

The Relationship Between Supply Chain Integration and Organizational Productivity: The Mediating Role of Supply Chain Agility in Small and Medium-Sized Food Enterprises in the Industrial Estates of Kerman

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ABSTRACT

Objective: This study aimed to examine the relationship between supply chain integration and organizational productivity and to determine the mediating role of supply chain agility among small and medium-sized food enterprises in the industrial estates of Kerman.

Methods and Materials: This applied, descriptive-correlational study was conducted among employees of small and medium-sized food enterprises located in the industrial estates of Kerman, Iran. The statistical population consisted of 500 employees, from whom 217 participants were selected using proportionate stratified random sampling based on Cochran's formula. Data were collected using three standardized instruments: a 30-item supply chain integration questionnaire assessing supplier, customer, and internal integration; a 10-item supply chain agility questionnaire assessing market sensing and responsiveness; and a 42-item organizational productivity questionnaire covering organizational culture, environmental conditions, motivation, empowerment, and leadership style. Internal consistency was evaluated using Cronbach's alpha, while convergent and discriminant validity were assessed through composite reliability, average variance extracted, and the Fornell-Larcker criterion. Data were analyzed using SPSS 19 and SmartPLS 2. Partial least squares structural equation modeling was employed to evaluate the measurement and structural models, with statistical significance set at $p < .05$.

Findings: The measurement model demonstrated high internal consistency, with Cronbach's alpha coefficients of .957 for organizational productivity, .941 for supply chain integration, and .933 for supply chain agility, and composite reliability values of .955, .946, and .938, respectively. AVE values ranged from .438 to .467, and the Fornell-Larcker criterion supported discriminant validity. All

relevant structural relationships were statistically significant at the 95% confidence level. The model explained 38.7% of the variance in supply chain agility ($R^2 = .387$). Effect sizes were moderate ($f^2 = .156$ and $.295$), predictive relevance was positive ($Q^2 = .113$), and the overall GOF index was $.411$. The structural results supported meaningful relationships among supply chain integration, supply chain agility, and organizational productivity, consistent with the proposed mediating role of supply chain agility.

Conclusion: The findings indicate that stronger supply chain integration is associated with greater organizational productivity and that supply chain agility serves as an important mechanism through which integrated supply chain practices can be translated into improved organizational outcomes in food-sector SMEs.

Keywords: *Supply Chain Integration, Supply Chain Agility, Organizational Productivity, Small and Medium-Sized Enterprises, Food Industry*

1 Introduction

In increasingly volatile and competitive markets, the performance of organizations depends not only on the efficiency of their internal operations but also on the extent to which they can coordinate activities across the broader supply chain. Contemporary firms operate within interconnected networks of suppliers, manufacturers, distributors, customers, and service providers, and disruptions or inefficiencies at one point in this network can rapidly affect the performance of the entire system. This issue is particularly critical for small and medium-sized enterprises (SMEs), which often operate with more limited financial resources, technological capacities, bargaining power, and managerial slack than large corporations. For SMEs, therefore, the ability to integrate supply chain activities, respond quickly to environmental changes, and convert interorganizational coordination into higher productivity has become a strategic requirement rather than an optional managerial capability. Recent studies increasingly emphasize that supply chain integration and agility can jointly strengthen organizational responsiveness, resilience, and performance, particularly when firms are exposed to uncertainty and disruption (Rahman et al., 2026). At the same time, productivity remains a central concern because the survival and growth of SMEs depend on their ability to transform scarce organizational resources into valuable outputs efficiently. Research on supply chain configuration and total factor productivity has further demonstrated that the structure and coordination of supply chain relationships can meaningfully influence productivity outcomes at the firm and industry levels (Lin & Zhu, 2025). These considerations make the interaction among supply chain integration, supply chain agility, and organizational productivity an important area of investigation.

Supply chain integration refers to the strategic and operational coordination of organizational processes within

the firm and between the firm and its external supply chain partners. It generally encompasses internal integration, supplier integration, and customer integration. Internal integration concerns coordination among departments, functions, and organizational units, whereas external integration involves the sharing of information, resources, plans, and decisions with suppliers and customers. Effective integration reduces fragmentation, improves information visibility, facilitates synchronized decision-making, and enables organizations to align procurement, production, logistics, and customer-service activities. In an integrated supply chain, organizational boundaries become less restrictive because firms coordinate their processes around common goals, shared information, and mutual responsiveness. Such integration is especially important under conditions of market uncertainty, where delays in information or poor coordination among supply chain members can amplify operational disturbances. Recent evidence suggests that integration plays an important role in strengthening the ability of organizations to maintain performance during supply chain disruptions, particularly when it is combined with ambidexterity and agility (Rahman et al., 2026). In addition, the increasing adoption of digitally enabled supply chains has made integration more important because the benefits of advanced technologies depend on the effective coordination of organizational processes, information flows, and decision structures across supply chain partners (Alamsjah & Yunus, 2022).

One of the main expected outcomes of supply chain integration is improved organizational productivity. Productivity generally refers to the efficiency with which an organization converts human, financial, technological, informational, and material inputs into desirable outputs. Although productivity has traditionally been associated with operational efficiency, contemporary organizational research treats it as a multidimensional phenomenon influenced by organizational culture, leadership, employee

empowerment, motivation, environmental conditions, technological capability, and process coordination. In SMEs, productivity improvements are particularly important because even relatively small inefficiencies in procurement, production planning, inventory management, or distribution can create substantial financial consequences. Supply chain integration may contribute to productivity by reducing duplication of activities, minimizing information asymmetry, shortening lead times, improving resource utilization, coordinating production with market demand, and reducing operational uncertainty. Research focusing on supply chain practices in small enterprises has indicated that sustainable supply chain capabilities can improve productivity when firms develop dynamic capabilities that allow them to adapt resources and routines to changing environmental conditions (Ghaedi & Zeraati Foukaliei, 2025). Similarly, evidence from other sectors indicates that automation, digital technologies, and supply chain optimization can improve productivity by increasing information processing speed, reducing manual inefficiencies, and supporting more precise operational decisions (Onukwulu, 2025). Therefore, integration may be viewed as one of the organizational mechanisms through which supply chain resources are converted into improved productivity.

However, integration alone may not be sufficient to guarantee higher organizational productivity. An organization may have extensive information exchange and coordination with suppliers and customers but still lack the capacity to react quickly when market conditions change. This distinction directs attention to supply chain agility, which refers to the ability of the supply chain to sense, interpret, and respond rapidly and effectively to changes in customer requirements, market demand, competitive pressures, supply disruptions, and other environmental uncertainties. Agility reflects speed, flexibility, responsiveness, and adaptability and is therefore especially important in markets characterized by short product life cycles, fluctuating demand, and uncertain supply conditions. Several studies have emphasized that agility is a multidimensional capability that requires coordinated decision-making and the ability to reconfigure supply chain activities in response to emerging circumstances (Patel et al., 2017; Rehman et al., 2020). Sustainable supply chain agility has also been conceptualized as a capability through which organizations simultaneously pursue responsiveness, operational continuity, and sustainability objectives (Al-Zabidi et al., 2021). These characteristics suggest that agility

can function as a critical mechanism linking supply chain structures and organizational outcomes.

