).

Supply chains now face a wider range of disruptions and unforeseen risks, driven largely by accelerating market changes and the growing complexity of relationships among supply chain partners. These conditions have directly pressured the organization's performance and long-term sustainability.



This is an Open Access article, distributed under the terms of the [Creative Commons Attribution 4.0 International license](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted re-use, distribution, and reproduction in any medium, provided the original work is properly cited.

Conflict of interest statement:

Author(s) reported no conflict of interest

Under these conditions, supply chain agility and risk management emerge as complementary strategic responses, as they theoretically enable firms to sense changes in their environment, respond rapidly, and proactively and systematically manage sources of risk (Gligor & Holcomb, 2012; Parast & Subramanian, 2021). However, the real scientific problem is not acknowledging the importance of these two responses; rather, it is understanding the mechanisms through which firms' proactive capabilities translate into actual risk management performance, especially when the organizational environment lacks formal risk governance structures.

These issues become crucial in environments characterized by high levels of uncertainty and institutional constraints. The Palestinian context, particularly the West Bank, provides a suitable setting for examining these relationships, given the institutional and logistical constraints faced by firms, fragmented markets, their heavy reliance on external markets and imports, particularly those linked to the Israeli economy, and recurring disruptions affecting the flow of goods and commercial activities (World Bank, 2017, 2025; UNCTAD, 2024; Lipinski & Shomali, 2024). Under these conditions, market sensing, strategic sourcing, and supply chain integration are expected to support management of supply chain risks and SME performance.

For SMEs, this problem is more significant; these businesses present a paradox: they are most vulnerable to disruptions, yet they have limited ability to withstand adverse events. They rely on informal norms that compensate for the lack of formal risk management systems. Setting this aside, it is still unclear how different proactive capabilities work together. It is also unknown why two organizations with identical skills and capabilities achieve different levels of risk management and market success. This uncertainty about how these capabilities work internally and the contextual conditions that determine or inhibit their effectiveness is the central scientific problem of this study.

1. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Supply chain disruptions management goes beyond minimizing damage when a problem occurs. Recent studies on agility link it to firms' efforts to anticipate change and develop robust systems that quickly adapt to turbulence and enable ever more responsive supply chains. Amid escalating competitive pressures and the acceleration of market changes, as a dynamic capability, supply chain agility enables firms to sense changes in their environment, face events among their members, respond quickly and efficiently to changes in demand, and manage potential disruptions (Alzate et al., 2022; Geyi et al., 2020; Gligor & Holcomb, 2012; Parast & Subramanian, 2021).

This analysis is based on three complementary perspectives: dynamic capabilities view (DCV), organizational information processing theory (OIPT), and risk management theory (RMT). From the DCV perspective, companies operating in an un-

certain environment can outperform their competitors by sensing, seizing, and reconfiguring resources (Teece, 2007). When applied to supply chain management, market sensing, supply chain integration, and strategic sourcing are critical dynamic capabilities under the DCV framework that enable firms to sense environmental changes, coordinate responses, and adapt supply structures accordingly. However, these capabilities do not assure better performance if they are not used effectively within organizational processes.

In this regard, OIPT complements this view by explaining how such capabilities strengthen a firm's capacity to process and manage information in uncertain environments (Galbraith, 1973). Building on these insights, RMT provides the missing link by emphasizing that the value of such capabilities is realized only when risks are effectively managed (Aven, 2016). In this regard, supply chain risk management performance represents the operational mechanism through which the informational and adaptive benefits of agility enablers are translated into tangible outcomes. That is, while DCV explains

the capabilities that allow firms to adapt, OIPT focuses on how information is processed and used. RMT, in turn, links these capabilities to performance through risk mitigation, response, and recovery.

The existing research suggests that supply chain agility involves more than rapid movement or immediate reactions. It also relies on a set of proactive enablers that help firms interpret the surrounding environment and act before risks become more serious. Prominent supply chain agility enablers include market sensing, integration, and strategic sourcing (Can Saglam, 2024; Kumar Sharma & Bhat, 2014; Lin et al., 2006). Market sensing is an organization's dynamic capacity to continuously monitor its external environment, assess technological and market changes, and react to these changes by identifying opportunities and threats and formulating strategies to address them, enabling it to improve market and firm performance (Barreto et al., 2024; Dias & Lages, 2021). Numerous studies have linked market sensing to firm performance indicators such as profitability, brand, financial performance, marketing, speed to market, growth rate, and competitive advantage (Barreto et al., 2024; Bayighomog Likoum et al., 2020).

However, the findings have not always been conclusive; some studies have indicated that the effect of market sensing on SME performance may neither be direct nor sufficient in itself (Ardyan, 2016). This discrepancy indicates that organizational and contextual factors may shape the association between market sensing and firm performance that have not yet received sufficient empirical attention, warranting further empirical examination to achieve a more comprehensive understanding of this relationship.

Similarly, strategic sourcing can help firms build a more stable supply base by selecting and diversifying suppliers and strengthening collaboration with them, and improve quality in long-term purchasing-related decisions (Frederico, 2023). These practices matter even more under frequent disruption and instability, where firms' ability to manage supplier relationships is critical to reducing resource risks and improving responsiveness to disruptions (Baryannis et al., 2018; Frederico, 2023).

Prior research suggests that strategic sourcing can help firms anticipate potential risks and limit their consequences (Venkatesan & Goh, 2018; Khan & Pillania, 2008; Kim et al., 2015; Lahiri, 2016). However, its direct relationship with firm performance is less clear, with previous studies reporting inconsistent results. This inconsistency raises an important question: when and under what conditions does strategic sourcing contribute to firm performance, particularly in business environments marked by high uncertainty?

Supply chain integration has received considerable attention as a fundamental pillar for improving information flow and enhancing coordination and cooperation across supply chain partners. Meta-analyses and large surveys show that supply chain integration is significantly associated with higher operational and financial performance (Ataseven & Nair, 2017; Hendijani & Saeidi Saei, 2020; Oubrahim et al., 2023).

Supply chain integration can enhance the ability to manage and respond to risks by fostering joint risk management skills and integrated risk planning across the company and participants in the broader supply chain (Chaudhuri et al., 2020). Firms depend on various external resources to sustain operations. Therefore, effective external integration is critical in limiting supply chain risks. As a result, effective supply chain integration can mitigate risks by enhancing communication and collaboration among stakeholders and positively influence supply chain risk management performance by alleviating information asymmetry and addressing supply chain risks (Lahmar et al., 2024). Studies have shown that integrating the supply chain is among the most critical constructs shaping organizational performance. Effective supply chain integration can improve SME performance by integrating suppliers, internal operations, and customers (Hendijani & Saeidi Saei, 2024; Khan, 2024). Overall, the literature broadly supports the association of supply chain integration with firm and supply chain risk management performance. Nevertheless, further research is still needed to validate this relationship across different contexts, particularly among SMEs.

In this context, research has increasingly examined supply chain risk management performance as a key construct associated with firms' capacity

to cope with operational risks in supply chains. This performance is associated with firms' ability to identify, assess, respond to, and mitigate risks that affect operations and continuity (Fan & Stevenson, 2018; Munir et al., 2020).

Recent findings also indicate that the implementation of effective supply chain risk management has led to reductions in disruption across the supply chain, leading to enhanced performance through increased operational and financial competence (Manhart et al., 2020; Munir et al., 2020; Thun & Hoenig, 2011).

