

# The Impact of Compatibility on the Process Integration of the Supply Chain in Improving Firm Performance: The Mediating Effect of Information Technology Capability

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**Abstract-** This study investigates the impact of various dimensions of compatibility on the process integration of the supply chain, which leads toward the improvement of firms operational and market performance. Meanwhile, this study also investigates the mediating effect of information technology capabilities between the relationship of supply chain process integration (SCPI) and firm performance. For this purpose, a survey was conducted via a structured questionnaire using online data collection method from the supply chain and production managers of superstores in Thailand. Total of 395 responses were analyzed using structural equation modeling (SEM) to test the hypotheses. The results proved the key important dimensions of compatibility facilitated SCPI, which contribute to the dynamic capability theory. Moreover, IT capabilities also proved as a key mediator, which have a partial influence on the relationship of SCPI and firm performance. Meanwhile, this study potentially contributes to the existing knowledge of supply chain management and open the new dimensions for future scholars to reveal this concept in detail.

**Keywords;** SCPI; Supply chain; IT capabilities; Firm performance.

## 1. Introduction

In the competitive corporate environment, solitary enterprises no longer strive as independent entities nonetheless as adherents of different supply chain (SC) systems [5; 18]. This dynamic business environment requires SC associates to participate in knowledge and capabilities sharing in both upward and downward SC management practices in order to accomplish the anticipated objectives [42]. The combination of information and knowledge translates into valued capabilities and ultimately promotes excellence in performance. Therefore, from SC process viewpoint, integrating the process and activities of the whole SC can build efficiency and outstanding value, thus achieving excellent SC performance [9; 12; 26; 38].

Supply chain process integration (SCPI) makes wisdom in the right place among SC partners, which also encourages partners to become further deeply rooted and valuable associates of different SC networks [44].

Therefore, it is of great significance to study SC from the angle of process integration for improving SC performance. Previous literature on logistics and SC management studied the impact of SC association on logistics, operations, and SC performance [35; 6; 7; 68]. Research on the dimensions of SCPI, which influence firm performance through SC capability has received limited attention. In particular, some scholars call for a further empirical investigation on how different dimensions of SCPI are interrelated and influence the firm performance [10; 40]. Meanwhile, several studies have shown that competitive advantage and performance of the enterprise can be attained by coordinating SC processes and activities, while few studies explore the factors contributing to SCPI and their results [14; 29; 53; 59; 71]. The development and integration of information technology (IT) plays a noteworthy contribution and provide new direction across every field of the corporation, including SC management and performance of firm [44; 6; 40; 42; 50]. Therefore, considering the attentive role of IT in various fields, this study explores the mediating effect of IT capabilities in the association between SCPI and firm performance.

Nevertheless, there are still many areas of SC research that have not been satisfactorily addressed. First of all, although many former pieces of research build focus on enterprises using IT for SC management, there are few comprehensive studies to address the connection between the use of IT and firm performance from the perspective of process-oriented SC management [7; 36; 57; 62; 65; 69]. Consequently, it is necessary to consistently study the process of IT as an important dimension of a firm in order to boost its performance [30; 57]. Secondly, although former studies have successfully demonstrated that integrated IT has a positive influence on SC integration, more clear description of the consequences of SCPI strategies is required to be investigated. Integrated SC strategy refers to business processes that create value by integrating suppliers, companies, and customers [65; 61]. IT capabilities and SCPI are the core components of integrated SC management to improve firm performance. IT capabilities are considered as the technical ability that helps to gather and manage the important information about key business processes and share it across functional domains and corporate boundaries [38; 61].

Therefore, this paper aims to explore the crucial role of IT capabilities on firm performance, thereby contributing to previous research results on integration process SC management.

Therefore, we solve the existing research gap by studying the impact of firm internal compatibility dimension on SCPI, which has not been studied before (as per our best knowledge) in the presence of IT capabilities of superstores in Thailand. This study also responded to calls for future investigation on the effect of SCPI aspects on firm performance in two ways [10; 13]. Firstly, the impact of compatibility on SCPI is studied with respect to a developing country such as Thailand. Secondly, this study explores the direct influence of SCPI on firm performance and the indirect impact through IT capabilities. Precisely, this research involves subsequent research issues:

1. What are the compatibility factors affecting SCPI?
2. What are the relationships among compatibility, SCPI, IT capabilities, and firm performance in Thailand?
3. Does IT capabilities mediate the association between SCPI and firm performance in Thailand?

## 2. Theoretical background

### 2.1. Firm performance

In an extremely turbulent environment, firms strive to attain competitive advantage and excellent performance [2]. Therefore, wide SC investigation has explored the key function of SC management in refining firm performance, and more explicitly, the role of SC integration and capability in promoting firm performance [54; 55; 56]. Few scholars measured the performance based on financial aspects [14; 71; 17; 48] and some measured it to market-based aspects [70; 73]. SC management researchers frequently regard the crucial role of SC integration in refining firm performance [8; 11; 12]. This compatible SCPI ensures that the right goods are delivered to the right customers at the accurate time and at a market price [14; 53; 42; 65; 12]. These operational and market performances of the firm will ultimately lead towards the overall performance of the firm.