The importance of supply chain agility has been demonstrated in various organizational and industrial contexts. Research in Saudi Arabia has reported a meaningful relationship between supply chain agility and organizational performance, suggesting that organizations capable of adjusting rapidly to changes in their supply networks are better positioned to achieve favorable performance outcomes (Alkrait & Almaktoom, 2021). Similarly, evidence from Iranian manufacturing firms has indicated that organizational capabilities such as information technology flexibility and organizational learning can improve performance through the mediating contribution of supply chain agility (Bavarsad et al., 2019). Other Iranian studies have also shown that supply chain agility is associated with organizational performance and may interact with broader organizational agility strategies in determining firm-level outcomes (Hosseini Balaei, 2015). Furthermore, green supply chain and sustainability-oriented practices have been linked with organizational agility and competitive advantage, implying that supply chain responsiveness can transmit the effects of strategic supply chain practices into broader organizational benefits (Azad, 2020; Safdari & Rostamzadeh, 2018). These findings reinforce the argument that agility should not be viewed merely as an operational response variable but rather as a strategic capability through which organizational resources and supply chain arrangements influence performance and productivity.

The development of supply chain agility is itself dependent on a variety of organizational and interorganizational antecedents. Information availability, supplier relationships, customer orientation, organizational learning, technological competence, strategic flexibility, culture, and leadership can all influence how rapidly an organization detects and responds to environmental change. In SMEs, organizational culture and information technology competence have been identified as particularly important determinants of supply chain agility because smaller firms often depend on rapid communication and flexible coordination rather than formalized bureaucratic systems (Malekifar et al., 2014). Market orientation and organizational innovativeness have also been shown to strengthen supply chain agility by helping firms recognize market signals and translate those signals into operational changes (Yoon et al., 2014). More recent research has emphasized the role of transformational leadership and organizational ambidexterity in fostering supply chain

agility, particularly in industries facing technological change and competitive uncertainty (Azizi et al., 2025). Strategic agility and sustainable manufacturing research similarly suggests that organizations require flexible decision structures and adaptive capabilities if they are to maintain responsiveness under dynamic market conditions (Vishlaghi et al., 2021). Collectively, these studies indicate that agility emerges from the interaction of organizational resources, information processing, learning, and integration mechanisms.

From an organizational information-processing perspective, supply chain integration can be expected to increase agility because integration improves the availability, timeliness, and accuracy of information across organizational boundaries. When suppliers and customers share information with the focal firm, managers can identify disruptions, demand changes, and emerging market requirements more rapidly. Internal integration further enables different departments to coordinate responses and allocate resources without excessive delay. This relationship is consistent with research demonstrating that agility depends on both relational capabilities and information-processing capacity in complex supply chain environments (Dubey et al., 2020). Supply chain agility is also influenced by broader organizational capabilities and competitive conditions. Research has identified several organizational factors that enhance supply chain agility and, subsequently, competitive capability, including technology, collaboration, strategic orientation, and organizational responsiveness (Aldaheri & Ahmad, 2023). Thus, supply chain integration may provide the structural and informational foundation for agility, while agility translates that foundation into timely organizational responses.

The mediating role of supply chain agility is especially relevant when examining the relationship between integration and productivity. Integration can improve information flow and coordination, but productivity gains are more likely when such integration results in faster and more effective operational decisions. In this sense, supply chain agility can act as an intermediate organizational capability through which integration is converted into improved productivity. A firm with integrated suppliers, customers, and internal departments may recognize market changes earlier, but the benefits of that recognition depend on whether the firm can modify sourcing, production, inventory, logistics, or customer-service activities quickly enough to exploit the available information. Studies examining the relationship between strategic flexibility and

market performance suggest that supply chain agility can strengthen the translation of organizational flexibility into performance outcomes (Ajike et al., 2024). Related research on sustainable manufacturing and dynamic supply chain capabilities also indicates that adaptive capabilities can explain how supply chain practices contribute to productivity improvements in smaller enterprises (Ghaedi & Zeraati Foukaliei, 2025). The implication is that integration may influence productivity both directly, through improved coordination and resource utilization, and indirectly, by developing the agility needed to respond effectively to environmental and operational changes.

The importance of this mechanism becomes more pronounced in the food industry. Food manufacturing and distribution are characterized by several conditions that intensify the need for both integration and agility, including perishability of inputs and products, variability in raw-material supply, seasonal fluctuations, food safety requirements, changing consumer preferences, quality-control pressures, transportation sensitivity, and relatively short delivery windows. Small and medium-sized food enterprises are particularly vulnerable to these challenges because they often have limited inventory buffers, less negotiating power with suppliers, restricted access to advanced logistics infrastructure, and fewer financial resources for absorbing disruptions. Consequently, supplier coordination, customer information, and internal process integration may be especially important for maintaining stable production and efficient resource use. At the same time, the ability to respond rapidly to changes in demand, ingredient availability, transportation conditions, or customer expectations can determine whether integrated supply chain arrangements actually result in productivity gains. Evidence from manufacturing organizations has shown that systematic evaluation of agility can help identify weaknesses in supply chain responsiveness and provide a basis for performance improvement (Patel et al., 2017). Similarly, sustainability-oriented assessments of agility emphasize that responsive supply chains must combine operational efficiency with adaptability if they are to remain viable under changing conditions (Al-Zabidi et al., 2021; Rehman et al., 2020).

Another factor increasing the importance of supply chain agility is the accelerating digital transformation of operations and supply networks. Digital technologies can facilitate real-time information sharing, demand forecasting, coordination, automation, and data-driven decision-making, but their contribution depends on organizational readiness

and the ability to use information rapidly. Research on Supply Chain 4.0 suggests that agility, ambidexterity, and organizational culture are important for converting digital transformation into improved organizational outcomes (Alamsjah & Yunus, 2022). Likewise, advances in automation and artificial intelligence are increasingly being associated with supply chain productivity because they support predictive decision-making, resource optimization, and faster operational adjustments (Onukwulu, 2025). Nevertheless, SMEs may encounter difficulties in adopting these technologies because of resource constraints and limited technical expertise. Under these circumstances, organizational and relational capabilities such as integration and agility may become even more important, as they allow firms to improve coordination and responsiveness without relying exclusively on large-scale technological investment. The evidence that IT competence contributes to agility in SMEs further supports this argument (Malekifar et al., 2014).

The theoretical and empirical literature therefore suggests a connected chain of relationships among supply chain integration, supply chain agility, and organizational productivity. Integration enhances information sharing, synchronization, and collaboration; agility enables firms to transform this coordinated information and relational capability into rapid responses; and productivity reflects the efficiency with which these capabilities are ultimately translated into organizational outputs. Yet existing studies have often examined these relationships separately, focusing on agility and organizational performance, sustainability and agility, strategic flexibility and market performance, or technological and organizational antecedents of agility. For example, research has examined agility as a mechanism linking information technology and learning with organizational performance (Bavarsad et al., 2019), the role of agility in improving competitive capability (Aldhaheeri & Ahmad, 2023), the relationship between agility and performance (Alkrait & Almaktoom, 2021), and the contribution of integration and agility under conditions of disruption (Rahman et al., 2026). However, fewer studies have simultaneously examined supply chain integration as the predictor, organizational productivity as the outcome, and supply chain agility as the mediating mechanism, especially in the context of food-sector SMEs in Iranian industrial estates. This gap is important because the characteristics of SMEs and the food industry may produce relationships that differ from those observed in large manufacturing corporations, automotive firms,

pharmaceutical organizations, or technologically advanced supply networks.

