

# Uncertain Supply Chain Management

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## The impact of supply chain integration on strategic performance: The mediating role of strategic vigilance

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### ABSTRACT

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The study aimed to identify the impact of supply chain integration through strategic performance and the mediating role of strategic vigilance in industrial companies. The Jordanian population is large and medium-sized, and the study population consists of medium and large-sized industrial companies. For hypothesis testing purposes the study and its model validity, Modeling Equation Structural Analysis (SEM) was used through the AMOS16 program. The study indicates that supply chain integration (strategic integration, internal integration, external integration) has an impact on strategic performance and response. The supply chain, as the results of the study indicated, shows that the response of the supply chain affects strategic performance. The study also found that the response of the supply chain mediates the impact of strategic vigilance on strategic performance. The study recommended working to raise the level of trust and honesty, commitment and attention to the interest of each party to the supply chain to maintain a good level of external integration of the supply chain and work to improve the level of supply chain response to markets and any changes that may occur in the market through corporate restructuring and streamlining working procedures.

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### 1. Introduction

In the past two decades, the good implementation of the supply chain is a key factor for the success of the company and the achievement of its goals, especially the profit goal, where the effectiveness and integration of supply chain management improves the performance of the supply chain. In light of global competition, companies sought to modify their strategies and view customer satisfaction as the secret of their survival and continuity, which requires them to improve the level of delivery of products and services to customers and achieve the required performance. One of the means that can be used to achieve the desired performance is supply chain integration (Lambert et al., 1998). The integration and response of the supply chain has become a prominent importance in recent years at both the theoretical and applied levels, and many studies have shown great interest in the role of integration and response supply chain improvement in corporate performance, by integrating internal and external company functions and effectively linking them with suppliers, customers, and the rest of the supply chain (Bradley, 1999; Yan et al., 2022; Vu et al., 2022). Furthermore, companies have measured their performance based on a financial perspective only. Recently, researchers have recognized the weaknesses and ambiguities in the methods previously used by management and identified many criteria that must be considered when developing a performance measurement system, as we cannot improve what we cannot measure (e.g. Tan et al., 2004). Performance measurement is the first step for managers to improve any decision-making process in the company, and (Harland, 1996; Christopher & Jüttner, 2000; Bask & Juga, 2001) indicated that performance measurement and knowing the methods used has an important role in achieving goals, evaluating performance and determining corrective actions in the future, as industrial companies

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focused on operations. The modern economy (the knowledge economy) no longer focuses on mass production, but rather focuses on directed production, as industrial companies have become focused on additional processes that are represented in customer service and others, so the need to use performance measures has increased, and the company began interested in developing an integrated system to measure performance instead of using individual methods, and accordingly indicate that the integration of supply chains is one of the main factors in improving performance (Håkansson & Persson, 2004; Bagchi et al., 2005; Jahre & Fabbe-Costes, 2005).

By literature review, it was found that supply chain integration revolves around three dimensions: internal integration, external integration and strategic integration (Min & Menzer, 2004). As the supply chain response contributes to achieving a high degree of strategic cooperation both internally and externally between the company and chain partners. Procurement, to ensure the efficient flow of products, services, information, funds, and decisions, to deliver the greatest possible value to the customer. This interest in bringing about integration constitutes a fundamental change in the management of modern business models, this change gives an indication to the companies operating individually that they cannot as independent units, but will compete through the efficiency and effectiveness of chains. Supply chain, and this change constitutes a strategic direction for the supply chain (Stank et al., 2001). It has been found that the integration and response of the supply chain are important tools to achieve competitive competitiveness of companies, and helps them achieve their goals, so that they can compete at the local and global levels to reach the desired performance. It is centered on short-term goals that seek the supply chain to achieve, around increasing productivity, reducing inventory turnover, and reducing costs, while the long-term strategic objective is to improve customer satisfaction, increase profits and market share for all partners (Wacker, 2004). According to Pagell (2004), supply chain integration is considered as one of the most important issues in supply chain management, and one of the most important elements support for it and its outputs, and it is the main key to the success of companies and supply chains, and it is the modern entry in the agenda of researchers, as there is no general agreement about the sub-dimensions of supply chain integration, in addition, we find that the relationships between these dimensions are not fixed, despite their description in studies. The degree of their impact on the level of corporate performance of companies was measured (Tan et al., 1998). Moreover, many companies have relied on supply chain integration as a means of facing challenges and the importance of supply chain integration has been formed for many researchers to address the impact of supply chain integration on companies' performance, but it did not receive the same attention in the Jordanian environment, in addition to that there is still a discrepancy in the results of studies regarding the impact of supply chain integration on performance (Li et al., 2009) and by searching in the previous literature on supply chains, through the review of previous studies, we have found that there is still a gap and the need for more studies that examine the effects of supply chain integration on the strategic performance of industrial companies in developing country environments. Therefore, this study examines the mediating effect of strategic vigilance in the relationship between supply chain integration and strategic performance of companies in Jordan.