Nevertheless, the existing literature continues to provide inconclusive evidence on how supply chain agility enablers relate to SME performance, particularly in environments characterized by high levels of uncertainty and resource constraints. Furthermore, SMEs usually operate with limited resources and lower capacity to absorb shocks; therefore, supply chain risk management performance is a more important factor in explaining their operational and competitive outcomes.

Risk management culture reflects shared beliefs, values, attitudes, and behaviors that determine how an organization identifies, communicates, assesses, and acts on risks in daily decision-making. Therefore, it determines whether proactive capabilities translate into actual responses or remain mere awareness without action (Schoenherr et al., 2023; Fan & Stevenson, 2018).

Robust risk management culture would enable market sensing to translate into correct supply decisions, strategic sourcing to become selecting risk-aware suppliers, and supply chain integration to turn into functional risk sharing rather than just supply chain coordination (Kumar & Anbanandam, 2020; Milkau, 2017). Conversely, a fragile risk management culture may lead to misinterpreting or ignoring warning signs and vital information, which therefore constrains the firms' abilities to capitalize on market sensing, strategic sourcing, and supply chain integration and transform it into a synchronized effort (Brustbauer, 2014; Schoenherr et al., 2023). Furthermore, risk management culture is especially vital for SMEs because they operate on informal norms rather than formal risk governance structures. Therefore, risk management culture is

not added to the proactive capabilities, but rather it determines whether these capabilities lead to an actual improvement in supply chain risk management performance (Schoenherr et al., 2023; Kumar & Anbanandam, 2020).

Although the literature in this field has continued to grow, three gaps remain underexplored. First, while prior studies have examined proactive enablers individually and in isolation, such as market sensing in the context of demand forecasting (Barreto et al., 2024; Day, 1994), strategic sourcing as a cost-reduction strategy (Yildiz Çankaya, 2020; Su, 2013), and supply chain integration as a collaboration mechanism (Siagian et al., 2021). Only a few studies have investigated these three enablers together as an integrated bundle of proactive capabilities.

Second, the literature suggests that supply chain risk management performance mediates the relationship between proactive supply chain agility enablers and firm performance. However, the hypothesis that such a performance serves as an intermediary between proactive agility enablers and firm performance (that is, strategic capabilities improve outcomes specifically because they strengthen operational risk management processes) has been noted conceptually but remains empirically underexplored, particularly in SME contexts (Can Saglam et al., 2021; Jidda et al., 2025).

Third, the moderating role of risk management culture in shaping the translation of proactive agility enablers into supply chain risk management performance among SMEs has received limited direct empirical attention. Against this backdrop, our study addresses the three identified gaps through an empirical investigation of SMEs operating across Palestine's manufacturing, services, and trade sectors, a context whose findings offer transferable insights for SMEs in conflict-affected, developing, and institutionally constrained economies.

Based on the preceding discussion, this study aims to examine the direct impact of three proactive enablers of supply chain agility on SME performance and on supply chain risk management performance while examining the mediating role of supply chain risk management performance and the moderating role of risk management culture.

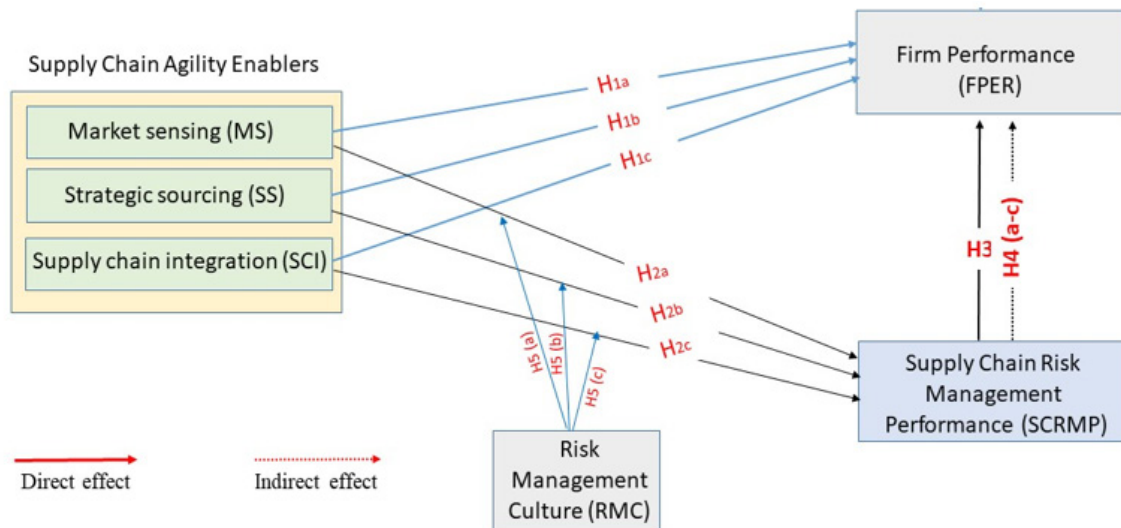


Figure 1. Proposed model

Thus, this study formulates the following hypotheses based on the hypothesized model presented in Figure 1:

H1a: Market sensing has a positive effect on firm performance.

H2a: Market sensing has a positive effect on supply chain risk management performance.

H1b: Strategic sourcing has a positive effect on firm performance.

H2b: Strategic sourcing has a positive effect on supply chain risk management performance.

H1c: Supply chain integration has a positive effect on firm performance.

H2c: Supply chain integration has a positive effect on supply chain risk management performance.

H3: Supply chain risk management performance has a positive effect on firm performance.

H4a: Supply chain risk management performance mediates the impact of market sensing on firm performance.

H4b: Supply chain risk management performance mediates the impact of strategic sourcing on firm performance.

H4c: Supply chain risk management performance mediates the impact of supply chain integration on firm performance.

H5a: Risk management culture positively moderates the effects of market sensing on supply chain risk management performance.

H5b: Risk management culture positively moderates the effects of strategic sourcing on supply chain risk management performance.

H5c: Risk management culture positively moderates the effects of supply chain integration on supply chain risk management performance.

2. METHOD

The study targeted SMEs operating across economic sectors in Palestine, including manufacturing, agriculture, wholesaling and retailing, education, and other sectors, given its high-risk environment, emerging economy status, and the lack of prior studies in this context. The study adopted the definition of the Palestinian Central Bureau of Statistics (PCBS, 2018), which classifies SMEs as establishments employing fewer than 50 employees, including the owner.

To collect data, the study employed convenience sampling. We distributed 500 questionnaires between November and December 2025 to business

owners, managers, and other decision-makers. Of these, 224 usable responses were obtained, representing a response rate of 44.8%. This response rate is consistent with levels reported in supply chain management and operations management research, where access to key managerial respondents can be challenging (Hughes et al., 2023). Table 1 illustrates the detailed respondent characteristics.

Palestine provides an important developing-economy context for examining supply chain agility and supply chain risk management, as SMEs operate under considerable economic uncertainty, logistical disruptions, and constraints. These conditions require firms to strengthen their ability to respond rapidly and effectively to changes and disruptions associated with supply chains, making supply chain agility and the ability to withstand adversity important capabilities that contribute to sustaining operations and improving performance.