The geographical and organizational context of Kerman also warrants specific investigation. Industrial estates concentrate numerous SMEs within geographically defined production environments where firms may share similar infrastructural constraints, labor markets, logistics conditions, and regional supply networks. In such settings, productivity differences may be influenced not only by internal management practices but also by how effectively enterprises coordinate relationships with suppliers and customers and respond to environmental change. Earlier Iranian studies have emphasized the relevance of supply chain agility, organizational agility, green supply chain management, and related capabilities in manufacturing organizations (Azad, 2020; Hosseini Balaei, 2015; Safdari & Rostamzadeh, 2018), while research on strategic agility has highlighted its importance for sustainable manufacturing development (Vishlaghi et al., 2021). Nevertheless, food SMEs in Kerman's industrial estates have received comparatively limited empirical attention. Investigating this context can therefore contribute to both the local management literature and the broader supply chain literature by clarifying whether stronger integration is associated with productivity and whether supply chain agility helps explain this relationship.

From a managerial perspective, identifying the mediating role of supply chain agility may also have practical implications. If integration directly improves productivity, managers should prioritize mechanisms such as cross-functional coordination, supplier collaboration, customer information exchange, joint planning, and integrated decision-making. If agility additionally mediates this relationship, managers should not treat integration as an end in itself but should focus on developing the organizational routines that convert integration into responsive action. Such routines may include rapid information processing, flexible production scheduling, alternative sourcing arrangements, decentralized decision-making, continuous learning, technological support, and closer monitoring of market changes. Research emphasizing organizational ambidexterity and transformational leadership suggests that managerial capabilities can help firms balance operational efficiency with adaptability (Azizi et al., 2025), whereas studies of market orientation and innovation indicate that responsiveness is strengthened when organizations continuously interpret environmental signals and convert them into coordinated actions (Yoon et al., 2014).

Accordingly, understanding the integration–agility–productivity mechanism may help managers of food SMEs allocate limited resources toward capabilities with the greatest potential to improve operational outcomes.

Accordingly, the aim of this study was to examine the relationship between supply chain integration and organizational productivity and to determine the mediating role of supply chain agility among small and medium-sized food enterprises in the industrial estates of Kerman.

2 Methods and Materials

This study employed an applied, descriptive-correlational research design to investigate the relationship between supply chain integration and organizational productivity, with particular emphasis on the mediating role of supply chain agility among small and medium-sized food enterprises located in the industrial estates of Kerman, Iran. The study was considered applied in terms of its purpose because it addressed relationships among organizational and supply chain variables within actual business settings and sought to generate findings that could be used by managers and decision-makers to improve organizational performance. In terms of methodological orientation, the research was descriptive-correlational because the variables were examined in their naturally occurring organizational context without experimental manipulation or researcher intervention. The correlational design was considered appropriate for determining the magnitude and direction of the relationships among supply chain integration, supply chain agility, and organizational productivity and for evaluating the proposed mediating mechanism through which supply chain integration may contribute to higher levels of organizational productivity. The research process involved an initial review of the theoretical and empirical literature, conceptualization of the proposed relationships among the study variables, selection and evaluation of standardized measurement instruments, administration of the questionnaires to eligible participants, statistical examination of the measurement properties of the instruments, and subsequent evaluation of the hypothesized structural relationships.

The statistical population consisted of employees working in small and medium-sized food companies operating in the industrial estates of Kerman. The total accessible population was estimated at 500 employees. Because employees were distributed across different enterprises and organizational groups, proportionate

stratified random sampling was employed to improve the representativeness of the selected participants. In this procedure, the population was divided into relevant strata based on the organizational distribution of employees, after which participants were randomly selected from each stratum in proportion to its size within the total population. The required sample size was determined using Cochran's sample-size formula for a finite population. Based on a population of 500 employees, a final sample of 217 participants was selected for inclusion in the statistical analyses. The use of proportionate stratified random sampling was intended to reduce sampling bias and ensure that employees from the participating small and medium-sized food enterprises were adequately represented in the study sample. All statistical analyses and hypothesis tests were consequently performed on the data obtained from these 217 respondents.

Data were collected using three standardized self-report questionnaires measuring supply chain integration, supply chain agility, and organizational productivity. Supply chain agility was assessed using the questionnaire developed by Dai in 2013. This instrument consisted of 10 items representing two principal dimensions: the ability to perceive changes in the market and the ability to respond to market changes. Participants rated the items using a Likert-type response scale, with higher aggregate scores reflecting a greater organizational capacity to recognize environmental and market changes and respond to such changes rapidly and effectively. In the present study, supply chain agility was conceptualized as an adaptive organizational capability through which firms identify market fluctuations, changes in customer requirements, supply-related uncertainties, and competitive pressures and subsequently reconfigure their supply chain activities in a timely manner. Previous assessment of the instrument reported a validity coefficient of 0.84, and the internal consistency reliability obtained for the scale was satisfactory, with a Cronbach's alpha coefficient of 0.804.

Supply chain integration was measured using the standardized instrument based on the model developed by Alhoti in 2013. The questionnaire comprised 30 items distributed across three dimensions: supplier integration, customer integration, and internal integration. Supplier integration reflected the extent to which the focal organization coordinated its information, activities, planning processes, and operational decisions with suppliers. Customer integration represented the degree of collaboration, information exchange, and coordination

between the organization and its customers, whereas internal integration captured the extent of coordination and information sharing among organizational departments and functional units. Responses were recorded on a Likert-type scale, and higher scores indicated stronger levels of supply chain integration. Previous psychometric evaluation of the questionnaire reported a validity coefficient of 0.91. The reliability of the instrument was also satisfactory in the present research context, with a Cronbach's alpha coefficient of 0.906, indicating a high degree of internal consistency among the items assessing supply chain integration.

Organizational productivity was assessed using the standardized Human Resource Productivity Questionnaire developed by Nasiripour and colleagues in 2010. The instrument consisted of 42 items covering five dimensions, including organizational culture, environmental conditions, motivation, empowerment, and leadership style. These dimensions were intended to capture a multidimensional conception of productivity in which organizational effectiveness is influenced not only by employees' performance but also by the cultural, motivational, managerial, and environmental conditions under which organizational activities are performed. Participants responded to the items using a Likert-type scale, with higher scores indicating more favorable levels of organizational productivity. Previous evaluation of the questionnaire reported a validity coefficient of 0.83. In the present study, the instrument demonstrated acceptable internal consistency, with a Cronbach's alpha coefficient of 0.733. Thus, the reliability coefficients for all three principal study variables exceeded the conventional minimum threshold of 0.70, supporting the adequacy of the instruments for subsequent statistical analysis. Given that all three questionnaires were standardized instruments with previously established evidence of validity and had been used in related research settings, their documented validity evidence was considered adequate for the purposes of the present study.