### 2.2. Compatibility

Compatibility denotes to “common experiences, values, principles and business strategies shared by SC partners” [47]. Compatibility is also known for its aptitude to make collaborations between partnership firms [49]. As per consistency theory, in order to strengthen the SC relationship, the partner organizations need to maintain compatibility [31]. In previous literature, compatibility has been conceptualized as a multi-dimensional structure comprising of knowledge and technology matching “technical compatibility”, functioning consistency “operational compatibility” and cultural matching “cultural compatibility” [8; 49; 41; 51].

Technical compatibility mentions to “the consistency of systems and processes used by SC partners, such as information system networks, software, point-of-sale (POS) terminals, business technologies and processes” [34]. Operational compatibility is defined as, “similarity in

capability and procedural issues, assuming the importance of the entire SC” [8; 32] which assist in promoting the building of trust, commitments and information sharing among SC associates. While, cultural compatibility mentions “the subjective norms, traditions, beliefs, and values which affect the firm SC management decisions” [49]. Business failures can happen when a firm holds incompatible standards, norms, and views and tries to mix its firm culture with its SC partners throughout process integration which leads to suspicion and conflicts [44; 43; 49].

### 2.3. Supply chain process integration (SCPI)

SC integration is referring as the strategic partnership between manufacturers and their SC partners, as well as the degree of collaboration management between organizations, interdepartmental and between customers and suppliers [14; 72]. Formerly the studies on the association between IT, SC integration and firm performance have been growing with the believe that there is a positive link between various aspects of IT and performance of the firm [53; 19] and that between SC integration and firm performance [40; 38; 4]. In addition, few studies have suggested that IT have the capability to promote the SC integration process [12; 69]. Therefore, SCPI is defined as “the degree to which a focus organization integrates its activities and processes with its SC partners by increased interaction and collaboration” [42]. Therefore, adopting a SC process perspective aids SC partners to coordinate upstream and downstream activity flows, such as information sharing, physical movement of products, and financial transactions, to ensure that the right products are provided to the right customers at right-time and at right-place with minimum cost [35; 6; 25]. Grounded on the prior literature of SCPI, the second-order construct is designed in this study comprising on “information flow integration”, “physical flow integration”, and “financial flow integration”.

Information flow integration refers to “the degree to which operational, tactical and strategic information is shared throughout the SC, and has been identified as a key factor in promoting SC activities and processes” [35; 42; 21]. Through an integrated system, sharing operational, and strategic information between SC partners can make progress in the firm performance as well as progress the performance of the whole SC [26]. Therefore, ensuring factual and up-to-date marketing information in the SC is considered as key to the success of upstream and downstream SC integration process [38; 73].

Physical process integration is a focus organization whose SC partners mutually use material optimization networks and processes in the SC to accomplish the extent of work-in-process inventory, the flow of supplies and finished products [35]. Upstream SC management, such as customers and vendors recurring damaged products to producers evoking goods that do not fulfill manufacturing values, are effectually achieved over a well-integrated SC system [35]. Downstream SC management, physical process integration supports just-in-time delivery automatic replenishment, and supplier inventory control, reducing safety inventory and utilization of shelf space [6; 66; 27].

Financial flow integration is “the degree to which the exchange of financial resources between coordinating organizations and their SC partners is driven by integration” [42]. Electronic and information systems supporting integrated SC networks can simplify and rationalize financial resource sharing among SC partners [43]. Though, firms usually hesitate to convert and attach their financial networks with upstream and downstream SC partners, although these may improve their ability to simplify transactions throughout the SC [44; 35].

#### 2.4. Information technology capabilities (ITC)

Capability is well-defined as “the attributes, capabilities, organizational processes, knowledge and skills that enable an enterprise to achieve superior performance and sustained competitive advantage over its competitors” [42]. IT capabilities can be described in two ways. First, IT capabilities belong to the internal use of technology-based systems and firm internal abilities. Most prevailing definitions restrict IT-related capabilities in IT or business functions, which indirectly assume that IT or business functions are responsible for all business value of information technology (BVIT) formation. Meanwhile, the creation of BVIT depends on the involvement of all functional departments and all stakeholders [65; 37]. Secondly, by enabling IT to effectively select, assemble, integrate, deploy, and utilize IT resources, or cooperate with other firm capabilities; IT capabilities are embedded in the process of enterprise IT value creation [46; 63]. Therefore, it is required to establish a comprehensive viewpoint to describe the impact of IT capabilities in SCPI and firm performance. This study conceptualizes IT capabilities as a second-order construct comprised of IT management, IT development, and IT intensity to explain the concept compressively.

