

# INTERNAL SUPPLY CHAIN INTEGRATION AND OPERATIONAL PERFORMANCE OF INDONESIAN FASHION INDUSTRY FIRMS: A SUPPLIER TO BUYER APPROACH

Thanaporn Sriyakul<sup>1</sup>, Rofiqul Umam<sup>2</sup>, Kittisak Jermsittiparsert<sup>3,4\*</sup>

<sup>1</sup>Faculty of Business Administration, Mahanakorn University of Technology, Bangkok, Thailand.

<sup>2</sup>School of Science and Technology, Kwansei Gakuin University, Hyōgo, Japan

<sup>3</sup>Department for Management of Science and Technology Development, Ton Duc Thang University, Ho Chi Minh City, Vietnam, <sup>4</sup>Faculty of Social Sciences and Humanities, Ton Duc Thang University, Ho Chi Minh City, Vietnam

<sup>1</sup>ajbamut@gmail.com, <sup>2</sup>egk71822@kwansei.ac.jp, <sup>3,4\*</sup>kittisak.jermsittiparsert@tdtu.edu.vn

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## Abstract

**Purpose:** The objective of the current study is to inspect how risk affects the success of supply chain integration, following the SCI concept and implementing integration framework, together with its relational view. The prime objective of the current study is to investigate the relationship between supply chain integration, supply chain risk practices and supply chain performance

**Methodology:** Integrating operations of supply chain with suppliers and customers, allow companies to streamline and improve data exchange and information that could result in the betterment of material and product flows within the SC.

**Results:** We particularly explore how risk at country level in the form of rule of law influences the operational performance of SCI through its innovativeness and cost. Furthermore, we aim to explore how risk management practices of SC can be connected under different scenarios of risk and uncertainty. The current study has used SEM-PLS as a statistical tool to answer the research questions raised in this study and research objectives envisaged in the current study. The findings of the study have provided support to the theoretical foundation and proposed hypothesis of the current study. Current study will be helpful for policymakers and practitioners in understanding the issues related to supply chain risk, supply chain integration and supply chain performance. In the author's knowledge this is among very few pioneering studies on this issue.

**Keywords:** Supply Chain risk, Integration, SEM-PLS, Fashion industry, Indonesia

## INTRODUCTION

For quite a long time, several researchers have been expressive about the need to have an integrated and close association among the supply chain partners and manufacturers, but the systematic approach has been emerged only recently in the supply chain integration (SCI). According to (Alhnaity *et al.*, 2018; Almeqdadi, 2018; Graham, 2018), an increased competition around the globe has made the organizations to realize the importance and need for mutually beneficial and cooperative supply chain partnerships. In addition, it has also prioritized the need for joint improvement of inter-organizational activities (Yu *et al.*, 2017).

The studies in the area of supply chain integration is distinguished through developing new dimensions and definitions (Xiao *et al.*, 2019). Whereas, some studies have also emphasized the individual aspects of the supply chain integration, specifically in terms of supplier and customer integration, however, other researchers employed various other comprehensive definitions (Altunkaya and Ates, 2018; Lo *et al.*, 2018). Furthermore, the formulation of supply chain integration is incomplete without the internal integration. The operational performance of SC can be defined as the result of efficient and effective flow of information and materials to and from different organizations, as services and processed products. The SCM also significantly affect the international trade. Although, SC is a concept, but it would be appropriate to consider it as a phenomenon, based on several sub factors and phenomena, such as agility, logistic, operation, lean, etc. During modern decades, supply chain management has appeared as an indispensable tool for attaining viable competitive advantages. Contribution of supply chain have been found in theory as well as in practice that has attracted practitioners and scholars to further observe it in detail.

Therefore, advanced and incomplete formulation of supply chain integration could result in the inconsistent and unreliable findings regarding the association among performance and supply chain integration (Prajogo and Olhager, 2012). However, for a complete understanding of the nature of relation among performance and SCI, it is important to closely observe the patterns of supply chain integration and how they are associated with various dimensions of organizational performance and how individual SCI dimensions are associated with certain performance dimensions (Wong *et al.*, 2011; Altunkaya and Ates, 2018). Therefore, IT suggests incorporating both configuration and contingency approaches for analysing supply chain integration. However, incorporating both these approaches in a single research study is important for assessing if the certain outcomes occur as a result of the association among supply chain integration and performance or as a result of an output from the survey or data collection.