Data analysis was conducted using both descriptive and inferential statistical procedures. After data collection, the completed questionnaires were coded, entered, screened, and prepared for analysis using SPSS version 19. Descriptive statistics were used to summarize the characteristics of the participants and the distributions of the principal research variables. Prior to hypothesis testing, the distributional characteristics of the study variables were evaluated using the one-sample Kolmogorov-Smirnov test in order to assess their conformity with the assumption of

normality. Internal consistency reliability was assessed using Cronbach's alpha coefficients for supply chain integration, organizational productivity, and supply chain agility. Cronbach's alpha values of 0.906, 0.733, and 0.804 were obtained for supply chain integration, organizational productivity, and supply chain agility, respectively. Because all coefficients exceeded the commonly accepted criterion of 0.70, the scales were considered to demonstrate adequate internal consistency for the main analyses.

The hypothesized relationships among the research constructs were examined through partial least squares structural equation modeling using SmartPLS 2. The PLS approach was employed because the proposed conceptual model contained multiple latent constructs and simultaneously examined both direct and indirect relationships among supply chain integration, supply chain agility, and organizational productivity. The analysis was designed to determine whether higher levels of supply chain integration were associated with greater organizational productivity, whether supply chain integration predicted supply chain agility, whether supply chain agility contributed to organizational productivity, and whether supply chain agility mediated the relationship between supply chain integration and organizational productivity. The measurement model was evaluated before interpretation of the structural relationships to ensure adequate reliability and validity of the latent constructs. Subsequently, the structural model was assessed on the basis of the magnitude and statistical significance of the estimated path coefficients and the explanatory capacity of the endogenous constructs. The mediating effect of supply chain agility was evaluated by examining the indirect pathway from supply chain integration to organizational productivity through supply chain agility in addition to the corresponding direct relationship. All hypothesis tests were conducted using data from the final sample of 217 respondents, and the threshold for statistical significance was set at $p < .05$.

3 Findings and Results

The final sample consisted of 217 employees working in small and medium-sized food enterprises located in the industrial estates of Kerman. Regarding gender, 176 participants (81.1%) were men and 41 (18.9%) were women. In terms of educational attainment, 13 participants (6.0%) had a high-school diploma or lower level of education, 47 (21.7%) held an associate degree, 92 (42.4%) held a bachelor's degree, and 65 (30.0%) had a master's degree or

higher qualification. With respect to work experience, 45 participants (20.7%) had 1–5 years of experience, 13 (6.0%) had 6–10 years, 50 (23.0%) had 11–15 years, 25 (11.5%) had 16–20 years, 35 (16.1%) had 21–25 years, and 49 (22.6%) had 26–30 years of work experience. Regarding age, 39

respondents (18.0%) were 20–30 years old, 50 (23.0%) were 31–40 years old, 54 (24.9%) were 41–50 years old, and 74 (34.1%) were older than 50 years. Finally, 93 participants (42.9%) were single and 124 (57.1%) were married.

Table 1

Descriptive Statistics and One-Sample Kolmogorov–Smirnov Test Results for the Study Variables (n = 217)

Variable	Mean	SD	Median	Skewness	Kurtosis	Minimum	Maximum	K–S Z	p
Supply Chain Integration	3.42	0.60	3.50	−0.44	0.60	1.00	4.88	0.836	.487
Supplier Integration	3.57	0.72	3.66	−0.66	0.82	1.00	5.00	1.969	.001
Customer Integration	3.38	0.68	3.40	−0.45	0.22	1.00	5.00	1.543	.017
Internal Integration	3.30	0.65	3.25	−0.07	0.29	1.00	5.00	1.048	.222
Organizational Productivity	3.36	0.63	—	—	—	—	—	1.259	.084
Supply Chain Agility	3.59	0.61	—	—	—	—	—	1.112	.169

As shown in Table 1, supply chain agility had the highest overall mean score ($M = 3.59$, $SD = 0.61$), followed by supplier integration ($M = 3.57$, $SD = 0.72$), overall supply chain integration ($M = 3.42$, $SD = 0.60$), customer integration ($M = 3.38$, $SD = 0.68$), organizational productivity ($M = 3.36$, $SD = 0.63$), and internal integration ($M = 3.30$, $SD = 0.65$). On the five-point response scale, the scores generally reflected moderate-to-relatively high levels of the investigated organizational characteristics. The one-sample Kolmogorov–Smirnov test indicated that the

distributions of overall supply chain integration ($p = .487$), internal integration ($p = .222$), organizational productivity ($p = .084$), and supply chain agility ($p = .169$) did not significantly deviate from normality. In contrast, supplier integration ($p = .001$) and customer integration ($p = .017$) demonstrated statistically significant departures from normality. Because partial least squares structural equation modeling does not require multivariate normality and is comparatively robust to non-normal distributions, these departures did not preclude subsequent PLS-SEM analyses.