Power analysis of the sample size is conducted using statistical power methods, which provide an estimate of the minimum required sample size. This estimate is derived from the effect size used in this study (0.15), the alpha level ($\alpha = 0.05$), and a power of 0.80. The power analysis showed that the model, which includes both mediation and moderation, requires a minimum of 138 observations. The final sample of 224 valid responses therefore exceeds this requirement.

Table 1. Sample characteristics (N = 224)

Category	Number	Frequency (Percent)
Gender		
Male	173	77.3%
Female	51	22.7%
Position		
Firm owner	53	24%
Supply chain manager	40	18%
Operations manager	36	16%
Purchasing manager	34	15%
Quality manager	23	10%
Warehouse manager	17	8%
Other decision-makers	21	9%
Industry		
Manufacturing	94	42%
Agriculture	37	17%
Wholesaling and Retailing	31	14%

Category	Number	Frequency (Percent)
Education	25	11%
Other	37	17%
Firm age (years)		
Less than 5	70	31%
5–10	79	35%
11–15	35	16%
16–20	22	10%
More than 20	18	8%
Firm size (number of employees)		
1–4	45	20%
5–19	87	39%
20–49	92	41%
Total	224	100%

Participation was optional and confidential. To lessen evaluation anxiety and common method bias (Podsakoff et al., 2003), confidentiality guarantees were given. To prevent duplicate submissions and improve data integrity, technical restrictions were also implemented, including limiting each IP address to a single response.

The study relied on measurement items adapted from prior studies. The selected scales were chosen because they demonstrated strong psychometric properties and had been widely used in studies examining supply chain agility, supply chain risk management performance, and firm performance. Minor wording modifications were made to improve clarity and suitability for the Palestinian SME context without changing the conceptual meaning of the original items. In this study, firm performance was operationalized as an overall performance construct capturing both operational and financial aspects. To translate the questionnaires from English into Arabic and ensure linguistic equivalence and content accuracy, we conducted a pilot test with 17 SME managers to assess the clarity and contextual suitability of the questionnaire items before finalizing the instrument. The measurement instrument is provided in Appendix A. Additionally, the complete survey questionnaire is publicly available in the Zenodo repository to enhance transparency and research reproducibility (Bargouthi, 2026).

All scales used to evaluate respondents' assessments of the questionnaire items were based on a five-point Likert scale. The constructs in the empirical model were specified and assessed as reflec-

Table 2. Measurement scales

Construct	Item	Sources
Market sensing (MS)	6	Barreto et al. (2024)
Strategic sourcing (SS)	5	Su (2013) and Yildiz Çankaya (2020)
Supply chain integration (SCI)	5	Siagian et al. (2021)
Risk management culture (RMC)	5	Liu et al. (2018) and Can Saglam et al. (2021)
SCRM performance	5	Can Saglam et al. (2021)
Firm performance (FPER)	7	Ganbold et al. (2021), Liu et al. (2020) Munir et al. (2020), Can Saglam et al. (2021), and Kanyepe et al. (2025)

tive measurement models. Table 2 contains a comprehensive listing of the measurement scales.

An online survey distributed via business networks, professional associations, and direct contacts was used to collect data.

The data were analyzed using partial least squares structural equation modeling (PLS-SEM) with SmartPLS 4. The methodological considerations indicated that PLS-SEM would be a good fit as follows:

1. It is appropriate for analyzing small to moderate-sized samples and complex designs that include mediation effects, moderator effects, and multiple latent constructs (Hair et al., 2021).
2. PLS-SEM requires minimal assumptions regarding the data distribution and is robust to deviations from multivariable normality. This makes the technique appropriate for analyzing data from survey questions commonly used in operations and supply chain management.
3. PLS-SEM is primarily concerned with predicting and explaining variance in a data set.

Both procedural and statistical strategies were implemented to test the potential impact of common method bias (CMB). Procedurally, respondent anonymity and confidentiality were guaranteed, and the questionnaire was meticulously constructed to mitigate evaluation apprehension and common scale effects, in accordance with established guidelines in survey research. Statistically, CMB was assessed using the full collinearity approach. The full-collinearity VIF values ranged from 1.034 to 1.825, with the highest value observed for SS → FPER (VIF = 1.825). All values were below the conservative threshold of 3.3, indicating that com-

mon method bias was unlikely to pose a serious concern (Kock, 2015).

This study collected survey responses about companies' practices without collecting any personal information that could reveal participants' or companies' identities. All responses were treated with strict confidentiality. In addition, all respondents voluntarily participated and were informed of the study's objectives and that it would be used solely for academic purposes. Ethical approval for this study was obtained from the Institutional Review Board (IRB) / Ethics Committee of Al-Quds University prior to data collection. The dataset used in this study was collected specifically for the present analysis and has not been used in any prior publication.

3. RESULTS

The results provided strong evidence of the measurement model's adequacy. Reliability of the items was established, as all outer loadings were greater than 0.70, except for RMC-1, which was removed because it did not achieve a loading consistent with the remaining items (Hair et al., 2021). Table 3 reports indicator-level VIF values as supplementary information, distinct from the inner-model VIF values used to assess structural collinearity. Cronbach's α and composite reliability (CR) values were above the minimum acceptable limit of 0.7, indicating adequate internal consistency reliability. Likewise, convergent validity was assessed using Average Variance Extracted (AVE); all AVEs were greater than 0.50, indicating convergent validity (Table 3).

Table 4 shows that all HTMT values were below the recommended threshold of 0.90, supporting discriminant validity among the study constructs (Hair et al., 2021).

Table 3. Measurement model assessment and indicator-level collinearity

Variables and items	Cronbach Alpha	CR	AVE	Loading	t-value	VIF (Outer Model)
Market sensing (MS):						
MS-1	0.926	0.928	0.731	0.855	41.302	2.699
MS-2				0.886	54.971	3.177
MS-3				0.863	45.075	2.915
MS-4				0.868	43.693	2.925
MS-5				0.833	38.658	2.491
MS-6				0.822	28.436	2.337
Strategic sourcing (SS)						
SS-1	0.897	0.911	0.710	0.892	15.340	1.729
SS-2				0.875	33.152	2.557
SS-3				0.890	59.388	3.099
SS-4				0.704	55.491	3.170
SS-5				0.838	64.771	3.258
Supply chain integration (SCI)						
SCI-1	0.882	0.915	0.684	0.705	16.407	1.451
SCI-2				0.818	33.113	2.099
SCI-3				0.877	52.027	2.821
SCI-4				0.858	43.712	2.892
SCI-5				0.864	41.618	2.813
Risk management culture (RMC)						
RMC-2	0.947	0.949	0.862	0.945	171.504	3.173
RMC-3				0.925	124.721	3.189
RMC-4				0.922	68.621	2.100
RMC-5				0.922	81.437	1.031
Supply chain risk management performance						
SCRMP-1	0.891	0.920	0.697	0.840	40.628	2.559
SCRMP-2				0.809	39.539	2.520
SCRMP-3				0.836	32.069	1.944
SCRMP-4				0.841	30.453	2.226
SCRMP-5				0.848	44.536	2.283
Firm performance (FPER)						
FPER-1	0.935	0.937	0.724	0.848	37.195	2.784
FPER-2				0.905	76.326	2.540
FPER-3				0.896	64.749	3.176
FPER-4				0.905	68.050	2.976
FPER-5				0.890	62.732	2.570
FPER-6				0.740	23.197	1.802
FPER-7				0.754	21.947	1.904

Table 4. Heterotrait–monotrait ratio (HTMT) for discriminant validity

	FPER	MS	SCI	RMC	SCRMP	SS
FPER						
MS	0.842					
SCI	0.863	0.807				
RMC	0.446	0.359	0.320			
SCRMP	0.839	0.847	0.847	0.406		
SS	0.772	0.599	0.673	0.305	0.697	

Note: FPER = Firm performance; MS = Market sensing; SCI = Supply chain integration; RMC = Risk management culture; SCRMP = Supply chain risk management performance; SS = Strategic sourcing.

