Moderating Effect of Innovation on the Relationship of Supply Chain Management Practices and Firm Performance: A Study of SMEs

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Abstract- **The study examines the moderating effect of innovation in the relationship of supply chain management practices (SCMP) and firm performance (FP) of the SMEs of Indonesia. To achieve this objective, using cross sectional research design, 250 questionnaires were distributed among the supply chain managers of the SMEs by using a convenient sampling technique which yield an 80% response rate. The data was analyzed by using the Structural Equation Modeling (SEM) technique. The findings of the study have shown that all the management practices have a positive and significant relationship with the FP of Indonesia SMEs. Furthermore, indirect moderating effect of innovation also shown that Innovation has a positive and significant moderating effect in most of the SCMP and FP. Whereas, one of the SCMP namely, quality information sharing (QIS) and FP relationship is not significantly moderated by the innovation. These findings empirically revealed that innovation is considered to be a significant moderator in the relationship of SCMP and FP which is considered to be significant contribution in the current study. Therefore, the current study added a body of literature in the existing empirical findings. The research limitation and future directions are also discussed at the last of the study.**

Keywords; supply chain management practices, innovation, firm performance, SMEs, Indonesia

1. Introduction

Supply chain management practices (SCMP) has achieved popularity in the earlier stage of 1990s when entire world faces the problem of massive competition in international market for providing goods and services at lowest price [1, 2]. Some previous researchers expose that firm managers, academicians, and advisors pay attention on the SCMP of the organization [1, 3-5]. In this regards, several organizations have a main concerned about to recognized SCMP for improving their firm performance (FP) [4, 43-45]. In line with this, [7] further stated that SCMP clearly classifies the strategic nature of coordinators among the firm's joint partners and also help to clarify the dual objects of SCM for increasing the FP. Therefore, the main challenges which are faced by the organization is learn about what SCMP they have to follow to improve their FP [4].

As the SCMP is supply chain activity is considered to be important to achieve customer value and gaining a sustainable competitive advantages and FP of the organization. In line with this, some preceding researchers have been used SCMP for enhancing FP [6], and further recommended that these practices are considered to be essential for any organization. On the other hand, in the extant literature, various studies have inconsistent findings and they further argued that there is need of study more on SCMP and FP [7] and many others have investigated the effects of SCMP on FP only [8]. In addition, the previous studies also have main concerned on the developed economies but the extant literature have little attention on the developing countries especially on the Indonesia small and medium enterprises (SMEs) because the SMEs plays an significant role in progress of an economy [9] and also help in decreasing poverty rate, and employment groups [10]. In the developing states like Indonesia, SMEs play a vital role to contribute the social and economic development, developing firms, trade growth, and production enterprises [10, 11].

Therefore, founded on the prior discussions, the present study has a main concerned on effect of SCMP on the FP indirectly by using the innovation as a moderator in the pharmaceutical industry of Indonesia. Preceding studies overlooked the moderator impacts of innovation between the SCMP and FP of SMEs. Hence the current research is annoying to fill this gap. In addition, the current research has been divided into the following sections, introduction, literature review, methodology, discussions and conclusions. At the last of the research, limitations and future directions of the study was also discussed. For analysis of the results, Smart PLS software was used.

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2. Literature Review

2.1. Firm performance

Firm performance (FP) is measured the situation of how well an industry achieved their goals which are required. Different studies are conducted on the FP but still, there is no comprehensive definition that is being used to relate measurement FP. Generally, in the previous literature, various researchers for measurement FP have used the financial performance. In contrast, many others have used non- financial performance to calculate and measure completion and production of an enterprises. After seeking the contradiction in the previous literature, in the current study, the researchers have used the FP [12] as a dependent variable that is perceptual in nature.

2.2. Supply Chain Management Practices (SCMP)

According to, [13], supply chain management practices (SCMP) is referred to a combination activity that is undertaken in the organization to give support for the SCM. Many researchers used different SCMP in their study which are, continual process flow, supplier's association, cycle period density, share information in respect of technology, and outsourced etc. [13] namely "supply chain integration (SCI), customer service management (CSM), information sharing (IS), geographical propinquity (GP), supply chain characteristics (SCC), and just-in-time capability (JIC)". In addition, [14] added the components which are standard communication, supplier based reduction, cross-functional groups, long range corporations, and supplier participation within measuring supplier and buyer connection. [15] further documented customer relation, quality, purchasing constituted as a SCMP. Consequently, literature represent SCMP in condition of different approaches but in the end a common objective that is extent FP. For the current study the components which are used for the FP that are considered to be important has been discussed below.