Figure 1

Initial PLS-SEM Measurement Model With Standardized Factor Loadings

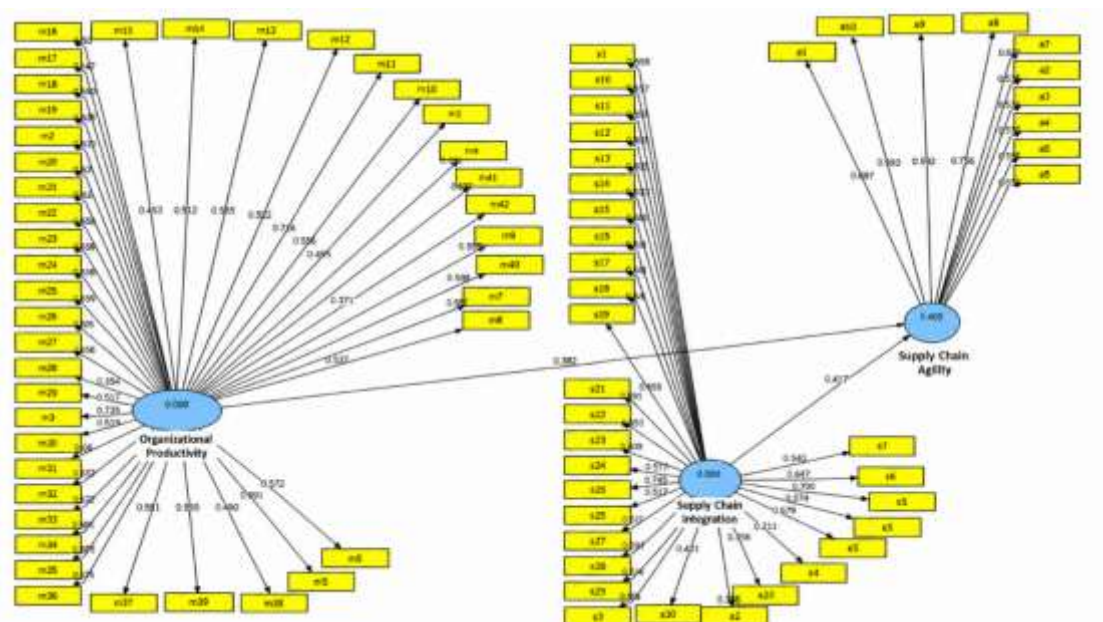
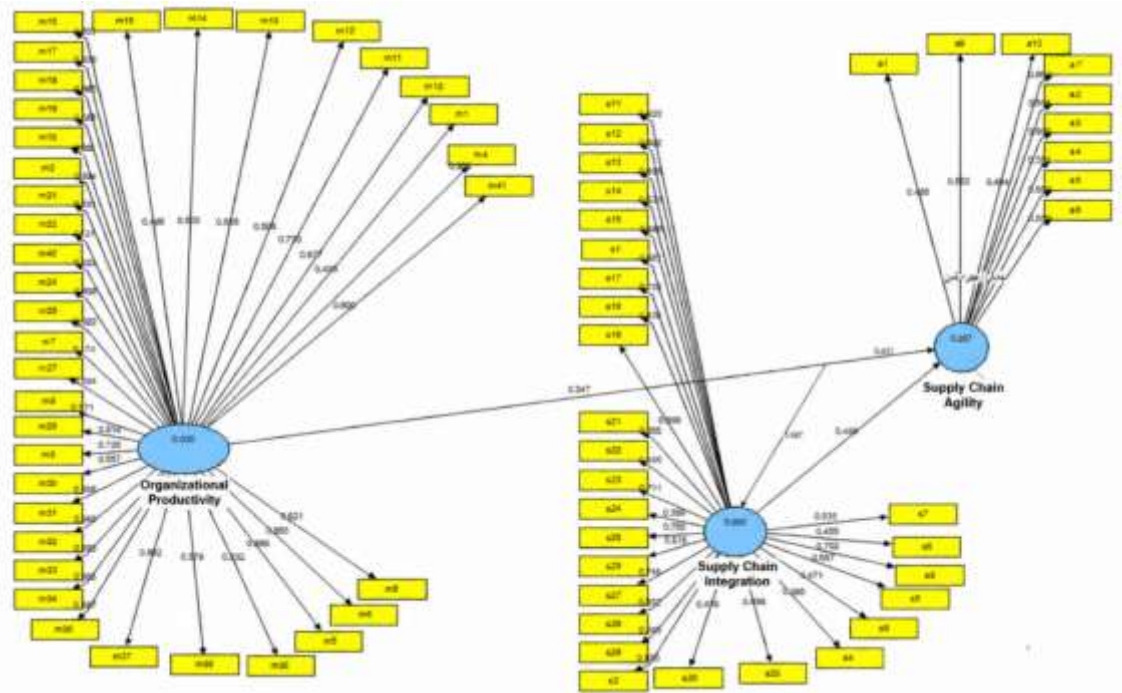


Figure 2

Revised PLS-SEM Measurement Model After Removal of Indicators With Factor Loadings Below 0.40



The measurement model was initially evaluated by examining the standardized outer loadings of the observed indicators on their corresponding latent constructs. A minimum loading of 0.40 was adopted as the criterion for retaining indicators in the model. Examination of the initial model indicated that several items did not adequately represent their intended constructs. Specifically, Items 20, 23, 26, 28, 35, and 42 of the organizational productivity questionnaire had factor loadings below 0.40 and were therefore removed. Similarly, Items 2, 4, 10, and 16 of the

supply chain integration questionnaire exhibited insufficient factor loadings and were excluded from the measurement model. Figure 1 represents the initially estimated measurement model, whereas Figure 2 presents the revised model following removal of the weak indicators. The remaining indicators demonstrated satisfactory relationships with their respective latent constructs and were therefore retained for subsequent evaluation of reliability, convergent validity, discriminant validity, and the structural model.

Table 2

Internal Consistency Reliability, Composite Reliability, and Convergent Validity of the Study Constructs

Construct	Cronbach's Alpha	Composite Reliability	AVE
Organizational Productivity	.957	.955	.459
Supply Chain Integration	.941	.946	.467
Supply Chain Agility	.933	.938	.438
Acceptable Criterion	≥ .70	≥ .70	≥ .40

The measurement-model results demonstrated satisfactory internal consistency reliability and convergent validity for all three latent constructs. Cronbach's alpha coefficients ranged from .933 to .957, while composite reliability coefficients ranged from .938 to .955, considerably exceeding the minimum acceptable value of .70. Organizational productivity demonstrated a Cronbach's

alpha of .957 and composite reliability of .955, supply chain integration yielded corresponding values of .941 and .946, and supply chain agility yielded values of .933 and .938. The average variance extracted values were .459 for organizational productivity, .467 for supply chain integration, and .438 for supply chain agility. All AVE values exceeded the adopted minimum criterion of .40,

indicating that the retained indicators demonstrated an acceptable level of convergent validity with their respective latent constructs. Taken together, these findings supported

the reliability and convergent validity of the revised measurement model.

Table 3

Discriminant Validity of the Study Constructs Based on the Fornell–Larcker Criterion

Construct	Organizational Productivity	Supply Chain Integration	Supply Chain Agility
Organizational Productivity	.677		
Supply Chain Integration	.221	.683	
Supply Chain Agility	.445	.522	.661

Discriminant validity was assessed using the Fornell–Larcker criterion by comparing the square root of the AVE for each latent construct with its correlations with the other constructs. As presented in Table 3, the square root of AVE was .677 for organizational productivity, .683 for supply chain integration, and .661 for supply chain agility. Each diagonal value was greater than the corresponding interconstruct correlations. Specifically, the correlation between organizational productivity and supply chain integration was .221, the correlation between organizational productivity and supply chain agility was .445, and the correlation between supply chain integration and supply chain agility was .522. These results indicated that each latent construct shared more variance with its own indicators than with the other constructs in the model, thereby confirming satisfactory discriminant validity.

The structural and overall model fit indices collectively indicated an acceptable fit and predictive capacity of the proposed PLS-SEM model. All relevant bootstrapped Z-statistics exceeded the critical value of 1.96, indicating that the estimated structural relationships were statistically significant at the 95% confidence level. The coefficient of determination for supply chain agility was $R^2 = .387$, indicating that approximately 38.7% of its variance was explained by the predictors included in the model and representing a moderate level of explanatory power. The effect-size analysis produced f^2 values of .156 and .295 for the relevant predictor effects on supply chain agility, respectively, both of which represented approximately moderate effect sizes according to conventional benchmarks. Predictive relevance was further assessed through the Stone–Geisser Q^2 criterion. For supply chain agility, the sum of squares of observations was 2950.00 and the sum of squares of prediction errors was 2616.03, resulting in $Q^2 = .113$. Because this value was greater than zero, the model demonstrated adequate out-of-sample predictive relevance for the endogenous construct, although

the magnitude of predictive relevance was relatively modest. Finally, overall model fit was evaluated using the Goodness-of-Fit index calculated from the average R^2 and communality values. Based on $R^2 = .387$ and a communality value of .438, the resulting GOF value was .411. As this value exceeded the commonly cited threshold of .36 for strong overall fit, the combined measurement and structural model demonstrated a strong overall level of fit and was considered appropriate for testing the hypothesized direct and mediating relationships among supply chain integration, supply chain agility, and organizational productivity.