The structural model was assessed in five steps (Hair et al., 2021). First, the model was evaluated for collinearity. The VIF values for the predictor constructs associated with the hypothesized relationships ranged from 1.623 to 3.421, remaining below the recommended threshold of 5, indicating no critical collinearity concerns (Hair et al., 2021). Second, we tested the hypotheses. Table 5 and Figure 2 demonstrate that market sensing ($\beta = 0.358$, $t = 6.640$, $p < 0.001$) and supply chain integration ($\beta = 0.318$, $t = 5.617$, $p < 0.001$) have positive, significant effects on firm performance, thereby supporting H1a and H1c. Besides, the direct effect

Table 5. Hypotheses testing

Hypotheses	Path	Standardized Path Coefficient (β)	T-value	p-value	f^2	VIF	Hypothesis decision
Direct effects							
H1a	MS $\rightarrow$ FPER	0.358	6.640	$p < 0.001$	0.071	2.848	Supported
H1b	SS $\rightarrow$ FPER	0.050	0.230	0.818	0.011	1.797	Not supported
H1c	SCI $\rightarrow$ FPER	0.318	5.617	$p < 0.001$	0.044	2.896	Supported
H2a	MS $\rightarrow$ SCRMP	0.383	6.208	$p < 0.001$	0.157	2.668	Supported
H2b	SS $\rightarrow$ SCRMP	0.311	6.874	$p < 0.001$	0.137	1.751	Supported
H2c	SCI $\rightarrow$ SCRMP	0.321	5.404	$p < 0.001$	0.055	2.919	Supported
H3	SCRMP $\rightarrow$ FPER	0.626	9.694	$p < 0.001$	0.190	3.421	Supported
Mediating effects							
H4a	MS $\rightarrow$ SCRMP $\rightarrow$ FPER	0.240	5.301	$p < 0.001$			Supported
H4b	SS $\rightarrow$ SCRMP $\rightarrow$ FPER	0.195	3.321	0.001			Supported
H4c	SCI $\rightarrow$ SCRMP $\rightarrow$ FPER	0.201	4.086	$p < 0.001$			Supported
Moderating effects							
H5a	MS x RMC $\rightarrow$ SCRMP	0.047	0.701	0.488	0.036	2.077	Not supported
H5b	SS x RMC $\rightarrow$ SCRMP	0.022	0.415	0.679	0.022	2.123	Not supported
H5c	SCI x RMC $\rightarrow$ SCRMP	0.054	0.801	0.422	0.020	1.623	Not supported

Note: FPER = Firm performance; MS = Market sensing; SCI = Supply chain integration; RMC = Risk management culture; SCRMP = Supply chain risk management performance; SS = Strategic sourcing. β = Standardized path coefficient; t-value = Bootstrap t-statistic; p-value = Statistical significance level; f^2 = Cohen's effect size; VIF = Variance Inflation Factor. Supported? indicates whether the corresponding hypothesis received empirical support.

of market sensing ($\beta = 0.383$, $t = 6.208$, $p < 0.001$), strategic sourcing ($\beta = 0.311$, $t = 6.874$, $p < 0.001$), and supply chain integration ($\beta = 0.321$, $t = 5.404$, $p < 0.001$) on supply chain risk management performance is also significant. Thus, H2a, H2b, and H2c were accepted. Additionally, supply chain risk management performance ($\beta = 0.626$, $t = 9.694$, $p < 0.001$) positively and significantly affects firm performance, supporting H3. Conversely, strategic sourcing ($\beta = 0.050$, $t = 0.230$, $p > 0.05$) does not significantly affect firm performance, rejecting H1b.

Table 5 and Figure 2 show that supply chain risk management performance partially mediates the links between market sensing and firm performance and between supply chain integration and firm performance. It fully mediates the relationship between strategic sourcing and firm performance, supporting H4a, H4b, and H4c.

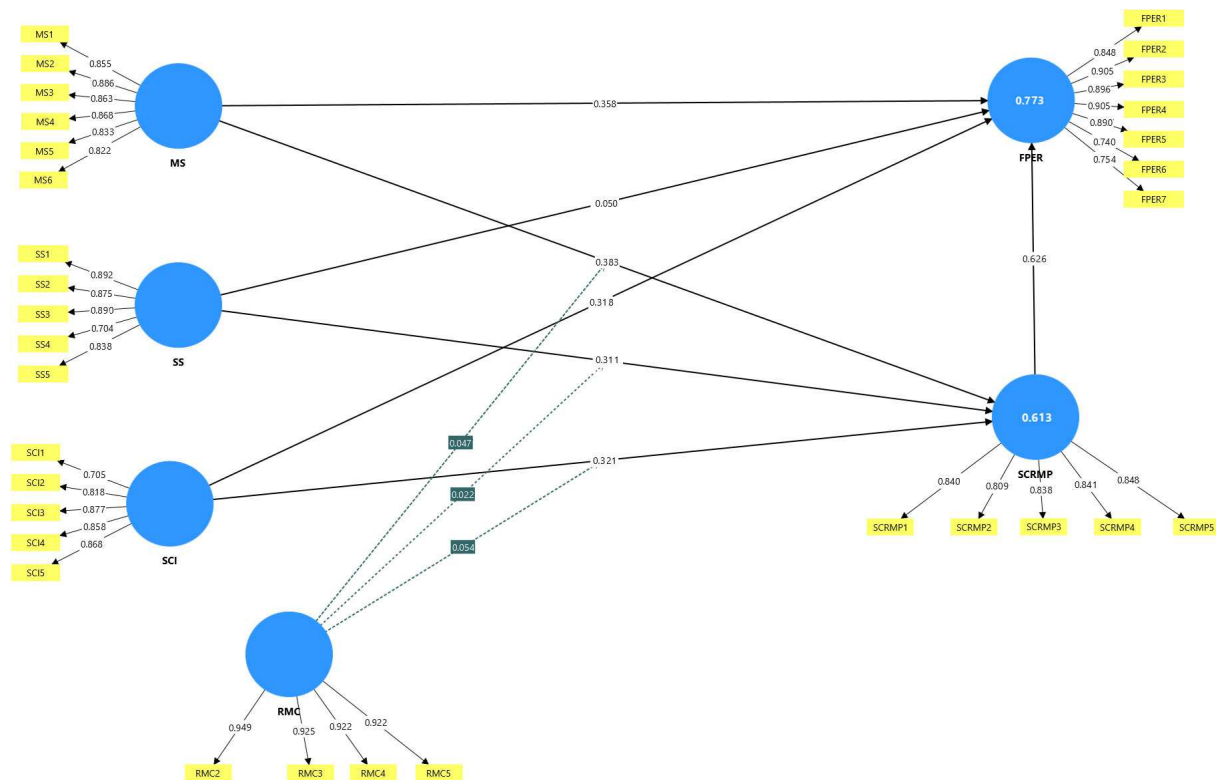
As presented in Table 5, no significant moderating influence of risk management culture was found on the relationships between marketing sensing ($\beta = 0.047$, $t = 0.701$, $p > 0.05$), strategic sourcing ($\beta = 0.022$, $t = 0.415$, $p > 0.05$), supply chain integration ($\beta = 0.054$, $t = 0.801$, $p > 0.05$), and supply chain risk management performance. Consequently, H5a, H5b, and H5c were rejected.