The aim of study is to fill the research gap by making use of the results of those studies to develop and improve performance in the five-star hotel sector in Jordan. The study also explores the relationship between supply chain integration and strategic performance and learn the spillover effect of strategic vigilance on the relationship between supply chain integration and strategic performance.

## **2. Literature review**

### *2.1 Supply Chain Integration*

The supply chain represents all the activities associated with the flow of products, services, and information from the sources of supply to the final consumer. The level of integration between these activities by improving the relationships between the supply chain units, whether they represent individuals or companies, in order to reach outstanding performance. Supply chain integration includes the processes of cooperation between functional departments, suppliers, and consumers to reach results that achieve the interests of all parties. Cooperation is an essential element for supply chain integration because cooperation, especially at the strategic level, requires effective communication between departments and coordination of joint efforts. The integration of the supply chain creates a cooperation between the company and its partners in the supply chain at the internal and external levels, to achieve the effective and efficient flow of products, services, information, funds and decisions, to deliver the maximum value to the customer that supply chain integration is vital to the continuation of the outstanding performance of the company, as the results of a study indicate that there is an impact of supply chain integration on performance, especially if the supply chain operations are highly complex, as operations increased supply complexity with product diversity, supply network complexity, short product life cycle, and environmental disruption, while the impact of supply chain integration on performance is very limited in the case of reduced supply complexity. Zolait et al. (2010) conducted a study to determine the impact of the integration of supply chain processes on the performance of companies and concluded that the integration of supply chain processes affects the performance of companies, and that the integration of information flow has a greater impact than the integration of the flow of physical and financial components. In the same direction, a study (Beheshti et al., 2014), which aimed to identify the impact of supply chain integration on financial performance, and the results showed that supply chain integration at any level affects financial performance, and specifically the overall supply chain integration leads to Higher levels of financial performance compared to the partial integrator of the supply chain, and others showed that supply chain practices affect the competitive advantage and the performance of companies, and that competitive advantage mediates the impact of supply chain practices on companies' performance.

## 2.2 Strategic vigilance

The term strategic vigilance appeared at the beginning of the eighties, but its applications date back to much earlier, and this is due to the use of mechanisms for collecting and analyzing information by many countries and institutions before the term crystallized in its contemporary meaning, and the collection and analysis of information greatly contributed to the development of Britain. The same applies to Japan in the nineteenth century when it relied on the informational awakening to open up to the world, as well as for Germany during the era of Bismarck, who developed an information system to determine the most important transformations and developments in the field of the Industrial Revolution. The definition of strategic vigilance is that continuous collective action through a group of individuals that collect and use information voluntarily and proactively in line with the likely changes that may occur in the external environment, in order to create business opportunities and reduce the risks of uncertainty. Technological vigilance is the vigilance that the economic enterprise devotes in particular to the development of technologies, with all that this entails, the creation of products or services, the development of stages and processes manufacturing, developing new equipment and now even developing information systems (Cagliano et al., 2006, Schonberger, 2007). Technological vigilance is concerned with collecting information that enables the organization to achieve a precedent in the field of technological innovations, and its attention is focused on technological and technical developments, scientific discoveries and electronic innovation. The credit for its emergence is due to Michael Potter, as the competitive advantage has increased interest in competitors and expanded the scope of competition to go beyond the current competitors within the industry sector and to include potential competitors, producers of alternative goods, suppliers and distributors (Chen & Paulraj, 2004). However, with the intensification of competition and greater openness of markets and their integration into a unified global market, competitive vigilance must anticipate possible changes and anticipate the behavior of competitors, as weak signals are considered the most important targeted strategic information.

## 2.3 Strategic performance

Zhou and Benton (2007) showed that strategic performance is an expression of the activities and tasks that the employee exercises in the organization and the actual results that he achieves in his field of work successfully to achieve the goals of the organization efficiently and effectively in accordance with the available resources, administrative systems, the rule and specific procedures for work.

While there are those who define strategic performance as “a reflection of the organization’s ability to meet the requirements of its internal environment (such as resources) and the requirements of its external environment (such as customer satisfaction and loyalty) in the short and long term compared to competitors, as it can be said that strategic performance is a result of all the various strategic processes and stages that take place within the organization, and it is considered a mirror of its strategic management (Chakravarthy, 1986; Ittner et al., 2003; Micheli & Manzoni, 2010).

## 3. Study Methodology

### 3.1 Study Approach

To achieve the objectives of the study, the descriptive analytical approach was based on the desk survey method of the literature that dealt with the topic of supply chain integration, for the purpose of building the theoretical framework for this study, in addition to using the field method to collect data through a questionnaire that was distributed to the study sample and analyzed statistically to describe the study variables and test its hypotheses, interpretation and clarification of the various aspects to reach conclusions that contribute to determining the impact of supply chain integration on supply chain response and operational performance, and then determining the impact of supply chain response on operational performance.