### 3. Research model and hypotheses development

In former studies, SC management scholars used the mixture of theories to clarify the complication of the SC management process. Successful integration among SC partners based on the consistency level of the goals, technology, culture, and reward system of the cooperative firms [44; 6]. On the contrary, lack of coordination with cooperative organization culture, operation process, and technical system may lead to the inconsistent business process of the whole SC and hinder the integration of SC process [35; 8]. To sustainance the above discussion that emphasizes the importance of consistency or compatibility among SC associates, this study discovers the role of three dimensions of compatibility (technology, operations, and culture) in facilitating SCPI. The existing inquiry has highlighted the critical role of resources, skills, and capabilities in ensuring firm competitiveness and performance [2]. Grounded on the dynamic capability theory, and it is believed that the competitive situation of any firm relay on its utilization of capabilities. Though, what capabilities can continue to create value in a speedily altering and unpredictable environment is still unclear [69; 1]. In the recent era, the technology played an important role across every step of organizational activities [67; 23; 28; 60]; therefore, IT capabilities are important to measure

the firm performance. Therefore, integrating the technology perspectives at the strategic level conceptually affects its support for the development of a competitive strategy for SCPI and also formulate strategies to enhance firm operational and market performance.

As a result, this paper suggested and empirically tested the research model that posits the impact of compatibility on SCPI in the presence of IT capabilities, to enhance the firm performance.

### 3.1. Compatibility

This study also considers compatibility as a three-component structure consisting of technological, operational, and cultural compatibilities.

#### 3.1.1. Technological compatibility (TC)

Incompatible business processes between partner firms can hamper the integration of interactive e-business and SC partners [31]. Meanwhile, SC integration process can be impeded by the incompatible resources such as technological, operational, and cultural [8; 49]. Consequently, SC partners with incompatible technologies and systems faced complications in evolving sustainable relations and combining IT systems with SC associates [43]. The swift development of information and communication technology (ICT) makes SC partners different in the technological platform. Consequently, the software, hardware, and network systems used by partner firms require to be well-matched with successful SCPI [44; 26]. Thus, this study hypothesizes that:

**H1a:** Technological compatibility has an impact on SC process integration.

#### 3.1.2. Operational compatibility (OC)

Information systems and SC literature incorporate the key role of consistency and suitability in the firm operation or SC associates [8]. The operational complexity has a negative impact on the exchange of information among SC partners firms [44]. Therefore, operational compatibility can simplify the expansion of coalitions and process integration athwart the SC, in particular, encouraging SC associates to combine their businesses to improve the logistics and SC performance [43; 49; 69]. This further underscores the want for operational compatibility between SC associates. Thus, this study hypothesizes that:

**H1b:** Operational compatibility has an impact on SC process integration.

#### 3.1.3. Cultural compatibility (CC)

Culture has Differences in business norms, values, and cultures among SC partners, potentially hinder relationships, and integration [8]. Several studies in the prior literature described the crucial participation of organizational culture towards the employees as well as organizational performance [44; 49; 24]. Meanwhile, [52] further emphasized the important role of firm culture in influencing the innovative decision-making to establish relationships and integrate business developments. Therefore, cultural compatibility is measured as a key

component of the success of SCPI. Thus, this study hypothesizes that:

**H1c:** Cultural compatibility has an impact on SC process integration.

### 3.2. SCPI, IT capabilities and firm performance

Numerous studies have discovered the association among SC integration and firm performance [26; 22; 58; 64]. Most SC management literature suggests that SC performance is improved in more combined IT based SCs. By integrating the various organizational information in the SC system to expand their strength and liveliness, once, information sharing happened by means of firm IT capabilities, should reduce the probability of disruption, on the other side, the inclusive impact should be abated, because the strong IT capability of the firm help to flow the information rapidly so that faster and more meaningful responses can be made [42; 20]. It is clear from the existing knowledge that SCPI potentially promotes the formation of exclusive SC capabilities, thus improving firm performance [6]. Though, few researchers believe that external integration is highly important to SC performance than internal integration which can be theorized as a three-factor construction containing “information, physical and financial flow dimensions” [43; 35; 61; 17].