Next, the explanatory power was assessed in the third and fourth steps by computing the coefficient of determination (R^2), the effect sizes (f^2), and the predictive relevance Q^2 .

Firm performance showed a substantial R^2 (0.773), whereas supply chain risk management performance showed a moderate R^2 (0.613) (Figure 2). The values of f^2 range from low to high (Table 5).

To evaluate the model's predictive power, the PLS-Predict approach was employed. In PLS-SEM, the MAE value should be lower than the corresponding linear model (LM) to be used as a criterion to evaluate the prediction strength. All endogenous construct indicators yielded PLS-SEM values lower than the LM values (Table 6). Hence, the Q^2 values were above zero, indicating the model's predictive power.

Finally, the standardized root mean square residual (SRMR) in this study was 0.062 (< 0.08). Furthermore, the normed fit index (NFI) was 0.931 (> 0.90), indicating good overall fit and quality. Collectively, these findings indicate that the model exhibits solid structural and predictive quality in line with contemporary PLS-SEM standards (Hair et al., 2021).



Note: FPER = Firm performance; MS = Market sensing; SCI = Supply chain integration; RMC = Risk management culture; SCRMP = Supply chain risk management performance; SS = Strategic sourcing.

Figure 2. Structural model

Table 6. PLS predict

Indicator	Q ² predict	PLS-SEM (MAE)	LM (MAE)	PLS-SEM-LM
FPER-1	0.532	0.580	0.621	-0.041
FPER-2	0.574	0.568	0.602	-0.034
FPER-3	0.602	0.510	0.551	-0.014
FPER-4	0.591	0.550	0.571	-0.021
FPER-5	0.580	0.602	0.645	-0.043
FPER-6	0.478	0.652	0.689	-0.037
FPER-7	0.512	0.552	0.584	-0.032
SCRMP-1	0.475	0.628	0.674	-0.046
SCRMP-2	0.448	0.610	0.658	-0.048
SCRMP-3	0.474	0.586	0.616	-0.030
SCRMP-4	0.514	0.552	0.593	-0.041
SCRMP-5	0.461	0.608	0.642	-0.034

Note: Q²predict = Stone-Geisser's predictive relevance; MAE = Mean Absolute Error; PLS-SEM = Partial Least Squares Structural Equation Modeling; LM = Linear Model benchmark. FPER = Firm performance; SCRMP = Supply chain risk management performance.

4. DISCUSSION

This study examined the association and the mechanisms through which three proactive supply chain agility enablers (market sensing, strategic sourcing, and supply chain integration) are

associated with supply chain risk management performance, as well as the risk management culture that may strengthen the association between supply chain agility enablers and supply chain risk management performance. The study draws on the dynamic capabilities view (DCV) (Teece, 2007), organizational information processing theory (OIPT) (Galbraith, 1973), and risk management theory (RMT) (Aven, 2016).

This positive association between market sensing capability and firms' overall performance aligns with the definition of sensing capability at the heart of the dynamic capabilities view (DCV), which emphasizes sensing routines to help firms navigate uncertainty. Market sensing helps decision-makers better understand their environment, supporting more effective decisions in line with the principles of OIPT (Daft & Lengel, 1986). This capability may be especially relevant for Palestinian SMEs facing uncertainty. The modest direct effect of market sensing on firm performance ($\beta = 0.358$) is consistent with Morgan et al. (2009) but differs from Ardyan (2016).

Interestingly, strategic sourcing ($\beta = 0.311$) was positively associated with supply chain risk management performance but had no direct association with SME performance. Its value may instead arise through supplier relationships, transparency, and information flows, consistent with Frederico (2023) and Venkatesan and Goh (2018). Similarly, Lahiri (2016) suggests that sourcing benefits emerge indirectly as risk management processes mature. This pattern indicates that strategic sourcing may be associated with SME performance through intermediate mechanisms rather than directly.

Additionally, the findings indicate that supply chain integration was positively associated with both firm performance ($\beta = 0.318$) and supply chain risk management performance ($\beta = 0.321$). From a DCV perspective, integration represents a seizing capability that translates sensing-derived knowledge into coordinated action. Based on OIPT, integration facilitates information flow and reduces information asymmetry among alliance partners, thereby enhancing transparency and supporting their collective ability to identify and respond effectively to risks. This finding is consistent with Flynn et al. (2010), who demonstrated that effective supply chain integration contributes to improved SME performance, particularly when managed holistically.

Supply chain risk management performance was strongly and positively associated with SME performance ($\beta = 0.626$), supporting H3. Thus, it is expected that strengthening supply chain risk management performance may enable firms to manage risks proactively and effectively (Awain et al., 2025) and may enhance SMEs' resilience to disruption and contribute to greater stability (Fauzan & Syara, 2025).

The findings suggest that supply chain risk management performance serves as a mechanism through which proactive enablers of supply chain agility are associated with higher organizational outcomes. Full mediation between strategic sourcing and firm performance, along with partial mediation for market sensing and supply chain integration, aligns with the dynamic capabilities view (DCV). The mediating effect of supply chain risk management performance underscores its importance in an unstable environment, where supply disturbances are common.

The moderating effect of risk management culture did not manifest as expected, possibly due to weak institutional practices in SMEs or because operational capabilities may have been more effective in coping with external environmental disturbances (Gligor & Holcomb, 2012). Accordingly, the hypotheses H5a, H5b, and H5c did not receive empirical support, indicating that risk management culture did not significantly moderate the hypothesized relationships. One possible explanation is that owner management and family governance in family-owned SMEs may limit variation in formal risk management culture across firms (Glowka et al., 2021).

In addition, the study advances the theoretical discussion by clarifying the relationships among supply chain agility, supply chain risk management performance, risk management culture, and firm performance. The findings also highlight the importance of examining these relationships in highly uncertain environments, particularly for SMEs. The theoretical contribution of this study does not lie merely in integrating the three theories. Rather, it lies in identifying supply chain risk management performance as the primary operational conversion mechanism through which supply chain agility capabilities are converted into performance outcomes.

The findings offer implications for SMEs operating in resource-limited or highly volatile markets. First, SMEs managers should strengthen market sensing to respond earlier to market disruptions. Second, given that strategic sourcing primarily contributes to performance through supply chain risk management, management should prioritize building relationships with reliable suppliers and maintaining a moderate level of diversification, thereby strengthening firms' resilience against supply chain disruptions. Third, integrating digital platforms such as low-cost digital coordination tools, regular supplier communication routines, and simple information-sharing practices can strengthen supply chain coordination and preparedness. Lastly, given that supply chain risk management mediates all the performance relationships identified in this study, SMEs should adopt systematic risk assessment practices, continuity planning, and scenario-based employee training, even with limited resources.

CONCLUSION

The study examined the direct relationships between three proactive enablers of supply chain agility and both SME performance and supply chain risk management performance, as well as the mediating role of supply chain risk management performance and the moderating role of risk management culture.