Based on this foundation, a contingency approach has been applied to observe the relation among supplier, internal and customer integration as well as for analyzing the business and operational performance of an organization. However, it is suggested that a supplier-customer integration plays a role of a moderator in the association among performance and internal integration. Afterwards, a configuration approach has been adopted to deeply assess the working of SCI dimensions, for the purpose of considering how performance is associated with different dimensions and patterns of supply chain integration (Graham, 2018). Thus, while correlating the performance and SCI patterns, both business and operational performance measures have also been analyzed which enables to draw comprehensive conclusions about the relationship.

It highlights an important point that whether the trends of supply chain integration either strong or balanced are strongly associated with certain performance measures or if the organizations having well integrated supply chains exhibit better performance in each dimension (Kim *et al.*, 2018). Thus, these are the important issues in decision making as they provide awareness regarding the SCI strategies.

## LITERATURE REVIEW

### Definitions of Supply Chain Integration (SCI)

In the area of research, the supply chain integration is a comparatively new concept. Although, extensive literature is available regarding the unidimensional nature of the SC relations, i.e. analyzing the association among supplier/customer and manufacturer (Cao and Zhang, 2011). A few researches have emphasized upon the two-way associations among the SC partners while other researchers have focused upon leading a SC in the form of a single process, thus individually act as a fragmented part of a system. A few supply chain integration definitions have put emphasis upon the material flow, while other definitions emphasize the flow of cash, information, and resources (Uygun and Dede, 2016). However, these definitions have considered several critical SCI elements. Although, the majority of these could not have considered the strategic position of supply chain integration (SCI).

The available literature is built on the basis of SCI construct involving internal integration i.e. manufacturer and extended it into supplier and customer integration as well as identifying the gaps for establishing a narrow definition for Supply chain integration (Prajogo *et al.*, 2016). Integration is referred as a combined control of uninterrupted economic as well as industrial processes. Under the SC context, supply chain integration is referred as the extent of the strategic association of manufacturers to the SC partners and manages the multiple inter and intra organizational operations within a supply chain. Thus, the goal is to maintain an efficient and effective flows of information, services, products, decisions, and money, as well as providing optimum value through high speed and low cost to its customers (Liu *et al.*, 2016).

A number of significant elements are included in this definition, firstly, the strategic importance of collaboration i.e. a continuing partnership for the successful achievement of mutual strategic goals was highlighted. It increases the duration of contract, creates mutual trust, encourages the resolution of conflicts, sharing of rewards, risks, and information. Furthermore, operational integration results in operational benefits while strategic integration leads to both strategic and operational advantages (Ralston *et al.*, 2015). It also focuses upon inter and intra organizational operations as it is a comprehensive concept which accounts for a number of processes including several materials, administrative tasks and transportation (Kwak *et al.*, 2018). Finally, the SCI in terms of customers' perspective is emphasized with an objective of delivering maximum customer value.

### Dimensions of SCI

It is important to consider the supply chain integration dimensions particularly for interpreting the means by which individuals' function and how they jointly operate. Appendix A indicates a summarized body of literature to analyze several aspects of supply chain integration. A few authors have observed the supply chain integration as a one way or a single construct (Zinn *et al.*, 2018). whereas other authors have classified the SCI as the external and internal integration of operations; (Ngai *et al.*, 2011), also a few others have integrated the deeper perspectives such as multi-dimensional SCI (Michalski *et al.*, 2018). However, each dimension indicates significant dimensions related to supply chain integration, having considerable convergence among them, thus making it hard to solve these relations.