2.3. Strategic partnership with suppliers (SPS) and firm performance

strategic partnership with suppliers (SSP) is talk about to the large scale association with enterprise and their suppliers [16]. Some of preceding researchers clarify that SPS is planned to grip on operational and strategic abilities of employee contribution firms to facilitate them in achieving significant advantages [4]. Furthermore, conscious partnership highlighted direct, long –range association and encourage share planning as well as. struggles concerning problem-solving [16]. SPS documents firms to function with suppliers that they are ready to divide responsibilities for success of manufacturing goods [17]. Many prior studies classify that

SPS have effective and positive effect on FP [9]. Based on the previous discussions, it is hypothesized that:

H1: Strategic partnership with supplier has a significant association with the firm performance of Pharmaceutical industry of Indonesia.

Level of information sharing and firm performance

level of information sharing (LIS) contain of two components such alike quality and quantity; and both components are very important for supply chain management practices (SCMP) and they have used as exogamic concepts in previous studies on supply chain management(SCM) [9, 17]. Besides, stages of information (quantity element) resources to comprehensive to which essential and proprietary information are transferred to an enterprises supply chain partner [18]. Within business share information can be different from the scheduled level to the intended level as well as from the management movement to market and information about consumers [19]. In addition, different researcher advocate that information share with others partners in the supply chain may become a basic origin for FP [19, 20]. Most of the previous studies explain and clarify that level of information sharing (LIS) have a positive effect on firm's performance [22,23]. Based on the previous discussions, following hypotheses have to provide for the current study:

H2: LIS has a positive significant influence on FP of Pharmaceutical industry of Indonesia.

2.4. Quality of information sharing (QIS) and firm performance

Quality of information sharing(QIS) contain timeliness, accuracy, credibility, adequacy, as final credibility of the information communicated [14,15]. Furthermore, information sharing is historical, and significant of its effect on supply chain management (SCM) with that what, when, and with all information shared [4, 21]. consequently, business need to interpreted their significant information as firm asset and confirm that information should be communicated with the minimum delay and distortion [16]. Empirically, a positive effect of the QIS on FP has been found in the study of [16]. For the current studies there are following hypotheses are proposed:

H3: QIS has a significant association with the FP of Pharmaceutical industry of Indonesia.

2.5. Internal supply chain process (ISCP) and firm performance

Internal supply chain process (ISCP) also recognized as rearrangement is referred to the application of go forward along with one and more than functions like production, sourcing, and convey to a much subsequently point in supply chain management [22-24]. An author revealed that there is a necessary to develop rearrangement strategy

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like examining how more steps a company wants to delay and which step they will be postpone [25, 26]. Benefit of postponement for firm is that firm have extra time for making changes in needs of customers and moderation of the demand function [27]. ISCP have being a positive effect on organizational performance [27]. Based on the previous discussion, the following hypotheses is proposed for the current study:

H4: ISCP has a significant association with the FP of Pharmaceutical industry of Indonesia

2.6. Lean practice and firm performance

Lean practice (LP) is measure to a procedure of eliminating conservation of time as well as means in the manufacturing process [26]. Furthermore, a lean practice should be considered a value, spirit, ideology, a management concept, a corporate culture, and a strategy [27]. At the present time, lean practice resources of management approaches that can be develop entire processes in the industry at all stages. As stated by Lewis [28] the lean practice make ease and facilitates in decreasing all waste, termination of shortages, keep down lead time, increase stock turnover, and assured customer satisfaction. Lean practice have a positive effect on firm's performance [21]. Besides, lean practice has a positive effect on FP [29]. Based on the previous discussions, the following hypotheses is proposed for current study:

H5: The LP has a significant association with the FP of Pharmaceutical industry of Indonesia.