4 Discussion

The present study examined the relationship between supply chain integration and organizational productivity, with particular emphasis on the mediating role of supply chain agility among small and medium-sized food enterprises located in the industrial estates of Kerman. The findings generally supported the proposed conceptual framework and indicated that the relationships among supply chain integration, supply chain agility, and organizational productivity were statistically meaningful. The descriptive findings showed that supply chain agility had the highest mean among the principal constructs, followed by supply chain integration and organizational productivity. Among the dimensions of supply chain integration, supplier integration obtained the highest mean, whereas internal integration showed the lowest mean. These findings suggest that the participating firms had developed relatively stronger coordination with external suppliers than coordination among their own internal functional units. From a managerial perspective, this pattern is important because external collaboration alone may not be sufficient to produce sustainable productivity improvements unless information, decisions, and operational activities are also effectively integrated within the organization. The structural

model nevertheless demonstrated acceptable explanatory and predictive capability, supporting the argument that integration and agility constitute important organizational capabilities in the food-sector SME context.

The positive relationship between supply chain integration and organizational productivity is theoretically plausible because integrated supply chains reduce fragmentation and facilitate more efficient coordination of resources, information, and operating activities. When organizations establish closer relationships with suppliers, customers, and internal functions, they can improve production planning, reduce duplication, decrease delays, coordinate inventories, and match production more closely to market requirements. Such mechanisms can ultimately increase the efficiency with which organizational resources are converted into outputs. This interpretation is consistent with the recent findings of Rahman and colleagues, who emphasized the contribution of integration to organizational performance under supply chain disruptions and argued that integration enables firms to coordinate capabilities across organizational boundaries (Rahman et al., 2026). The result is also compatible with the findings of Lin and Zhu, who demonstrated that supply chain configuration can have meaningful implications for total factor productivity, suggesting that the architecture and coordination of supply networks are directly relevant to productive efficiency (Lin & Zhu, 2025). In the context of small and medium-sized food enterprises, integration may be particularly valuable because limited resources make operational inefficiencies relatively costly, while better coordination can reduce waste, improve procurement accuracy, and facilitate more effective utilization of labor and production capacity.

The results also indicated a meaningful relationship between supply chain integration and supply chain agility. This finding suggests that firms with better-integrated supply chains are more capable of perceiving changes in the market and responding to those changes quickly. Integration facilitates the timely exchange of information concerning customer demand, supplier availability, production constraints, logistics conditions, and competitive developments. As a consequence, decision-makers can recognize emerging problems earlier and coordinate responses more effectively. This interpretation is consistent with the organizational information-processing perspective presented by Dubey and colleagues, according to which relational integration and information-processing capability are essential foundations of agility in supply chains exposed to uncertainty (Dubey et al., 2020). The finding is also

aligned with Alamsjah and Yunus, who emphasized that agility in digitally transformed supply chains depends on coordination, organizational culture, and ambidextrous capabilities that enable organizations to translate information into rapid operational responses (Alamsjah & Yunus, 2022). Thus, supply chain integration appears to provide the informational and relational infrastructure through which agility can develop.

The observed relationship between integration and agility is additionally consistent with studies emphasizing the multidimensional antecedents of agile supply chains. Aldhaheeri and Ahmad showed that organizational and supply chain factors contribute to supply chain agility and competitive capability, highlighting the importance of collaboration and coordinated organizational processes (Aldhaheeri & Ahmad, 2023). Similarly, Malekifar and colleagues found that organizational culture and information technology competence were important for the development of supply chain agility in SMEs (Malekifar et al., 2014). Although the present study focused specifically on integration rather than organizational culture or IT competence, these findings collectively suggest that agility does not emerge independently. Rather, it is produced through a combination of information availability, internal coordination, external collaboration, and organizational readiness. The relatively high mean score observed for supply chain agility in the present sample may therefore reflect the capacity of these enterprises to use their supplier and customer relationships to identify changes and adjust operational activities accordingly.

The relationship between supply chain agility and organizational productivity also deserves particular attention. Supply chain agility enables firms to react quickly when market demand changes, supplies are delayed, customer requirements shift, or operational disruptions emerge. Such responsiveness can protect organizations against production stoppages, excess inventories, lost sales, resource underutilization, and delays in customer service. Accordingly, an agile supply chain can contribute to productivity not necessarily by increasing the quantity of available resources, but by improving how effectively existing resources are deployed under changing conditions. The present findings are consistent with Alkrait and Almaktoom, who reported a positive relationship between supply chain agility and organizational performance (Alkrait & Almaktoom, 2021). They are also supported by Hosseini Balaei, whose investigation in the food industry indicated that organizational agility strategies and supply chain agility

were associated with improved organizational performance (Hosseini Balaei, 2015). The consistency of these findings is especially relevant because the current research also focused on food enterprises, where supply and demand conditions may change rapidly and where agility can directly influence the efficient use of perishable resources.

The findings further correspond with the results of Bavarsad and colleagues, who showed that supply chain agility can serve as a mediating mechanism through which organizational capabilities such as information technology infrastructure flexibility and organizational learning affect performance (Bavarsad et al., 2019). This comparison is important because it suggests that supply chain agility may function as an intermediate capability rather than merely as an isolated operational outcome. In the present study, the modeled relationships were consistent with the proposition that supply chain integration can contribute to organizational productivity partly by strengthening supply chain agility. In conceptual terms, integration improves access to relevant information and facilitates coordination, whereas agility determines whether the organization can transform these advantages into rapid and effective action. This sequence provides a plausible explanation for why integrated firms may achieve better productivity outcomes: they are not only better connected to suppliers, customers, and internal units, but are also better positioned to respond to information generated through those connections.

The mediating role of supply chain agility is also supported conceptually by research on strategic flexibility and market performance. Ajike and colleagues demonstrated that supply chain agility plays an important role in the relationship between strategic flexibility and organizational market performance, reinforcing the idea that flexibility-related resources become more valuable when organizations possess the capability to respond rapidly to environmental change (Ajike et al., 2024). Similarly, Azizi and colleagues found that transformational leadership and organizational ambidexterity can foster supply chain agility, emphasizing that agility operates as a strategically developed capability that connects organizational characteristics with supply chain outcomes (Azizi et al., 2025). The present results extend this logic to supply chain integration and organizational productivity by suggesting that integrated processes generate greater value when they are translated into responsive supply chain behavior. In SMEs, where managerial resources are limited and operational disturbances can have immediate financial effects, the ability

to convert integration into agile action may be particularly important.

The findings are also consistent with research emphasizing the sustainability-related dimensions of agility. Rehman and colleagues argued that supply chain agility contributes to sustainability by helping manufacturing organizations respond efficiently to uncertain and changing operating conditions (Rehman et al., 2020). Al-Zabidi and colleagues similarly proposed that sustainable supply chain agility reflects the organization's capacity to combine responsiveness with economic, environmental, and operational objectives (Al-Zabidi et al., 2021). Although sustainability was not directly measured in the present research, these studies provide relevant explanatory support because productivity in food SMEs is closely tied to resource efficiency, waste reduction, continuity of supply, and the capacity to prevent disruptions. In food manufacturing in particular, delayed responses can cause spoilage, inventory losses, production interruptions, or failures to satisfy customer requirements. Therefore, the contribution of agility to productivity may partly arise from its capacity to minimize the operational consequences of uncertainty.