The diverse SCI dimensions can be divided into three groups. Supplier and customer integration are also known as external integration, defined as the extent of association between the manufacturers and the external partners for shaping the inter-organizational practices, processes, and strategies into synchronized and collaborative processes. Customer integration includes fundamental capabilities that arise as a result of partnership with the critical customers on the other hand, supplier integration accounts for the fundamental competencies that arise as a result of partnership with the critical suppliers (Kou *et al.*, 2018). Contrarily, internal integration covers activities of the manufacturers, thus, indicating the extent to which a manufacturer shapes the strategies, processes, and practices of its organization in a synchronized system for the purpose of satisfying the requirements of its customers as well as for establishing an efficient connection with the suppliers. However, the external and internal integration perform different functions in terms of supply chain integration context. As external integration observes the significance of developing interactive and close associations with the suppliers and customers, and internal integration observes that the departments under manufacturer must function like an integrated process. However, both integrations are essential to enable the members of supply chain to perform as a joint body for maximizing the supply chain's value (Moreno-Luzon *et al.*, 2019).

### Relation among performance and internal integration

As internal fit exhibits the consistency level between the structural features of an organization (Gopal *et al.*, 2019). Similarly internal integration observes that the functional areas and departments in an organization must act as an integrated system of processes (Ul-Hameed *et al.*, 2019). In addition, the internal integration desolates the functional obstacles and develops cooperation for satisfying the needs of their customers, instead of functioning under functional silos that are related to specialization and classical departmentalization (Huo *et al.*, 2019). However, manufacturers are capable of maintaining structure of an organization and the flow of customers' orders across activities and functions within the organization. For instance, whenever there is a delay in the customers' order, the customer does not seem to be interested regarding which function created a delay in its flow rather they just care for the fulfilment of the order. It calls for the need of a fulfillment process which involves the collaborative efforts of all functions and activities. Therefore, the essential elements of fulfillment process are cross-functional teams, united working, and information sharing. Thus, the selection of efficient performance measure is somehow challenging because of the interdependence and inherent complexity of SCs. It has been argued that financial performance of an organization must be taken as a main estimator of the SC performance due to the motive of profit maximization (Huo *et al.*, 2019). Although other researchers have mentioned the constraints or issues of solely relying upon financial performance as a performance measure. According to researchers (Basheer *et al.*, 2019) measurement of supply chain performance must incorporate operational determinants such as ability to react against the changing environment and customer service.

Measures of effectiveness and efficiency are used for explaining performance standards. Measure of effectiveness is employed to describe the standards of external performance, while measure of efficiency is employed for describing internal standard of performance. In modern supply chain management, the standards of efficiency and effectiveness are high priority concerns among firms. Efficiency and effectiveness can also be measured using six important components including employee fulfillment, product reliability, efficiency of work, on-time delivery, customer fulfillment, and profitability. For instance, efficiency can be achieved with timely production, and effectiveness can be accomplished through innovation and supplier or customer orientation (Cai and Jun, 2018). However, performance measurement tools and systems are substantially changing across firms along the SC. Traditionally, performance measurement of firms was solely concentrated on profits and costs of the firms. However, nowadays, due to weakening condition of global demand for goods and services, firms are majorly depending on their supply chain management skills in order to improve their quality and revenues and push its cost out of supply chains.

Therefore, time, flexibility, cost, delivery, and quality are the important measures for estimating operational performance. Although, no direct association has been found by a few scholars among operational performance and internal integration (Mohamed and Hassan, 2019) while a positive association found among operational performance and internal integration by other researchers, such as logistics service performance and process efficiency (Wong *et al.*, 2011). However, it is suggested that internal integration acts as a basis for the supply chain integration and is expected to be positively associated with operational performance. Hence the proposed hypothesis is as follows:

***H<sub>1</sub>: A positive relation exists between the manufacturers' operational performance and internal integration within a supply chain***

### Association of performance to supplier-customer integration

On the basis of structural contingency theory, the term external fit explains the level of consistency among the structure of an organization and the strategy which a firm employs with respect to the existing external environment. As a change in external environment i.e. changes in the characteristics of suppliers and customers, must be responded by selecting, implementing, and developing appropriate strategies by the manufacturers for maintaining external fit in both external environment and internal structural characteristics (Fernández *et al.*, 2018). Therefore, a supplier and customer relationship develops upon the manufacturers' internal connection for generating an important SCI element. A close tie among manufacturer and customers creates opportunities to enhance the information accuracy of demand, which tends to minimize the planning time of manufacturing process, discontinuance of inventory and product design of manufacturer, thus, enabling it to become more responsive towards its customers. This is due to the fact that customer integration provides opportunities for holding the intelligence placed within the collaborative processes as well as it also allows manufacturers to give greater value, reduce cost, and rapidly identify the changes in demand of its customers.