## 2.7. Moderating effect of innovation

The word innovation plays a vital role in increasing quality and progress of an organization [29]. It measures the organizational struggle that provide advantages to the firms on the long term bases [30]. The previous studies classify the organizations preserve about their powerful positions in current market because of indefinite investment in innovation because is performed in an organization process and in technology [29]to develop the goods to enhance the FP of the organizations. In spite of this, innovation play a vital role in increasing FP whether various firms fail to execute well due to innovation because they not have proper guidelines about use of that technology and due to absence of regulations and procedures [31]. On the others hand, innovation play a vital role in SPS is found in the study of [27]. In addition, it is also found that innovation has a positive and significant association with the QIS [29, 30]. In the same vein, innovation has a positive and significant effect on LIS [27]. In addition, it is indicated that innovation is also very important for QIS that it have a positive effect on innovation [27]. For the moment, the level of information sharing has a positive and significant effect on innovation [27]. Based on the previous discussions, it is found that

these variables have a relationship among them. Therefore, it is hypothesized that:

H6: Innovation has a significant moderating effect in the relationship of SCMP and FP of Pharmaceutical industry of Indonesia.

3. Research Framework

Based on previous literature review discussion, the research framework of the current study is established. The following Figure 1 illustrated the higher level of conceptual framework for this research. The framework identifies that supply chain management practices (SCMP) indicators have an impact on the firm performance (FP) through the moderating variable Innovation.
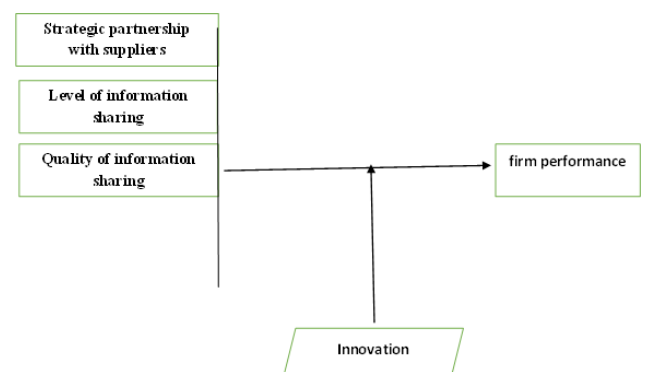
Figure 1. conceptual framework of the study

4. Methodology

This study employed quantitative approach, employed self-administered questionnaire, and cross-sectional research design to examine the research framework and proposed hypotheses. This techniques in primary study is considered an important practical approach for providing the data which could be used for the wider generalization of the study [31].

4.1. Target Population and sampling techniques

The population consists of all the elements or individuals which represents the specification of researcher [32-34]. For current research, data was collected from the SMEs which were working in the Indonesia. The respondents of the study were supply chain managers. The researcher conducted the study on self-administered questionnaire by using the convenient sampling technique. The total 250 questionnaires were distributed were distributed, among of them 200 questionnaires were returned back which yields an 80% response rate.

4.2. Research Instrument

The theoretical model of this study consists of seven variables and all these variables are measured by adapting

the questionnaire from some of the prior studies since their reliability as well as validity had been established. 5-Likert scales is used that has a range within 1 (strongly disagree) to 5 (strongly agree). SCMP e.g. SPS consists of 5 items, LIS consists of 5 items, QIS consists of 5 items, ISCP consists of 3 items, and lean practices consists of 3 items adapted from [27], innovation consists of 5 items and adapted from [35], and OP is adapted from [27].

5. Statistical analysis of the study
5.1. Measurement Model

To test the model, in the current used the structural equation modelling (SEM) technique by using the partial least squares (PLS) with Smart PLS 3.0 [36] software. This software is called a second generation software that could be used to test the complex model along with the latent variables. Table 1 has been showing the results which were obtain through the measurement model. Based on the Table 2, it could be clearly seen that all of the loading are above the 0.05 that is called the threshold value that is suggested by [37]. The AVE (Average Variance extracted) of all the constructs which has exceeding value 0.5 [38]. As is it is explained by that minimum value of composite reliability (CR) should be 0.70 [36]. So, we can conclude that convergent validity has been achieved. Table 2 and 3 further shown the discriminant validity results. Hence, it is explored by [39] and [40] that minimum value of AVE in the measurement model should be minimum higher than the cross loading. As it is shown in the Table 3 and Table 4 all values meet the criteria of discriminant validity. Each construct AVE should always higher than the correlation between all of these. It is clearly shown in the following Table 2 and 3 that all the construct fulfills the criteria for the discriminant validity. Accordingly, it is suggested by Hair [27] suggests that measured variable loading should always be higher than the cross loading through at least 0.1 that is considered sufficient for the discriminant validity. As such we can conclude that discriminant validity is achieved.