The results can also be interpreted in light of green and sustainable supply chain research in Iran. Safdari and Rostamzadeh found that green supply chain management was associated with organizational agility, indicating that coordinated supply chain practices can strengthen adaptive organizational capabilities (Safdari & Rostamzadeh, 2018). Azad similarly reported that green supply chain agility could contribute to competitive advantage and broader organizational agility in industrial firms (Azad, 2020). More recently, Ghaedi and Zeraati Foukaliei emphasized the mediating contribution of sustainable supply chain dynamic capabilities in the relationship between sustainable supply chain practices and the productivity of small economic enterprises (Ghaedi & Zeraati Foukaliei, 2025). These findings provide a particularly close conceptual parallel to the present study because both lines of research recognize that supply chain practices may not improve productivity automatically; instead, their effects may be transmitted through dynamic organizational capabilities that enable firms to adapt resources and processes to environmental requirements.

The relatively strong reliability and acceptable convergent and discriminant validity of the measurement model further strengthen confidence in the interpretation of the results. Cronbach's alpha and composite reliability coefficients exceeded the accepted threshold of .70 for all

constructs, indicating high internal consistency. The AVE values also met the criterion adopted in the study, while the Fornell–Larcker assessment supported discriminant validity because each construct shared more variance with its own indicators than with the other constructs. These results suggest that supply chain integration, supply chain agility, and organizational productivity represented empirically distinguishable constructs despite their theoretical interrelationships. The removal of indicators with loadings below .40 further improved the measurement model by excluding items that did not adequately represent their intended latent variables. Consequently, the structural relationships were evaluated on the basis of a measurement model with satisfactory psychometric properties.

The structural-model indicators also provided evidence of acceptable explanatory and predictive performance. The R^2 value of .387 indicated that the model explained 38.7% of the variance in the endogenous supply chain agility construct, representing moderate explanatory power. The reported effect-size values of .156 and .295 indicated moderate contributions of the relevant predictors, implying that the relationships were not merely statistically detectable but also substantively meaningful. The Q^2 value of .113 was above zero, demonstrating predictive relevance for the endogenous construct, although its magnitude suggested that predictive capability was modest rather than strong. In addition, the reported GOF value of .411 indicated strong overall fit according to the criterion used in the study. Together, these indicators suggest that the proposed model provides a meaningful explanation of the relationships among integration, agility, and productivity in the studied enterprises, while also indicating that additional organizational, technological, environmental, and managerial variables are likely to explain the remaining variance.

The present results are also compatible with the broader literature on strategic and organizational agility. Vishlaghi and colleagues emphasized that strategic agility is central to sustainable manufacturing development because organizations must continuously align resources, structures, and decisions with changing environmental conditions (Vishlaghi et al., 2021). Yoon and colleagues similarly demonstrated that market orientation and organizational innovativeness enhance supply chain agility by enabling firms to identify and respond to external signals more effectively (Yoon et al., 2014). These findings help explain why integration alone may not be sufficient. Information received from customers or suppliers becomes valuable only

when organizations possess the internal mechanisms required to interpret and act upon it. Therefore, the effectiveness of supply chain integration is contingent on the organization's capacity to transform relational and informational inputs into adaptive decisions and actions.

Technological developments provide another explanation for the observed relationships. Digitalization, automation, and artificial intelligence increasingly enable organizations to coordinate supply chain activities, forecast demand, monitor inventories, and respond to disruptions with greater speed. Onukwulu emphasized that automation and artificial intelligence can increase supply chain productivity through improved decision-making, process efficiency, and real-time responsiveness (Onukwulu, 2025). However, technology alone does not guarantee productivity gains. Its value depends on whether firms are sufficiently integrated to share and process information and sufficiently agile to act on that information. This is particularly relevant to SMEs, which may lack the financial capacity to implement sophisticated technologies at the same level as large corporations. For such firms, strengthening integration and agility may provide a comparatively accessible mechanism for achieving productivity improvements even when technological resources remain constrained.

5 Conclusion

Overall, the findings reinforce the view that supply chain integration, supply chain agility, and organizational productivity should not be considered independent managerial phenomena. Instead, they represent interconnected components of organizational capability. Integration establishes coordination and information-sharing mechanisms, agility transforms those mechanisms into adaptive responses, and productivity reflects the efficiency gains that can emerge when organizational resources are coordinated and adjusted effectively. The results are therefore broadly consistent with previous research showing that integration, agility, dynamic capabilities, strategic flexibility, and organizational responsiveness contribute to improved organizational outcomes across manufacturing and supply chain contexts (Patel et al., 2017; Rahman et al., 2026). In the specific setting of small and medium-sized food enterprises in Kerman, the findings indicate that efforts to improve productivity should extend beyond isolated internal efficiency initiatives and encompass the broader network of supplier relationships, customer coordination,

internal integration, and responsive supply chain capabilities.

Several limitations should be considered when interpreting the findings. First, the study used a cross-sectional design, and all variables were measured at one point in time; consequently, the observed relationships cannot establish definitive causal direction among supply chain integration, supply chain agility, and organizational productivity. Second, the data were obtained through self-report questionnaires, making the results potentially susceptible to common-method variance, social desirability, and respondents' subjective perceptions of organizational practices. Third, the sample was limited to 217 employees from small and medium-sized food enterprises located in the industrial estates of Kerman, which restricts the generalizability of the findings to firms in other geographical regions, industrial sectors, or organizational sizes. Fourth, although the measurement model demonstrated acceptable reliability and validity, several indicators were removed because of inadequate factor loadings, suggesting that some questionnaire items may not fully reflect the contextual characteristics of the studied population. Finally, the model concentrated on three principal constructs and therefore did not account for other potentially influential factors such as information technology capability, environmental uncertainty, organizational learning, leadership style, firm size, supply chain resilience, innovation capability, or market turbulence.

Future studies should employ longitudinal designs to investigate how changes in supply chain integration and agility influence organizational productivity over time and to provide stronger evidence regarding causal relationships. Researchers may also replicate the model in other provinces, industrial clusters, and economic sectors and compare food SMEs with larger enterprises to determine whether organizational size moderates the proposed relationships. Multi-source data collection is recommended, including information obtained from managers, employees, suppliers, customers, and objective organizational records, to reduce common-method bias and provide more robust measures of productivity. Future models could incorporate additional mediating or moderating constructs, including digital supply chain capability, supply chain resilience, environmental uncertainty, organizational learning, innovation capability, strategic flexibility, or information-sharing quality. Comparative studies could also examine whether different dimensions of supply chain integration—supplier, customer, and internal integration—exert different direct and indirect

effects on agility and productivity. Researchers may further employ covariance-based structural equation modeling, longitudinal mediation analysis, multigroup analysis, or configurational methods to examine the robustness of the relationships identified in this study.