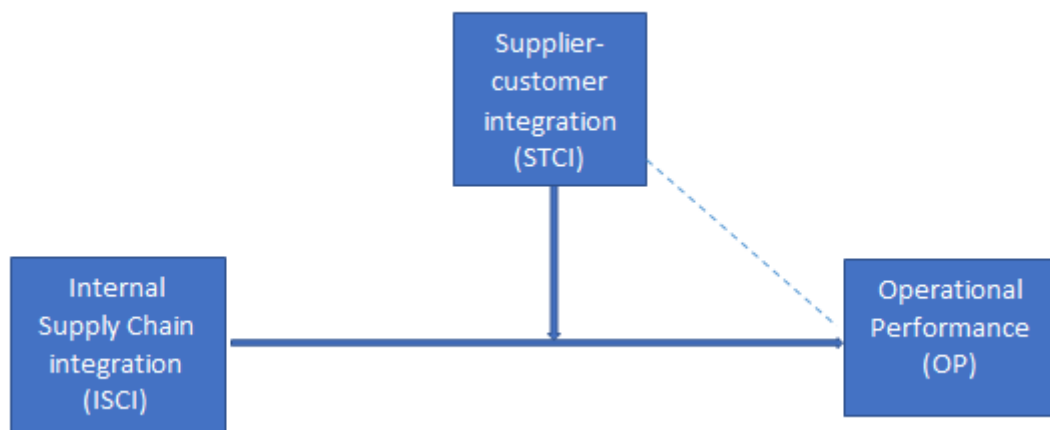
Customer integration is linked directly and indirectly with the customer satisfaction through its association with innovation and product development (Yu *et al.*, 2013). Developing a strong strategic relation among suppliers under integrated supply chain would help in anticipating and understanding the requirements of manufacturers for efficiently meeting the changing needs. Thus, the mutual information exchange regarding processes, products, capabilities, and schedules assist manufacturers in timely production, planning of production, and for enhancing the delivery performance. Suppliers tends to achieve better customer service through having a better understanding about the operations of the manufacturers, which leads to the improvement in service quality by the manufacturer. However, studies (Paulraj *et al.*, 2008) indicated the connection among supplier integration and product development performance. Whereas absence of no relation or negative relation among operational performance and supplier integration is found in other studies (Villena *et al.*, 2011). The stage theorists stated that internal integration is a necessary phenomenon for supplier and customer integration. They suggested

this statement on the basis of the reasoning that external linkages and uncertainties must be necessarily absorbed internally into the suitable organizational places. In addition, the initial obstacle for achieving the external SCI benefits are the intra-organizational obstacles in the internal integration. Thus, supplier and customer integration expands the eradication of functional silos of internal integration to spread across the boundaries of organizations.

***H<sub>2</sub>: Given the relation among operational performance and internal integration, the supplier and customer integration within the supply chain are directly linked with the operational performance of the manufacturer.***

### Role of a Moderator

A Contingency theory explains that dimensions of supply chain integration interact with each other to influence the organizational performance. Therefore, the efforts that manufacturers make to develop external customer and supplier integration also helps in developing internal integration for achieving successful operational performance. The relation among customer integration and internal integration are found to be linked with the logistics performance that is also associated with the financial performance (Wuttke *et al.*, 2013). Internal integration has found to moderate the external integrations' impact on the performance whereas customer integration has found to moderate the association between performance and supplier integration (Flynn *et al.*, 2010). The influence of supply chain integration on the performance configuration theory indicates that the emerging trends of supply chain integration are expected to be associated with the operational performance in several different ways. The organizations have found to perform better if they originate successful configuration of interconnected elements. For instance, a strong customer integrated SCI pattern has a probability of having stronger association with customer satisfaction than a strong supplier integrated SCI pattern. Moreover, the relation among performance and SCI is expected to be determined by the SCI pattern, depending on the balance and strength of three dimensions.