Therefore, SCPI improves forecasting, synchronizes creation and delivery procedures, coordinates inventory-related conclusions, and reduces cycle times for invoices payable and receivable which ultimately improve the IT capabilities of the firm [42; 69; 34]. Therefore, it is obvious from the literature that the integration of SC process and events enhances the IT capability of SC. Thus, this study hypothesizes that:

**H2a:** SC process integration has an impact on IT capabilities.

Well-integrated SC processes promote effective co-creation and customer value generation, thereby improving operational performance [42; 19]. By promoting accurate demand estimates, demand balances, SCPI enhances the operational performance of SC partners, thereby increasing sales revenue [45]. In addition, the integration of information, physical, financial flow actions will have the positive impact on operational performance by diminishing the cost of inventory and promoting synchronization and coordination among SC partners [7; 45]. Therefore, the integration of SC process can improve operational performance at different levels of the SC, such as promoting on-time delivery at the retailer level and automatic replenishment [42; 19]. Thus, this study hypothesizes that:

**H2b:** SC process integration has an impact on firm operational performance.

The distribution of information, physical, financial resources among SC associates improves the market performance of contributing firms in a competitive environment [70]. The resource-based view and dynamic capability theory show that the incorporation of intangible assets promotes the realization of market performance in SC [40; 42]. These types of SC integrations will improve the market performance of participating firms. In the

setting of SC management, market performance can be explored by means of market share, available services for customer maintenance, development in sales volume, and profitability [44; 11]. Thus, this study hypothesizes that:

**H2c:** SC process integration has an impact on firm market performance.

### 3.3. Information technology capabilities and firm performance

IT capabilities are described in the literature of information sciences in several concepts such as “the firmwide ability to acquire, deploy, and leverage IT resources to help a firm achieve a competitive advantage and enhance firm performance” [65; 69; 3]. Meanwhile, some studies refer as IT function to performing in a high-quality and complex manner is to manage and operate the process [57; 46; 33]. Moreover, IT capabilities are also described as firm IT capacity that affects the business process and satisfies the business requirements [65]. IT capability is not a simple one-dimensional concept; instead, it is a complex structure with multiple dimensions. Therefore, in the current study settings, IT capability is considered as the firm ability to effectively mobilize and organize IT resources to execute strategic IT planning, utilize and manage IT assets for developing SC integration process. So that three core IT capabilities are discussed in this study; “IT-management capability” (refers as the management of IT-related issues e.g. IT infrastructure, cost, staff development, partner relationship), “IT-development capability” (refers as development and implementation of IT system to fulfill the business requirements in a precise manner), “IT-intensity capability” (refer as the actual use of IT to achieve the competitive advantage) [65; 46]. These capabilities together determine firm overall IT capabilities, and these capabilities should not be ignored. Therefore, this study integrated these three IT capabilities and measured based on second-order formative construct formulation to shape the firm overall IT capabilities. These capabilities are not covariate and also not similar, based on antecedents and consequences. Meanwhile, this integration is measured as a mediator between the relationship of SCPI and firm performance. Thus, this study hypothesizes that:

**H3a:** IT capabilities have a mediating effect on the relationship between SCPI and firm operational performance.

**H3b:** IT capabilities have a mediating effect on the relationship between SCPI and firm market performance.

**H4:** Operational performance is positively related to market performance.

### 3.4. Research Framework

Grounded on the theoretical consideration, Figure 1 represents the proposed research model of this study, which has been tested and verified based on the data collected from the employees of superstores in Thailand.

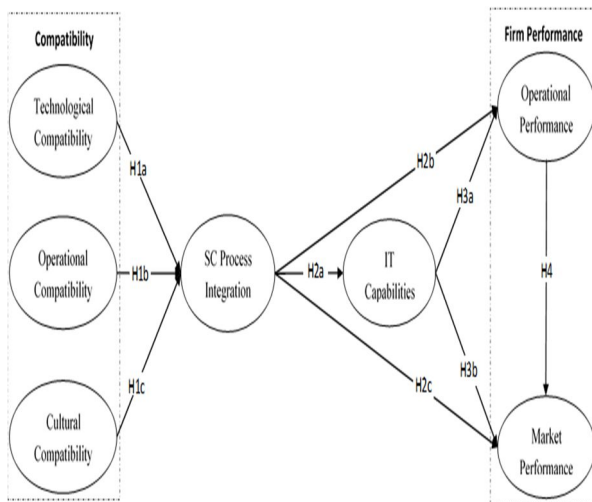


Figure 1. Proposed research model

## 4. Research methodology

### 4.1. Construct operationalization

To test the proposed research model, a structured survey was conducted from the employees of superstores in Thailand. The survey was designed and tested prior to submitting for data collection. Seven-point Likert scale from 1= strongly disagree to 7= strongly agree was used. All the measures were adapted from the previous studies and modified according to the context of this study. Moreover, to test the content validity of the designed questionnaire, a panel of 2 professors and 3 research scholars were invited to analyze the questionnaire. The approved questionnaire was circulated for data collection.

Three key dimensions of the compatibility were measured adopting the survey items as suggested [44; 49]. SCPI was measured by three formative constructs; information flow integration, physical flow integration, and financial flow integration, and the items were adapted from the [44;35]. IT capabilities are also measured using a formative scale based on three key constructs; IT management capability, IT development capability, and IT intensity. The survey items for IT management capability and IT development were adapted from the study of [65]. While IT intensity was adapted from [46]. Eight items from the studies of [71; 11] were adapted to measure the operating performance, and four items from the study of [65] were used to explore the market performance. Table 6 in appendix contain all the measures.