Managers of small and medium-sized food enterprises should strengthen supply chain integration by establishing systematic information-sharing mechanisms with suppliers and customers while simultaneously improving coordination among purchasing, production, sales, logistics, and quality-control units. Particular attention should be devoted to internal integration because the descriptive results suggested that it was comparatively weaker than supplier integration. Managers should establish rapid decision-making procedures, flexible production schedules, alternative sourcing arrangements, and real-time monitoring of changes in customer demand and raw-material availability to strengthen supply chain agility. Investment in digital information systems should be directed toward improving visibility and coordination rather than simply acquiring technology. Firms should also develop regular supplier evaluation systems, collaborative forecasting processes, shared inventory information, and contingency plans for disruptions. Employee training should emphasize cross-functional cooperation, rapid problem solving, and decentralized decision-making so that information obtained through supply chain integration can be converted promptly into operational action. By simultaneously strengthening integration and agility, food SMEs can improve resource utilization, reduce delays and waste, respond more efficiently to uncertainty, and ultimately enhance organizational productivity.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.

References

- Ajike, E. O., Adeleke, A. A., Bamidele, A. G., Olubiyi, T. O., Adesuyi, O. O., Ilori, G. E., Ariguzo, V. A., & Binuyo, B. O. (2024). The Moderating Role of Supply Chain Agility on the Relationship Between Strategic Flexibility and Organizational Market Performance in Nigerian Pharmaceutical Industry. *PaperASIA*, 40(5b), 337-349. <https://doi.org/10.59953/paperasia.v40i5b.259>
- Al-Zabidi, A., Rehman, A. U., & Alkahtani, M. (2021). An approach to assess sustainable supply chain agility for a manufacturing organization. *Sustainability*, 13(4), 1752. <https://doi.org/10.3390/su13041752>
- Alamsjah, F., & Yunus, E. N. (2022). Achieving Supply Chain 4.0 and the Importance of Agility, Ambidexterity, and Organizational Culture: A Case of Indonesia. *Journal of Open Innovation Technology Market and Complexity*, 8(2), 83. <https://doi.org/10.3390/joitmc8020083>
- Aldaheri, R. T., & Ahmad, S. Z. (2023). Factors Affecting Organisations' Supply Chain Agility and Competitive Capability. *Business Process Management Journal*, 29(2), 505-527. <https://doi.org/10.1108/bpmj-11-2022-0579>
- Alkrait, Y., & Almaktoom, A. (2021). The relationship between supply chain agility and organizational performance in KSA. *PalArch's Journal of Archaeology of Egypt/Egyptology*, 18(15), 266-271. <https://archives.palarch.nl/index.php/jae/article/download/8333/7778/16318>
- Azad, B. (2020). *Examining the Impact of Green Supply Chain Agility on Gaining Competitive Advantage and Organizational Agility in the Industry (Case Study: Active Industrial Units in Ardabil)* Moqaddas Ardabili Institute of Higher Education, Department of Management].
- Azizi, M., Hanoum, S., Purnomo, J., Shubbak, M., & Gandolfi, F. (2025). Fostering Supply Chain Agility through Transformational Leadership and Organizational Ambidexterity in the Indonesian Automotive Industry. *Operations and Supply Chain Management: An International Journal*, 18(3), 511-523. <https://doi.org/10.31387/oscm0620486>
- Bavarsad, B., Zare, H., & Fa'ali, R. (2019). The Effect of Information Technology Infrastructure Flexibility and Organizational Learning on Performance with the Mediating Role of Supply Chain Agility Performance in Manufacturing Companies of Khuzestan Province. *Quarterly Journal of Innovation Management in Defense Organizations*, 1(1), 69-96.
- Dubey, R., Bryde, D. J., Foropon, C., Graham, G., Giannakis, M., & Mishra, D. B. (2020). Agility in humanitarian supply chain: an organizational information processing perspective and relational view. *Annals of Operations Research*, 1-21. <https://doi.org/10.1007/s10479-020-03824-0>
- Ghaedi, M., & Zeraati Foukaliei, P. (2025). Examining the Effect of Sustainable Supply Chain Practices on the Productivity of Small Economic Enterprises with the Mediating Role of Sustainable Supply Chain Dynamic Capabilities. National Conference on Futures Studies, Management, and Sustainable Development, Tehran, Iran.
- Hosseini Balaei, S. (2015). *Investigating the effect of organizational agility strategies and supply chain agility on organizational performance (Case study: Roshd Food Company)* <https://elmnet.ir/doc/10784125-26494>
- Lin, B., & Zhu, Y. (2025). Supply chain configuration and total factor productivity of renewable energy. *Renewable and Sustainable Energy Reviews*, 209, 115140. <https://doi.org/10.1016/j.rser.2024.115140>
- Malekifar, S., Taghizadeh, S. K., Rahman, S. A., & Khan, S. U. R. (2014). Organizational Culture, IT Competence, and Supply Chain Agility in Small and Medium-Size Enterprises. *Global Business and Organizational Excellence*, 33(6), 69-75. <https://doi.org/10.1002/joe.21574>
- Onukwulu, E. C. (2025). Advances in Automation and AI for Enhancing Supply Chain Productivity in Oil and Gas. *International Journal of Research and Innovation in Applied Science*. <https://doi.org/10.51584/ijrias.2024.912057>
- Patel, B., Samuel, C., & Sharma, S. K. (2017). Evaluation of Agility in Supply Chains: A Case Study of an Indian Manufacturing Organization. *Journal of Manufacturing Technology Management*, 28(2), 212-231. <https://doi.org/10.1108/JMTM-09-2016-0125>
- Rahman, M. K., Piprani, A. Z., Mohiuddin, S., Nazir, S., & Shah, A. A. (2026). Unraveling the Impact of Organizational Ambidexterity: The Role of Integration and Agility in Enhancing Performance Amidst Supply Chain Disruptions. *Global Business and Organizational Excellence*. <https://doi.org/10.1002/joe.70028>
- Rehman, A. U., Al-Zabidi, A., AlKahtani, M., Umer, U., & Usmani, Y. S. (2020). Assessment of supply chain agility to foster sustainability: fuzzy-DSS for a Saudi manufacturing organization. *Processes*, 8(5), 577. <https://doi.org/10.3390/pr8050577>
- Safdari, M., & Rostamzadeh, R. (2018). Examining the Impact of Green Supply Chain Management on Organizational Agility (Case Study: Iran Khodro Tabriz). *Value Chain Management Journal*, 1(4). https://journals.iau.ir/article_652343.html?lang=en
- Vishlaghi, M., Zarei, A., & Feiz, D. (2021). Designing Strategic Agility Model for Sustainable Manufacturing Boom Based on Grounded Theory(Case Study: Automotive Industry). *Journal of Improvement Management*, 15(2), 127-153. <https://doi.org/10.22034/jmi.2021.238717.2292>
- Yoon, T., 고애란, & Jin, B. (2014). The Role of Market Orientation and Organizational Innovativeness in Enhancing the Supply Chain Agility of Korean Apparel Firms. *Journal of the Korean Society of Clothing and Textiles*, 38(5), 718-732. <https://doi.org/10.5850/jksct.2014.38.5.718>