**Figure 1: Conceptual Framework**

The study has hypothesized a two-way and three-way interactions among the SCI dimensions.

***H<sub>3</sub>: The supplier-customer integration moderates the relationship between operational performance and internal integration.***

The theoretical framework of the current study is shown in figure 1. The coordination theory along with the resource-based view are used as underpinning theories of the current study. These theories have been widely used to explain the factors and phenomena in explaining the issues related to supply chain management

### METHODOLOGY

The literature has been surveyed for identification of reliable measures for existing scales and constructs, in order to measure operational performance, customer-supplier integration, business performance, and internal integration (Wiengarten *et al.*, 2016). After finding no reliable measures, new measures were developed while conducting interviews and company visits, based on our observations and understanding about the constructs.

All the indicators have measured through seven-point Likert scale. The higher Likert scale values represent better performance or strong integration. The questionnaires were sent through email with a cover letter underlying the potential contributions and objectives of the present study. However, followed by the mailings and telephone calls for improving the rate of response and avoiding the issues of missing data or non-response bias. A total of 569 organizations have been contacted, from which only 356 questionnaires have been delivered, resulting in 317 usable and fully responded

questionnaires. The overall response rate was 55.7 and 85.5% based on the companies that are contacted through telephone and number of questionnaires that were actually sent.

## RESEARCH ANALYSIS AND DISCUSSION

### Reliability and validity

The cumulative proportion for each variable has plotted averse to its cumulative proportion for several tests, indicating that the data is normally distributed. All the scales have turned out to be valid having alpha values being lied between 0.84-0.94. Therefore, Appendix B shows that strong loadings are found for all items of the constructs. The results of exploratory factor analysis also reflect that lower loadings on the constructs are found for all items which were not considered to be measured. However, the results exhibited a unidimensional construct. Afterwards, content validity test was done through critical evaluation and careful synthesis of an iterative and existing constructs that have been reviewed by the domain experts. The confirmatory factor analysis is employed for the purpose of assessing convergent validity based on the previous study (Hafeez *et al.*, 2018). The measurement item of each construct is related with the corresponding construct, while the covariance's were estimated freely among the constructs. The indices of the model fit were as follows:  $\chi^2(976) = 4751.23$ , CFI= 0.95, NNFI= 0.95, SRMR= 0.070, RMSEA= 0.090. The model was found to be acceptable specifying the presence of convergent validity (O'Leary-Kelly & Vokurka, 1998; Hu & Bentler, 1999). In addition, values for all the factor loadings turned out to be above 0.50, having t-values to be greater than 2, whereas the coefficient values for each item were twice than its standard error, thus exhibiting the convergent validity. However, all the four values for the average variance extracted were also greater than 0.50 for the four constructs, and the value of the fifth construct turned out to be 0.46.

The minimum value for AVE must be 0.50, whereas only one construct exhibited less than 0.50, hence, satisfying most of the criteria proposed by several other researches. A constrained confirmatory factor analysis model was formulated for every potential pair of constructs, to analyze the discriminant validity. The correlation among these paired constructs were set at 1.0 and were compared with the unconstrained or original model, where correlation values are estimated freely among the constructs. However, the difference of  $\chi^2$  exhibited discriminant validity (Asif *et al.*, 2018; Audu, 2018; Bachev, 2018; Belderbos *et al.*, 2018). Moreover, for each construct, the average variance extracted turned out to be greater than the squared association among the constructs, thus confirming the presence of discriminant validity (See table 1). items loadings with cross-loadings as presented in Table 2.