### 4.2. Data collection and sampling

This study aims to explore the effect of compatibility on SCPI, which leads to the performance of the firm through IT capabilities in Thailand. Because the context of this particular study focused in Thailand; therefore, data were collected from the employees working in superstore using online survey method. Consistent with the focus of this research, only supply chain managers, production managers, and relevant employees are expected to respond to the questionnaire. For data collection, first, the email was sent to the top management of the superstore firms in which they are communicated about the aims of the current survey. All the possible queries were replied to satisfy the top-management, and no official data was

collected to ensure the security and privacy of the firm. After getting permission from top-management, the questionnaire was submitted to the management and requested to circulate among only relevant employees through email or using the official company blog. The respondents are free to response, and no incentive was offered.

After seven weeks, a reminder was sent to the top management to make sure the participation of their employees in the survey. This survey took approximately three months to get a reasonable response from January 2019 to March 2019. Total of 427 responses was initially recorded, out of which 13 responses were found more than 70% incomplete, which was excluded from the data. Three responses were 20% incomplete, which were retained and filled by applying the average method. Moreover, 19 responses were found having the same reply, such as "Agreed" for every question, which shows the non-serious attitude of the respondents. Therefore, after removing these items, a total of 395 final responses was used in final data analysis.

### 4.3. Data analysis

The structural equation modeling (SEM) has applied to measure the relationship among the constructs. Therefore, AMOS version 23 was applied for the measurement model and structural model analysis. The survey items were adapted from the previous studies and modified according to the needs of the study where required. However, the explanatory factor analysis (EFA) has been applied to confirm the issue of validity. Moreover, confirmatory factor analysis (CFA) was also applied to test the measurement fit of the model and consistency.

## 5. Results and discussions

Table 1 provides an overview of the main respondents to the study (gender, education, and years of experience. Participants were the employees of superstores in Thailand. In all, 67.3% of the participants were men, while 32.7% were female. The results show that 23% of respondents had between 1 to 3 years of work experience in their respective superstore, while 42% had between 4 to 6 years of work experience. Collectively, 35% of respondents had more than 6 years of experience. The majority of respondents have received higher education, in which only 16.2% are undergraduate, while 39.5% are graduates and 23.8% are postgraduates. Remaining 20.8% have the other professional education certification.

**Table 1.** Respondents profile

Category		Frequency	Percentage (%)
Gender	Male	266	67.3
	Female	129	32.7
	Total	395	100
Experience	1 to 3 years	91	23
	4 to 6 years	166	42
	7 to 9 years	62	15.7
	Over 10 years	76	19.3
	Total	395	100
Education	Undergraduate	64	16.2
	Graduate	156	39.5
	Postgraduate	94	23.8
	Others professional education	81	20.8
	Total	395	100

**5.1. Measurement model**

Reliability and convergent validity were analyzed before applying the structural model.

CFA was applied to test the measurement model fitness and the results obtained from described that the values of CMIN/Df = 1.969, CFI = 0.949, SRMR = 0.061, RMSEA = 0.050 and PClose = 0.569 are under the threshold values. The results of the measurement model are presented in

Table 2, comprising on factor loadings, Cronbach's alpha, composite reliability, and average variance extracted. The value from

Table 2 described that the factors loadings of all items meet the minimum requirement of a threshold value for a complex model. Meanwhile, the values of Cronbach's alpha are also higher than 0.7, showing the positive results of reliability analysis. CR and AVE are also above the threshold values as described [16]. Therefore, it can be concluded that data have no issue about reliability and convergent validity.

**Table 2.** Factor Loadings, Convergent Validity, and Reliability

SR	Variables	Items	Loadings	Cronbach's Alpha	CR	AVE
1	Technical competency	TC1	0.811	0.910	0.913	0.779
		TC2	0.812			
		TC3	0.762			
2	Operational competency	OC1	0.747	0.885	0.889	0.728
		OC2	0.794			
		OC3	0.778			
3	Cultural competency	CC1	0.771	0.876	0.876	0.702
		CC2	0.758			
		CC3	0.793			
4	Informa	IF1	0.755	0.912	0.913	0.725

	Information integration	IFI2 IFI3 IFI4	0.709 0.797					
5	Physical flow integration	PFI1 PFI2 PFI3 PFI4	0.696 0.875 0.770 0.874	0.896	0.897	0.692		
6		Financial flow integration	FFI1 FFI2 FFI3	0.793 0.743 0.766	0.789	0.791	0.558	
7			IT management capability	ITM C1 ITM C2 ITM C3 ITM C4	0.697 0.792 0.747 0.756	0.873	0.874	0.635
8				IT development capability	ITDC1 ITDC2 ITDC3 ITDC4	0.746 0.784 0.803 0.740	0.888	0.889
9	IT intensity	ITI1 ITI2 ITI3			0.754 0.877 0.873	0.868	0.877	0.709
10		Operational performance			OP1 OP2 OP3 OP4 OP5 OP6 OP7 OP8	0.706 0.743 0.851 0.692 0.781 0.767 0.885 0.822	.950	0.948
11			Market performance		MP1 MP2 MP3 MP4	0.741 0.849 0.729 0.828	0.915	0.917

Moreover,

Table 3 represents the inter-construct correlations and discriminant validity of the data. As results shown in

Table 3, the inclined line shown the square root of AVE, and the values are greater the inter-construct correlations. Higher the values of AVE square root described that there is no issue of discriminant validity [15]. therefore, the data can be utilized for further analysis.