The findings show that supply chain integration and market sensing were positively associated with both SME and supply chain risk management performance, whereas strategic sourcing was associated only with supply chain risk management performance. Supply chain risk management performance was positively associated with SME performance and mediated the relationships between all three supply chain agility enablers and SME performance. Risk management culture did not moderate these relationships.

These findings position supply chain risk management performance as a key mechanism linking proactive supply chain agility enablers to SME performance, with its role being particularly important for strategic sourcing, where the effect was fully mediated. From a practical perspective, the results highlight the need for SMEs to move beyond reactive approaches by combining market monitoring, supplier relationships, information sharing, and risk preparedness.

This study has several limitations. First, its focus on Palestinian SMEs means that the findings may reflect specific economic and institutional conditions; future research could test the model in other countries and sectors. Second, convenience sampling may have reduced sample representativeness, suggesting the need for probability sampling or more representative samples. Third, the study examined only three agility enablers; future research could consider IT capabilities, organizational support, and governmental factors. Finally, reliance on self-reported data from a single respondent may introduce perceptual bias and common method variance. Longitudinal, multi-source, or mixed-method studies could further examine how organizational capabilities, risk management practices, and performance evolve.

AUTHOR CONTRIBUTIONS

Conceptualization: Mohammad Bargouthi, Prashanth Bharadwaj, Framarz Byramjee.

Data curation: Mohammad Bargouthi.

Formal analysis: Mohammad Bargouthi, Framarz Byramjee.

Investigation: Mohammad Bargouthi, Prashanth Bharadwaj, Framarz Byramjee.

Methodology: Mohammad Bargouthi, Prashanth Bharadwaj.

Project administration: Mohammad Bargouthi.

Resources: Mohammad Bargouthi, Prashanth Bharadwaj, Framarz Byramjee.

Supervision: Prashanth Bharadwaj, Framarz Byramjee.

Validation: Mohammad Bargouthi, Prashanth Bharadwaj, Framarz Byramjee.

Visualization: Mohammad Bargouthi.

Writing – original draft: Mohammad Bargouthi.

Writing – review & editing: Prashanth Bharadwaj, Framarz Byramjee.

REFERENCES

1. Alzate, I., Manotas, E., Boada, A., & Burbano, C. (2022). Meta-analysis of organizational and supply chain dynamic capabilities: A theoretical-conceptual relationship. *Problems and Perspectives in Management*, 20(3), 335-349. [https://doi.org/10.21511/ppm.20\(3\).2022.27](https://doi.org/10.21511/ppm.20(3).2022.27)
2. Ardyan, E. (2016). Market sensing capability and SMEs performance: The mediating role of product innovativeness success. *DLSU Business Economics Review*, 25(2), 79-97. <https://doi.org/10.59588/2243-786X.1620>
3. Arvis, J.-F., Rodrigue, J.-P., Ulybina, D., & Rastogi, C. (2026). A metric of global maritime supply chain disruptions: The global supply chain stress index – maritime

- (GSCSI-M). *Journal of Transport Geography*, 131, Article 104575. <https://doi.org/10.1016/j.jtrangeo.2026.104575>
4. Ataseven, C., & Nair, A. (2017). Assessment of supply chain integration and performance relationships: A meta-analytic investigation of the literature. *International Journal of Production Economics*, 185, 252-265. <https://doi.org/10.1016/j.ijpe.2017.01.007>
 5. Aven, T. (2016). Risk assessment and risk management: Review of recent advances on their foundation. *European Journal of Operational Research*, 253(1), 1-13. <https://doi.org/10.1016/j.ejor.2015.12.023>
 6. Awain, A. M. S. B., Asad, M., Sulaiman, M. A. B. A., Asif, M., & Shanfari, K. S. A. (2025). Impact of supply chain risk management on product innovation performance of Omani SMEs: Synergetic moderation of technological turbulence and entrepreneurial networking. *Sustainability*, 17(7), Article 2903. <https://doi.org/10.3390/su17072903>
 7. Azadegan, A., Mellat Parast, M., Lucianetti, L., Nishant, R., & Blackhurst, J. (2020). Supply chain disruptions and business continuity: An empirical assessment. *Decision Sciences*, 51(1), 38-73. <https://doi.org/10.1111/dec.12395>
 8. Bargouthi, M. (2026). *Supply chain agility enablers and SME performance: A moderated mediation model of supply chain risk management performance and risk management culture* [Data set]. Zenodo. <https://doi.org/10.5281/zenodo.21386895>
 9. Barreto, L. S., Freitas, V., & De Paula, V. A. F. (2024). Sustainable supply chain innovation and market performance: The role of sensing and innovation capabilities. *Cleaner and Responsible Consumption*, 14, Article 100199. <https://doi.org/10.1016/j.clrc.2024.100199>
 10. Baryannis, G., Validi, S., Dani, S., & Antoniou, G. (2018). Supply chain risk management and artificial intelligence: State of the art and future research directions. *International Journal of Production Research*, 57(7), 2179-2202. <https://doi.org/10.1080/00207543.2018.1530476>
 11. Bayighomog Likoum, S. W., Shamout, M. D., Harazneh, I., & Abubakar, A. M. (2020). Market-sensing capability, innovativeness, brand management systems, market dynamism, competitive intensity, and performance: An integrative review. *Journal of the Knowledge Economy*, 11(2), 593-613. <https://doi.org/10.1007/s13132-018-0561-x>
 12. Brustbauer, J. (2014). Enterprise risk management in SMEs: Towards a structural model. *International Small Business Journal: Researching Entrepreneurship*, 34(1), 70-85. <https://doi.org/10.1177/0266242614542853>
 13. Can Saglam, Y. (2024). Fostering supply chain agility by prominent enablers' identification and developing conceptual modeling based on the ISM-MICMAC approach. *Journal of Modelling in Management*, 19(3), 980-1002. <https://doi.org/10.1108/JM2-01-2023-0002>
 14. Can Saglam, Y., Yildiz Çankaya, S., & Sezen, B. (2021). Proactive risk mitigation strategies and supply chain risk management performance: An empirical analysis for manufacturing firms in Turkey. *Journal of Manufacturing Technology Management*, 32(6), 1224-1244. <https://doi.org/10.1108/JMTM-08-2019-0299>
 15. Chaudhuri, A., Ghadge, A., Gaudenzi, B., & Dani, S. (2020). A conceptual framework for improving effectiveness of risk management in supply networks. *The International Journal of Logistics Management*, 31(1), 77-98. <https://doi.org/10.1108/IJLM-11-2018-0289>
 16. Daft, R. L., & Lengel, R. H. (1986). Organizational information requirements, media richness and structural design. *Management Science*, 32(5), 554-571. <https://doi.org/10.1287/mnsc.32.5.554>
 17. Day, G. S. (1994). The capabilities of market-driven organizations. *Journal of Marketing*, 58(4), 37-52. <https://doi.org/10.1177/002224299405800404>
 18. Dias, A. L., & Lages, L. F. (2021). Measuring market-sensing capabilities for new product development success. *Journal of Small Business and Enterprise Development*, 28(7), 1012-1034. <https://doi.org/10.1108/JSBED-07-2019-0216>
 19. Fan, Y., & Stevenson, M. (2018). A review of supply chain risk management: Definition, theory, and research agenda. *International Journal of Physical Distribution & Logistics Management*, 48(3), 205-230. <https://doi.org/10.1108/IJPDLM-01-2017-0043>
 20. Fauzan, T. R., & Syara, A. S. (2025). Integrating supply chain risk management and organizational agility in post-pandemic era: A pathway to superior MSMEs performance in Indonesia. *Transekonomika: Akuntansi, Bisnis Dan Keuangan*, 5(1), 265-279. <https://doi.org/10.55047/transekonomika.v5i1.849>
 21. Flynn, B. B., Huo, B., & Zhao, X. (2010). The impact of supply chain integration on performance: A contingency and configuration approach. *Journal of Operations Management*, 28(1), 58-71. <https://doi.org/10.1016/j.jom.2009.06.001>
 22. Frederico, G. F. (2023). Rethinking strategic sourcing during disruptions: A resilience-driven process contribution to knowledge on supply chains. *Knowledge and Process Management*, 30(1), 83-86. <https://doi.org/10.1002/kpm.1742>
 23. Galbraith, J. R. (1973). *Designing complex organizations*. Addison-Wesley. Retrieved from <https://archive.org/details/designingcomplex00galb>
 24. Ganbold, O., Matsui, Y., & Rotaru, K. (2021). Effect of information technology-enabled supply chain integration on firm's operational performance. *Journal of Enterprise Information Management*, 34(3), 948-989. <https://doi.org/10.1108/JEIM-10-2019-0332>
 25. Geyi, D. A. G., Yusuf, Y., Menhat, M. S., Abubakar, T., & Ogbuke, N. J. (2020). Agile capabilities as necessary conditions for maximising sustainable supply chain performance: An empirical investigation. *International Journal of*