Table 1. Measurement Model of the study

Measurement Scale	Items	Loadings	Cronbach's Alpha	AVE	CR
Strategic partnership with suppliers	SPS 1	0.877	**0.81**	**0.66**	**0.854**
	SPS 2	0.823			
	SPS 3	0.721			
	SPS 4	0.831			
Level of information sharing	LIS 1	0.629	**0.80**	**0.54**	**0.851**
	LIS 2	0.611			
	LIS 3	0.696			
	LIS 4	0.656			
	LIS 5	0.726			
Quality of information sharing	QIS 1	0.764	**0.77**	**0.50**	**0.833**
	QIS 2	0.754			
	QIS 3	0.685			
	QIS 4	0.748			
Internal supply chain process	ISCP 1	0.617	**0.76**	**0.53**	**0.821**
	ISCP 2	0.784			
	ISCP 3	0.757			
Lean practices	LP1	0.736	**0.80**	**0.63**	**0.85**
	LP2	0.754			
	LP3	0.764			
Innovation	INV1	0.655	**0.83**	**0.64**	**0.86**
	INV2	0.768			
	INV3	0.637			
Firm performance	FP1	0.910	**0.86**	**0.80**	**0.890**
	FP2	0.880			
	FP3	0.750			
	FP4	0.780			

Note: "SPS- Strategic partnership with suppliers, LIS-Level of information sharing, QIS- quality of information sharing, ISCP-internal supply chain process, LP-lean practices, INV-innovation, FP-firm performance".

Table 2. HTMT Discriminant

	SPS	LIS	QIS	ISCP	LP	INN	FP
SPS							
LIS	0.334						
QIS	0.168	0.724					
ISCP	0.449	0.823	0.560				
LP	0.71	0.60	0.60	0.61			

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	9	7	0	1		
INN	0.230	0.260	0.490	0.230	0.340	
FP	0.356	0.430	0.340	0.560	0.280	0.340

Note: "SPS- Strategic partnership with suppliers, LIS-Level of information sharing, QIS- quality of information sharing, ISCP-internal supply chain process, LP-lean practices, INV-innovation, FP-firm performance".

Table 3. Forner Lacker Discriminant Validity

	SPS	LIS	QIS	ISCP	LP	INN	FP
SPS	**0.870**						
LIS	0.334	**0.750**					
QIS	0.168	0.500	**0.879**				
ISCP	0.449	0.340	0.600	**0.780**			
LP	0.719	0.607	0.724	0.611	**0.860**		
INN	0.230	0.260	0.490	0.230	0.340	**0.789**	
FP	0.356	0.430	0.340	0.560	0.280	0.340	**0.895**

Note: "SPS- Strategic partnership with suppliers, LIS-Level of information sharing, QIS- quality of information sharing, ISCP-internal supply chain process, LP-lean practices, INV-innovation, FP-firm performance/"

5.2. Structural model

The next steps in assessing the structural model are to examine the hypothesized relationships among constructs in the measurement model. The model explanatory power was resolute through inspecting how well the observed data fit the hypothesized relationship among the constructs. Following, [27], bootstrap the re-sampling approach has been hired to test all the significant of all each coefficient. As recommended by Hair et al. (2014), five thousand duplications through using the randomly selected subsamples which were performed to test all the hypothesized relationships. Table 5 depicts the beta coefficients and t-values for the first 3 direct hypotheses. As depicted, this study found support for eight out of 3 hypotheses tested.

Table 4 presents the results of PLS bootstrap algorithms that confirms the significant direct relationship of Strategic partnership with suppliers (SPS) and firm performance (FP) (β = 0.66, t value = 15.86, p value = 0.00). The findings also revealed the significant positive relationship of logistic information system (LIS) and firm performance (FP) (β = 0.19, t value = 3.138, p value =

0.002) and hypothesis (two) is supported. In addition, quality information system (QIS) also has positive and significant association with the firm performance (FP) (β = 0.43, t value = 6.83, p value = 0.000). Moreover, findings further show that Internal supply chain process also has positive and significant association with the firm performance (FP) (β = 0.555, t value = 5.833, p value = 0.001). Similarly, findings of the study further show that lean practices (LP) also has a positive and significant relationship with the firm performance (FP). All of the findings have shown that SMEs in the Indonesia have a greater attention on the SCMP to increase the performance of the organization.