**Table 3.** Inter-construct correlations and discriminant validity

	OP	MP	PFI	IFI	ITDC	ITM C	ITI	T C	OC	CC	FF I
OP	<b>0.836</b>										
MP	0.546**	<b>0.858</b>									
PFI	0.334**	0.325**	<b>0.832</b>								
IFI	0.449**	0.356**	0.434**	<b>0.852</b>							
ITDC	0.427**	0.467**	0.427**	0.530**	<b>0.817</b>						
ITM C	0.453**	0.383**	0.429**	0.631**	0.525**	<b>0.797</b>					
ITI	0.383**	0.273**	0.218**	0.340**	0.302**	0.228**	<b>0.842</b>				
TC	0.537**	0.485**	0.353**	0.423**	0.422**	0.349**	0.390**	<b>0.882</b>			
OC	0.552**	0.462**	0.364**	0.423**	0.443**	0.443**	0.341**	0.554**	<b>0.853</b>		
CC	0.550**	0.514**	0.377**	0.390**	0.443**	0.443**	0.351**	0.547**	0.598**	<b>0.838</b>	
FFI	0.381**	0.346**	0.344**	0.412**	0.537**	0.525**	0.322**	0.409**	0.382**	0.384**	<b>0.747</b>

*Significant at: \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001. Inclined lines rendered in Boldface show the Square Root of the AVE.*

**5.2. Structural model**

After the confirmation of data reliability, convergent, and discriminant validity, the SEM was applied to test the hypotheses of the study. The values of CMIN/Df = 2.431, CFI = 0.955, SRMR = 0.057, RMSEA = 0.040 and PClose = 0.554 are under the threshold values showing the good fitness of model. Table 4 represents the results of path analysis for the direct impact of constructs. The values from Table 4 shows that TC has a positive impact on SCPI, and the value beta coefficient is 0.289 at 0.001 level of significance, which supported the H1a. H1b is also supported, showing the value of the beta coefficient in path analysis is 0.226, significant at 0.001. CC also has a positive impact on SCPI (b=0.200, P=0.001) supporting H1c. Figure 2 describes the value of R-square in SCPI is 0.35, which means that 35% variance in the SCPI is explained by compatibility. These results described that compatibility is significantly and positively related to the SCPI of superstores in Thailand.

SCPI was measured by using formative scale, and ITC was also measured using the formative scale. The measurement model also confirmed the reliability and validity of these constructs. Meanwhile, SCPI have a significant positive impact on ITC, and the beta value is 0.715 at the 0.001 significance level. Figure 2 also represents the value of R-square in ITC is 0.51, which means that 51% variance in the ITC is explained by SCPI, supporting the H2a.

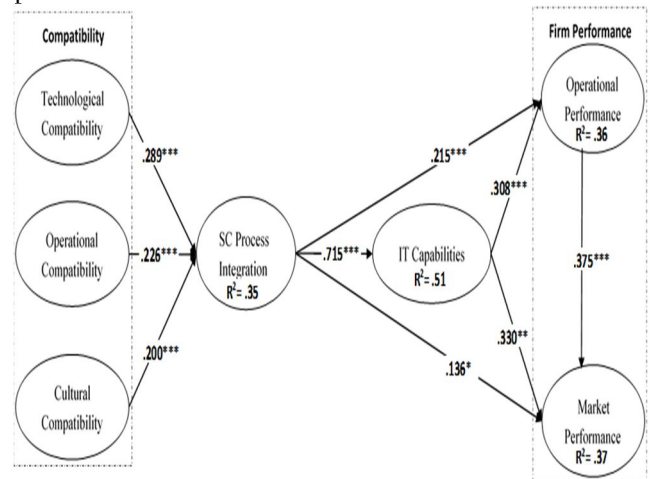
**Table 4.** Path analysis results

Hypotheses		Estimate	S. E.	C.R.	P-Value	Results
SCPI	<- --	T C	.289	.03 7	5.82 8	*** Support ed