### 3.2 Sampling

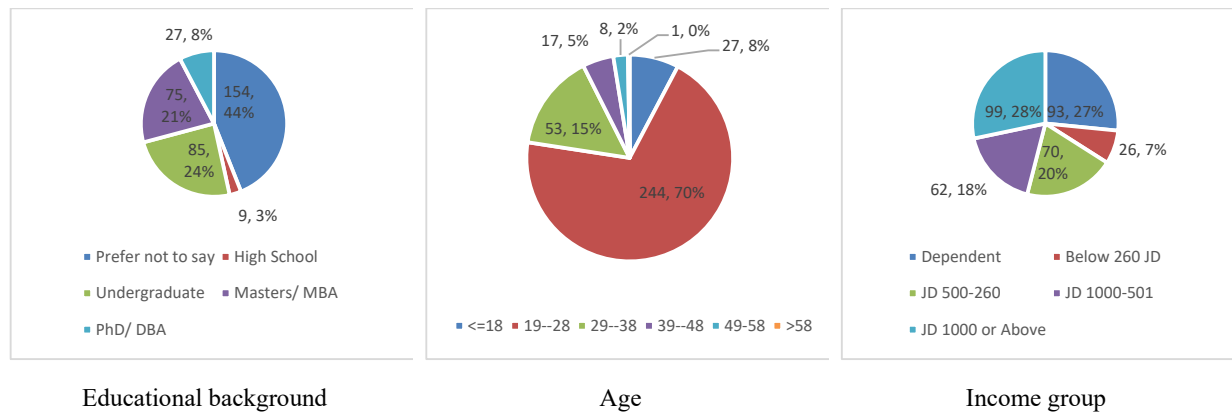
The study population consisted of medium and large-sized industrial companies, numbering about 250 companies, according to a survey conducted by the researcher of the database available on the website. Electronic email messages were sent to the Jordanian Companies Controller Department for the purpose of taking and for purposes. Probability random sample, the simple random sampling method was used at an error level of (5%) and a confidence level of (95%), so the sample size is 200 companies, and this method was used in some previous studies. 217 questionnaires were distributed to the companies under study, and they 144 were retrieved (144), i.e. (66%), and 3 questionnaires were excluded because they were not suitable for analysis, while the questionnaires valid for analysis were (141), i.e., at a rate of (65%) of the questionnaires that were distributed.

### 3.3 Data Analysis Method

Due to the non-normal nature of the data, this study tested the research model using partial least squares structural equation modelling (PLS-SEM, 3.1). PLS-SEM is a multivariate analysis tool that evaluates path models that have latent constructs (Hair et al., 2019). Model estimation is performed with  $r^2$ ,  $Q^2$ , and the effect size  $f^2$  that describes the path effect from exogenous construct to endogenous construct (Hair et al., 2019).

#### 4. Analysis and Discussion

We first present demographical statistics through Fig. 1 as follows,



**Fig. 1.** Personal characteristics of the participants

##### 4.1 Reliability and Validity

As shown in Table 1, all values of Cronbach's alpha, composite reliability, and rho-A are well above the threshold of 0.70 (Hair et al., 2019). These results signify that the constructs are reliable and performed well. AVE for each construct is above 0.50, indicates the convergent validity (Hair et al., 2019). Finally, all the VIF values are less than 3, establishing the lack of multi-collegiality issues among the study constructs.

**Table 1**  
Reliability Analysis

Variable	Number of items	Cronbach's Alpha	Average Variance Extracted
SCI	6	0.859	0.859
Organizational capabilities	4	0.873	0.873
Strategic vigilance	4	0.853	0.694
Strategic performance	5	0.873	0.6113

The item loading and cross-loading reported for validation of construct discriminant validity (See Table 2). Additionally, Fronell-Larcker criterion value for each contract is less than 0.70 to establish discriminant validity for each construct (Hair et al., 2019). HTMT ratio essentially is less than 0.90 to provide the evidence for discriminant validity for study constructs (Henseler et al., 2016). Table 2 shows that the study has evidence of discriminant validity.