- Production Economics*, 222, Article 107501. <https://doi.org/10.1016/j.ijpe.2019.09.022>
26. Gligor, D., & Holcomb, M. (2012). Understanding the role of logistics capabilities in achieving supply chain agility: A systematic literature review. *Supply Chain Management: An International Journal*, 17(4), 438-453. <https://doi.org/10.1108/13598541211246594>
 27. Glowka, G., Kallmünzer, A., & Zehrer, A. (2021). Enterprise risk management in small and medium family enterprises: The role of family involvement and CEO tenure. *International Entrepreneurship and Management Journal*, 17(3), 1213-1231. <https://doi.org/10.1007/s11365-020-00682-x>
 28. Hair, J. F., Jr., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Partial least squares structural equation modeling (PLS-SEM) using R: A workbook*. Springer Nature. <https://doi.org/10.1007/978-3-030-80519-7>
 29. Hendijani, R., & Saeidi Saei, R. (2020). Supply chain integration and firm performance: The moderating role of demand uncertainty. *Cogent Business & Management*, 7(1), Article 1760477. <https://doi.org/10.1080/23311975.2020.1760477>
 30. Hendijani, R., & Saeidi Saei, R. (2024). Supply chain integration, competitive strategies and firm performance. *International Journal of Organizational Analysis*, 33(6), 1410-1438. <https://doi.org/10.1108/IJOA-06-2023-3788>
 31. Hughes, M. M., Zhou, Z., Zinn, W., & Knemeyer, A. M. (2023). Plastic response to disruptions: Significant redesign of supply chains. *Journal of Business Logistics*, 44(1), 80-108. <https://doi.org/10.1111/jbl.12321>
 32. Ivanov, D. (2021). Supply chain viability and the COVID-19 pandemic: A conceptual and formal generalisation of four major adaptation strategies. *International Journal of Production Research*, 59(12), 3535-3552. <https://doi.org/10.1080/00207543.2021.1890852>
 33. Jidda, D. J., Zhen, L., Ashraf, S. F., Nasir, A., & Amoako, T. (2025). Value of enterprise risk management integration and supply chain performance: Mediating role of firm's resilience capability. *SAGE Open*, 15(1). <https://doi.org/10.1177/21582440241305618>
 34. Kanyepe, J., Musasa, T., & Wilbert, M. (2025). Supply chain risk factors, technological capabilities, and firm performance of small to medium enterprises (SMEs). *Journal of Small Business Strategy*, 35(1), 115-128. <https://doi.org/10.53703/001c.125910>
 35. Khan, A., & Pillania, R. K. (2008). Strategic sourcing for supply chain agility and firms' performance. *Management Decision*, 46(10), 1508-1530. <https://doi.org/10.1108/00251740810920010>
 36. Khan, M. S. (2024). Investigating the impact of supply chain integration on operational performance with a mediating role of supply chain capabilities of the SME sector in Pakistan. *South Asian Journal of Operations Logistics*, 3(2), 198-223. <https://doi.org/10.57044/SA-JOL.2024.3.2.2438>
 37. Kim, M., Suresh, N. C., & Kocabasoglu-Hillmer, C. (2015). A contextual analysis of the impact of strategic sourcing and E-procurement on performance. *Journal of Business & Industrial Marketing*, 30(1), 1-16. <https://doi.org/10.1108/JBIM-01-2012-0010>
 38. Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration*, 11(4). <https://doi.org/10.4018/ijec.2015100101>
 39. Kumar Sharma, S., & Bhat, A. (2014). Modelling supply chain agility enablers using ISM. *Journal of Modelling in Management*, 9(2), 200-214. <https://doi.org/10.1108/JM2-07-2012-0022>
 40. Kumar, S., & Anbanandam, R. (2020). Impact of risk management culture on supply chain resilience: An empirical study from Indian manufacturing industry. *Proceedings of the Institution of Mechanical Engineers, Part O: Journal of Risk and Reliability*, 234(2), 246-259. <https://doi.org/10.1177/1748006x19886718>
 41. Lahiri, S. (2016). Does outsourcing really improve firm performance? Empirical evidence and research agenda. *International Journal of Management Reviews*, 18(4), 464-497. <https://doi.org/10.1111/ijmr.12075>
 42. Lahmar, A., Galasso, F., Lamothe, J., & Chabchoub, H. (2024). Integrated supply chain risk management index (ISCRi): Applying AHP and QFD. In *2024 10th International Conference on Control, Decision and Information Technologies (CoDIT)* (pp. 2948-2954). IEEE. <https://doi.org/10.1109/CoDIT62066.2024.10708271>
 43. Lin, C.-T., Chiu, H., & Chu, P.-Y. (2006). Agility index in the supply chain. *International Journal of Production Economics*, 100(2), 285-299. <https://doi.org/10.1016/j.ijpe.2004.11.013>
 44. Lipinski, J., & Shomali, R. Q. (2024). Navigating adversity: Revisiting entrepreneurial theories in the context of the occupied Palestinian territories. *Administrative Sciences*, 14(12), Article 313. <https://doi.org/10.3390/admsci14120313>
 45. Liu, C.-L., Shang, K.-C., Lirn, T.-C., Lai, K.-H., & Lun, Y. H. V. (2018). Supply chain resilience, firm performance, and management policies in the liner shipping industry. *Transportation Research Part A: Policy and Practice*, 110, 202-219. <https://doi.org/10.1016/j.tra.2017.02.004>
 46. Liu, H., Wu, S., Zhong, C., & Liu, Y. (2020). The sustainable effect of operational performance on financial benefits: Evidence from Chinese quality awards winners. *Sustainability*, 12(5), Article 1966. <https://doi.org/10.3390/su12051966>
 47. Manhart, P., Summers, J. K., & Blackhurst, J. (2020). A meta-analytic review of supply chain risk management: Assessing buffering and bridging strategies and firm performance. *Journal of Supply Chain Management*, 56(3), 66-87. <https://doi.org/10.1111/jscm.12219>