Hypotheses		O	Estimate	S. E.	C.R.	P-Value	Results
SCPI	<- --	C C	.226	.03 5	4.41 3	***	Support ed
SCPI	<- --	C C	.200	.03 7	3.94 8	***	Support ed
ITC	<- --	SC PI	.715	.03 9	20.2 72	***	Support ed
OP	<- --	SC PI	.215	.07 9	3.74 0	***	Support ed
MP	<- --	SC PI	.136	.08 8	2.33 8	*	Support ed
OP	<- --	IT C	.431	.07 2	7.49 4	***	Support ed
MP	<- --	IT C	.188	.08 4	3.07 5	**	Support ed
MP	<- --	O P	.375	.05 5	7.46 0	***	Support ed

*Significance level: \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001.*

SCPI is also positively associated with OP and MP as described in Figure 2 and Table 4, while the values are b=0.215 significant at 0.001 and b=0.136 significant at 0.05, respectively. These results are supporting the H2b and H2c. The results from Table 4 also shows the direct impact of ITC on OP and MP.



**Figure 2.** SEM results for hypotheses testing

Moreover, this study incorporates the mediating effect of ITC in between the relationship of SCPI and firm performance, which is measured in two aspects; operational performance and market performance. Therefore, the bootstrapping method using AMOS software was implemented to test the indirect impact of ITC as recommended by (Preacher & Hayes, 2004). The outcomes from

Table 5 represent the direct and indirect effect of the mediator, showing that ITC is partially mediated the relationship between SCPI and OP (b=0.308, p=0.001). Meanwhile, ITC also partially mediate the effect of SCPI on MP (b=0.136, p=0.01). Therefore, the H3a and H3b are supported by the empirical analysis. R-square of OP has recorded as 0.36 and 0.37 for MP showing a reasonable contribution in the prescribed constructs and supported H4.

**Table 5.** Path analysis for mediation

Hypotheses	Direct effect	Indirect effect	Results

OP <--- ITC <--- SCPI	.215***	.308***	Partial mediation
MP <--- ITC <--- SCPI	.136*	.330**	Partial mediation
<i>Significance level: *p &lt; 0.05, **p &lt; 0.01, ***p &lt; 0.001.</i>			

## 6. Conclusion, implications, and future directions

The purpose of this research was to examine the impact of compatibility on SCPI, which leads towards the firm operational and market performance by utilization of firm IT capabilities. Therefore, an empirical analysis was achieved to test the prescribed hypotheses based on the data collected via a survey questionnaire from the employees of superstores in Thailand.

The overall results described that technology compatibility has a positive influence on the SCPI, which indicates that technical issues should be considered for sustainable improvement of SCPI across the partners. Meanwhile, operational compatibility is also found as a key to improve the SCPI; therefore, it is required to develop and enhance the operational compatibilities such as financial, physical and exchange of information among the partner firms. Also, the cultural compatibilities are equally important to measure the successful alliance between the partner firms and supplier. The positive organizational culture can create a suitable environment for building a long-term relationship which helps to strengthen the SC integration process. These findings are related to the prior studies of [44; 49; 51].

The results are supported from dynamic capability theory show that SCPI enables SC partners to achieve and get benefits from IT capabilities such as management, development, and intensity of IT systems by effectively and efficiently sharing strategic resources and IT capabilities. Meanwhile, this study also proved that SCPI has a positive and significant impact on ITC. Specified the increasingly volatile global business environment, firms should place a high value on building their IT capabilities to respond speedily to external emergencies. Moreover, SCPI also has a positive impact on firm performance, either operational and market. Therefore, the shared and improved setup of firm's SCPI can lead its operational and market performance.

This study also described that the effect of SCPI had been partially mediated by IT capabilities. So that the firms are required to pay more attention to development, management, and penetration of IT-based systems for SC management, which ultimately improved the firm overall performance as proved by this study. Meanwhile, this study also proved the positive impact of operational performance on a firm's market performance. These results are consistent with previous research [44], suggesting that the link between SCPI and outcome of firm performance can be mediated by several other factors. These results also supported the findings of [43; 69] which show that firm capability has a positive impact on market share growth to enhance its market performance.

### 6.1. Research implication

This research has an important contribution to SC management literature and has certain enlightenment to theory and practice. Through the empirical test of the proposed framework, this study is conducive to the development of SC theory. The relationship between SCPI and firm performance has been anticipated through the intermediary variable of IT capability. The study also empirically tested varying results on the link between SC integration and firm performance, thus contributing to knowledge acquisition. The present study encompasses the SC management theory by approving the multidimensionality of SC construction and demonstrating the different effects of these scopes on the diverse IT capabilities and firm performance dimensions.

In order to support consistency theory, this study provides a basis for the SC management literature by recognizing and verifying the role of technological, operational, and cultural compatibility dimensions in enabling SCPI, thus proving why firms need to recognize specific compatibility dimensions throughout the process. This study also encompasses the findings of [43] by proving technological, operational, and cultural compatibility as crucial dimensions of inter-organizational compatibility and its impact on the SCPI. In addition, this paper also extends the application of consistency theory from the literature of innovation adoption to the research area of SC management.