Table 1. Reliability

	Indicators	Loadings	CR	AVE	Cronbach Alpha
ISCI	ISCI1	.943	0.975	0.872	0.885
	ISCI2	.955			
	ISCI4	.902			
	ISCI5	.825			
	ISCI7	.955			
	ISCI8	.822			
	ISCI9	.717			
	ISCI10	.821			
	ISCI12	.732			
	ISCI14	.821			
	ISCI15	.832			
STCI	STCI1	.824	0.702	0.737	0.924
	STCI3	.712			
	STCI4	.771			
	STCI5	.732			
	STCI6	.782			
	STCI7	.832			
	STCI9	.892			
	STCI11	.921			
OP	OP1	.822	0.960	0.871	0.893
	OP2	.955			
	OP3	.722			
	OP4	.825			
	OP6	.941			
	OP7	.732			
	OP8	.782			
	OP10	.832			
	OP11	.892			
	OP12	.921			



OP13 .921

The discriminant validity is one of the measures to examine the interrelationship of the reflective variables with their own indicators. Basically, it shows or measure that the measurement or operationalization of the variables which genuinely are not linked are linked in the case of study. Fornell-Larcker has introduced one of the robust and widely used measures of discriminate validity therefore the current study is using this value as a base to evaluate the discriminant validity.

**Table 2. Discriminant Validity**

	1	2	3
ISCI	<b>0.709</b>		
ECNP	0.680	<b>0.727</b>	
STCI	0.657	0.676	<b>0.712</b>

### Results of regression analysis

For testing of 1-3 hypotheses, hierarchical regression analysis was employed. The first step involves the identification of direct internal integrations' influence on the business and operational performance. The second step examined the relation among customer-supplier integration to the business or operational performance, keeping in view the relation among operational or business performance and internal integration. However, the third step observed the relation among two-way and three-way connections among supplier integration, customer integration, and internal integration and the operational performance, for observing the presence of any moderating effect in the underlying relationship.

**Table 3. Direct Effect**

	( $\beta$ )	SD	T-value	P-Values
H1	0.211	0.135	3.211	0.000
H2	0.357	0.152	3.678	0.000

The moderation results of the current study are reported in table 4.

**Table 4. In-Direct Effect through moderation**

	( $\beta$ )	SD	T-value	P-Values
H3	0.321	0.035	3.261	0.002

The results of the current study have shown. An agreement with the hypothesized results.

### CONCLUSION

Nowadays, the ways that companies used to compete have changed considerably. The role of customer loyalty in observing overall strategic fit for the firm is quite important, but firms are gradually switching their focus from customer towards production, while making efforts to broaden the scope of operational performance. Only recently, firms have shown a rising tendency for production of high-quality goods at a minimum cost but has considerably lost enticement in achieving competitive advantage. In present era, most focus has been given on delivering customer demanded products at the right place, time and at the ideal price. Some of the researchers have further elaborated this phenomenon, by expressing the foremost role of firm's i.e. satisfying requirement of customers, in terms of delivering right product possessing right quantity and quality with suitable technology, to the customers. The main purpose of this study is to investigate the link between internal supply chain integration and operational performance of the manufacturing firms in Indonesia. The study has adopted a unique approach by examining the direct and moderating role of supplier to customer integration on the operational performance. Based on this foundation, a contingency approach has been applied to observe the relation among supplier, internal and customer integration as well as for analyzing the business and operational performance of an organization. However, it is suggested that a supplier-customer integration plays a role of a moderator in the association among performance and internal integration. The current study has used the AMOS to analyze the data collected from production managers of Indonesian manufacturing firms. The study will be helpful for policy makers in researcher in understanding the issues related to supply chain, its integration, and operational performance. The findings of the current study have provided support to with the proposed. The results have shown that along with customer focus approach the firms are also following the production focus approach. The findings of the study will be helpful for policy makers in understanding the issues related to integration supply chain management. In author knower this is among few pioneering studies on these issues. The study suggests that the initial obstacle for achieving the external SCI benefits are the intra-organizational obstacles in the internal integration. Thus, supplier and customer integration expand the eradication of functional silos of internal integration to spread across the boundaries of organizations. The current study is carried out a study on the whole fashion industry of Indonesia only. Therefore, a separate study for each sector such as food, health etc. is recommended.

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