48. Milkau, U. (2017). Risk culture during the last 2000 years – From an aleatory society to the illusion of risk control. *International Journal of Financial Studies*, 5(4), Article 31. <https://doi.org/10.3390/ijfs5040031>
49. Morgan, N. A., Slotegraaf, R. J., & Vorhies, D. W. (2009). Linking marketing capabilities with profit growth. *International Journal of Research in Marketing*, 26(4), 284-293. <https://doi.org/10.1016/j.ijresmar.2009.06.007>
50. Munir, M., Jajja, M., Chatha, K., & Farooq, S. (2020). Supply chain risk management and operational performance: The enabling role of supply chain integration. *International Journal of Production Economics*, 227, Article 107667. <https://doi.org/10.1016/j.ijpe.2020.107667>
51. Oubrahim, I., Sefiani, N., & Haponen, A. (2023). The influence of digital transformation and supply chain integration on overall sustainable supply chain performance: An empirical analysis from manufacturing companies in Morocco. *Energies*, 16(2), Article 1004. <https://doi.org/10.3390/en16021004>
52. Palestinian Central Bureau of Statistics. (2018). *Establishments Census 2017: Final Results Report (Updated Version)*. Ramallah, Palestine: Palestinian Central Bureau of Statistics. Retrieved from <https://www.pcbs.gov.ps/reference/report-history/>
53. Parast, M. M., & Subramanian, N. (2021). An examination of the effect of supply chain disruption risk drivers on organizational performance: Evidence from Chinese supply chains. *Supply Chain Management: An International Journal*, 26(4), 548-562. <https://doi.org/10.1108/SCM-07-2020-0313>
54. Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879-903. <https://doi.org/10.1037/0021-9010.88.5.879>
55. Schoenherr, T., Mena, C., Vakil, B., & Choi, T. Y. (2023). Creating resilient supply chains through a culture of measuring. *Journal of Purchasing and Supply Management*, 29(4), Article 100824. <https://doi.org/10.1016/j.pur-sup.2023.100824>
56. Siagian, H., Tarigan, Z. J. H., & Jie, F. (2021). Supply chain integration enables resilience, flexibility, and innovation to improve business performance in COVID-19 era. *Sustainability*, 13(9), Article 4669. <https://doi.org/10.3390/su13094669>
57. Su, J. (2013). Strategic sourcing in the textile and apparel industry. *Industrial Management & Data Systems*, 113(1), 23-38. <https://doi.org/10.1108/02635571311289647>
58. Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319-1350. <https://doi.org/10.1002/smj.640>
59. Thun, J.-H., & Hoenig, D. (2011). An empirical analysis of supply chain risk management in the German automotive industry. *International Journal of Production Economics*, 131(1), 242-249. <https://doi.org/10.1016/j.ijpe.2009.10.010>
60. United Nations Conference on Trade and Development (UNCTAD). (2024). *Report on UNCTAD assistance to the Palestinian people: Developments in the economy of the Occupied Palestinian Territory* (TD/B/71/3). United Nations. Retrieved from <https://unctad.org/publication/report-unctad-assistance-palestinian-people-0>
61. Venkatesan, S. P., & Goh, M. (2018). Strategic sourcing under supply disruption risk. In Y. Khojasteh (Ed.), *Supply chain risk management: Advanced tools, models, and developments* (pp. 179-200). Springer. https://doi.org/10.1007/978-981-10-4106-8_11
62. World Bank. (2017). *Unlocking the trade potential of the Palestinian economy: Immediate measures and a long-term vision to improve Palestinian trade and economic outcomes*. World Bank. Retrieved from <https://documents1.worldbank.org/curated/en/960071513228856631/pdf/ACS22471-REVISED-Palestine-Trade-Note-Web.pdf>
63. World Bank. (2025). *Impacts of the conflict in the Middle East on the Palestinian economy*. World Bank. Retrieved from <https://thedocs.worldbank.org/en/doc/88b250e19a55174787bafafd5323260e-0280012025/>
64. Yildiz Çankaya, S. (2020). The effects of strategic sourcing on supply chain strategies. *Journal of Global Operations and Strategic Sourcing*, 13(2), 129-148. <https://doi.org/10.1108/JGOSS-01-2019-0002>

APPENDIX A

Table A1. Measurement instrument

Constructs	Measurment
Market sensing (MS)	MS1: Our firm can quickly learn from suppliers, customers, and competitors.
	MS2: Our firm continuously updates its knowledge of customers' needs and preferences.
	MS3: Our firm can rapidly and effectively apply new knowledge to relevant products and services.
	MS4: Our firm is capable of keeping pace with changes in technology and competitors' products.
	MS5: Our firm can effectively monitor changes in technology and demand for alternative products.
	MS6: Our firm possesses a clear understanding of customer needs in the markets where it operates.
Strategic sourcing (SS)	SS1: Top management emphasizes the strategic role of the sourcing function.
	SS2: The firm's long-term sourcing plan includes developing relationships with key suppliers.
	SS3: The sourcing function interacts effectively with other organizational functions, such as manufacturing and marketing.
	SS4: Strategic purchasing decisions support the overall strategy of the firm.
	SS5: Managing supplier relationships is considered an important aspect of the firm's sourcing activities.
Supply chain integration (SCI)	SCI1: Our firm shares comprehensive product information with external partners.
	SCI2: Our firm involves external partners in product development activities.
	SCI3: Our firm shares inventory-level information with external partners.
	SCI4: Our firm shares production planning information with external partners.
	SCI5: Our firm effectively coordinates its activities with external partners.
Supply chain risk management performance (SCRM performance)	SCRM1: Our firm has successfully reduced the frequency of supply-related risks over the past three years.
	SCRM2: Our firm has successfully minimized the impact of supply-related risks when they occur over the past three years.
	SCRM3: Our firm's performance in managing supply chain risks is better than that of its competitors.
	SCRM4: The resources allocated to risk management have increased compared to three years ago.
	SCRM5: Our firm's ability to respond to opportunities and threats in the business environment has improved compared to three years ago.
Risk management culture (RMC)	RMC1: Our firm uses various mechanisms to encourage employees to share risk management knowledge.
	RMC2: Risk management is emphasized as an important component of training programs for new employees.
	RMC3: Our firm considers risk management to be as important as operational performance.
	RMC4: Ensuring the smooth functioning of the supply chain is a top priority for all employees.
	RMC5: Risk awareness is widely embedded among employees in our firm.
Firm performance (FPER)	FPER1: Compared with major competitors, our firm consistently adheres to its planned production schedules.
	FPER2: Compared with major competitors, our firm achieves superior inventory turnover and lower inventory holding costs.
	FPER3: Compared with major competitors, our firm effectively manages and reduces supply chain lead times.
	FPER4: Compared with major competitors, our firm has achieved higher sales growth during the recent period.
	FPER5: Compared with major competitors, our firm's profitability has improved during the recent period.
	FPER6: Compared with major competitors, our firm's return on assets (ROA) has improved during the recent period.
	FPER7: Compared with major competitors, our firm's gross profit margin has improved during the recent period.