This paper is also important for SC managers and policymakers. First, research shows that SC practitioners attach great importance to identifying technological, operational, and cultural aspects that influence the SCPI. Secondly, considering that active capabilities such as IT capability intermediate the link between SCPI and firm performance, SC managers want to regard SC integration for management decision making. In fact, several researchers have described that integration is not solitary linked to operational effectiveness but also should be carried out for strategic motives [68]. This tactic will permit SC managers and policymakers to effectually perceive, reconfigure, and install concerned dynamic IT capabilities to exploit the aids of SC integration. Finally, considering that IT capabilities is a crucial dimension of SCPI, the current research results indicate that SC managers should consider integrating SC processes through "advanced automated information systems" to attain SC efficacy and effectiveness. Which also assist in identifying the more IT capabilities to improve the desired firm performance in the competitive market environment.

### 6.2. Limitations and future directions

The paper has some limits and points to potential scope for further investigation. The current research depends on cross-sectional data, by means of a single piece of information from each superstore in Thailand. Longitudinal studies can examine the possible impact of the pre - and post-integration compatibility dimensions of SC processes. Future investigation will include emphasis on recognizing the precise elements of SCPI at every stage to deliver a more comprehensive definition of SCPI across the other countries. This investigation uses the survey data of SC retail level stores to study the conceptual model.



Future researchers should focus on different levels of SC management across the manufacturing firms.

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Table 6 Measurement Items

Variables	Items	Sources
<b>Technical compatibility</b>	TC1	Our firm's software is compatible with supply chain partners' software.
	TC2	Our supply chain partners' information systems are technically compatible with those of our firm.
	TC3	Technical capabilities of our firm and supply chain partners are compatible.
<b>Operational compatibility</b>	OC1	Our firm's procedures are compatible with our supply chain partners' business procedures.
	OC2	Managers from our firm and supply chain partners firms have similar professional skills.
	OC3	Our firm's operational processes are compatible with supply chain partners' operational processes.
<b>Cultural compatibility</b>	CC1	Managers from our firm and those of our supply chain partners have compatible philosophies in business dealings.
	CC2	The organizational values and social norms prevalent between our firm and our supply chain partners are congruent.
	CC3	The goals and objectives of our firm are compatible with those of our supply chain partners.
<b>Information flow integration</b>	IF11	Our integrated systems allow us to share customer needs and wants through sales data.
	IF12	Our integrated systems allow our firm to project and plan future demand with supply chain partners.
	IF13	Integrated systems allow us to share delivery schedules with supply chain partners.
	IF14	Integrated systems allow sharing of inventory data between supply chain partners.
<b>Physical flow integration</b>	PF11	Our firm jointly manages the supply chain inventory with supply chain partners.
	PF12	Our firm jointly manages just-in-time delivery of products with supply chain partners.
	PF13	Our firm jointly configures the flow of products with supply chain partners.
	PF14	Our firm and supply chain partners jointly work to reduce inventory holdings.
<b>Financial flow integration</b>	FF11	Account receivable processes are automatically triggered when our firm ships products to supply chain partners.
	FF12	Account payable processes are automatically triggered when our firm receives products from supply chain partners.

	FFI3	Our firm has an integrated electronic fund transfer system with our supply chain partners.	
<b>IT management capability</b>	ITMC1	Our IT function is good at managing contracts with software vendors.	[65]
	ITMC2	Our IT function can effectively manage IT assets.	
	ITMC3	Our IT function can maintain an efficient budget for IT operations.	
	ITMC4	Our IT function can satisfy business requirements timely.	
<b>IT development capability</b>	ITDC1	Our firm is able to purchase suitable information systems to meet business needs.	[65]
	ITDC2	Our firm is able to implement the information systems that meet business needs.	
	ITDC3	Our firm is able to develop information systems that meet business needs.	
	ITDC4	Our firm has strong IT project management skills.	
<b>IT intensity</b>	ITI1	IT is used extensively by our competitors	[46]
	ITI2	IT is used extensively by our suppliers and business partners.	
	ITI3	IT is a critical means to interact with customers in this industry.	
<b>Operational performance</b>	OP1	Our firm's effectiveness in fulfilling requirements.	[71;11]
	OP2	Our firm's effectiveness in responding to changes in market demand.	
	OP3	Our firm's effectiveness in on-time delivery.	
	OP4	Reduction in lead time to fulfill customers' orders.	
	OP5	Our firm's effectiveness in delivering reliable quality products.	
	OP6	Reduction in cost to reach customers.	
	OP7	Reduction in overhead costs.	
	OP8	Reduction in inventory costs.	
<b>Market performance</b>	MP1	We have entered new markets more quickly than our competitors	[65]
	MP2	We have introduced new products or services to the market faster than our competitors.	
	MP3	Our success rate of new products or services has been higher than our competitors.	
	MP4	Our market share has exceeded that of our competitors.	