**Table 2**  
Outer Loading and Cross Loadings

	OC	SP	SV	SCI
Organizational capabilities 1	0.832	0.452	0.562	0.598
Organizational capabilities 2	0.864	0.491	0.546	0.615
Organizational capabilities 3	0.845	0.522	0.560	0.566
organizational capabilities 4	0.811	0.522	0.691	0.582
Strategic performance 1	0.514	0.859	0.638	0.556
Strategic performance 2	0.488	0.872	0.618	0.508
Strategic performance 3	0.516	0.856	0.622	0.519
Strategic performance 4	0.506	0.817	0.539	0.490
Strategic vigilance 1	0.674	0.505	0.836	0.616
Strategic vigilance 2	0.625	0.540	0.850	0.565
Strategic vigilance 3	0.507	0.631	0.816	0.531
Strategic vigilance 4	0.552	0.688	0.830	0.575
SCI 1	0.435	0.481	0.492	0.725
SCI 2	0.503	0.483	0.556	0.807
SCI 3	0.549	0.534	0.559	0.830
SCI 4	0.614	0.527	0.623	0.814

**Table 3**  
The results of Fronell-Larker and Heterotrait-Monotrait Ratios

Fronell-Larker Criterion					Heterotrait-Monotrait Ratios				
OC	0.638				OC	-	-	-	-
PC	0.594	0.651			PC	0.685	-	-	-
SV	0.657	0.612	0.633		SV	0.823	0.820	-	-
SCI	0.670	0.610	0.686	0.683	SCI	0.811	0.697	0.792	-

Note: SCI: Supply Chain Integration, OC: organizational capabilities, SV: strategic vigilance, PC: Strategic performance

#### 4.2 Path Analysis

The  $r^2$  value for the three input variables (i.e., SCI, OC and SV) on the OPI explains that on average 53.5% percent of change in OPI can be explained by SCI, OC and SV. The predictive relevance ( $Q^2$ ) value for the part of the model is the average 0.467 indicating a medium.

**Table 4**

The results of Fronell-Larcker Criterion

<i>Fronell-Larcker Criterion</i>					
OC	0.638	-	-	-	-
PC	0.594	0.651	-	-	-
SV	0.657	0.612	0.633	-	-

**Table 5**

Hypothesis testing

Hypothesis	Coefficient	t-value	Sig.	Decision	$Q^2$	$R^2$	$F^2$
SCI→OP	0.705	21.960	0.000	Accept	0.452	0.497	0.988
SCI→SV	0.374	6.660	0.000	Accept			0.231
OP→SV	0.444	8.779	0.000	Accept	0.452	0.570	0.163
SCI→SP	0.189	2.972	0.003	Accept			0.033
SV→SP	0.244	8.173	0.000	Accept	0.506	0.538	0.244
OP→SP	0.099	1.504	0.003	Accept			0.029

As we can observe from the results of Table 5, all hypotheses have been confirmed when the level of significance is one percent. The biggest effect is associated with the relationship between SCI and OP ( $\beta = 0.705$ ) followed by the OP and SV relationship ( $\beta = 0.444$ ) and the relationship between SCI and SV ( $\beta = 0.374$ ). All relationships are positive which means an increase in SCI will also lead to increase in OP, SV and SP. It also means that an increase in OP will increase SV and SP.

#### 4.3 Mediating Effects

As noted in Table 6, mediation effect of trust between the SCI and SP reveals that trust mediates the relationship between SCI and SP ( $\beta = 0.267$ ,  $p = 0.004$ ). The relationship between the OP and SP is mediated by the trust. The result depicts that trust mediates the relationship between OP and SP ( $\beta = 0.402$ ,  $p = 0.000$ ). The relationship between the SCI and SV is mediated by the OP. The result shows that BI mediates the relationship between SCI and SV ( $\beta = 0.437$ ,  $p = 0.000$ ).

**Table 6**

The results of the mediating effect

Relationship	$\beta$	t-value	Sig.	Decision
HM1: SCI → OP → SP	0.267	2.928	0.004	Mediation
HM2: SV → OP → SP	0.402	3.688	0.000	Mediation
HM3: SCI → OP → SV	0.437	5.069	0.000	Mediation

### 5. Conclusion

We find that the results of this study are in agreement with the results of the study of Narasimhan and Kim (2002) which examined the relationship between the integration of the supply chain in institutional performance in light of the organizational capabilities. The study also agreed with the study of Flynn et al., (2010) which examined the relationship between supply chain integration and its impact on institutional performance, and the results of this study showed a direct impact of supply chain integration on institutional performance. The results of the study also have shown that there is a statistically significant relationship between strategic vigilance through analysis of the variables of strategic vigilance (competitive vigilance, commercial vigilance, technological vigilance) and supply chain integration (integration with the consumer, integration with the supplier, integration with intermediaries) and strategic performance, and the level of Mediation in part, as commercial vigilance fully mediated by the positive relationship between integration with customers and strategic performance, and commercial vigilance partially mediated by the positive relationship between integration with brokers and performance strategic. It partially mediated the positive relationship between customer integration and strategic performance, and technological vigilance partially mediated the positive relationship between customer integration and strategic performance. The results also have confirmed the existence of a mediation of competitive vigilance of the positive relationship between integration with mediators and performance.

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