Table 4. Direct Effect

Hypothesis	Beta	S.E	T Value	P Value	Decision
SPS -> FP	0.660	0.042	15.861	0.000	Supported
LIS -> FP	0.188	0.06	3.138	0.002	Supported
QIS -> FP	0.434	0.064	6.83	0.000	Supported
ISCP -> FP	0.555	0.034	5.833	0.001	Supported
LP -> FP	0.240	0.072	3.336	0.001	Supported

Note: "SPS- Strategic partnership with suppliers, LIS-Level of information sharing, QIS- quality of information sharing, ISCP-internal supply chain process, LP-lean practices, INV-innovation, FP-firm performance".
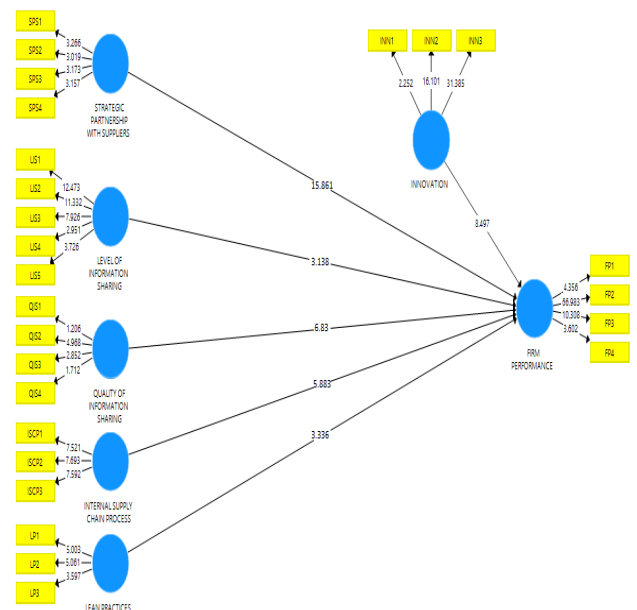
Figure 2. Direct effect of exogenous variable on the endogenous

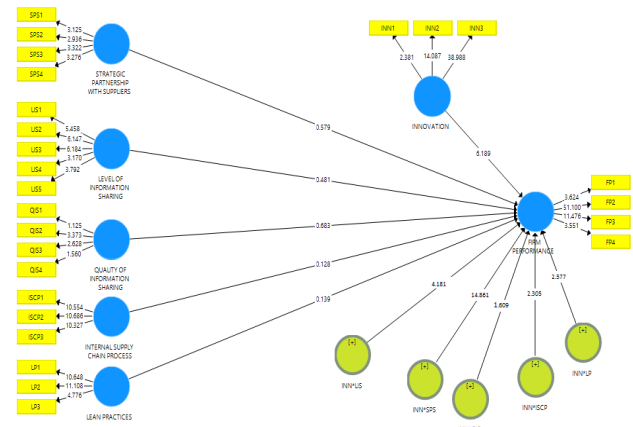## 5.3. Indirect Moderating Effect

The research model hypothesized that information sharing moderate in the relationship of three antecedents of SCM capabilities on the business performance. The moderation test was employed by using the two stage calculation approach. This approach was employed as per the suggestion of the [41], who recommended that when the objective of study is whether is that moderating variable significantly moderates in the relationship of exogenous and endogenous variable. For this purpose, to test the moderation hypotheses, this study has used [42] criteria to determine whether the moderation condition is exist.

The findings of the current study have shown that innovation is significantly moderates in the relationship of most of the supply chain management practice (SCMP) namely, strategic partnership with suppliers (SPS), level of information sharing (LIS), Internal supply chain process (ISCP) and lean practices (LP) and firm performance (FP). These findings supported the following hypothesis (H6a, H6b, H6d, H6e). This shows that information sharing is considered to be significant moderator in the relationship of SCMP, LIS, ISCP and LP and FP SMEs of Indonesia. On the other hand, it is found that INN is not significantly moderates in the relationship of QIS and FP. These findings do not support to the hypothesis (H6c). The contradiction in the hypothesis might due to the reason that food industry of Indonesia is not sharing the proper information for the QIS because it is intangible in nature. Therefore, without proper information this could not significantly effect on their relationship. Another, possible reason might be a due to the fact that it might be an overlapping of other variables. Therefore, a future research might be existed in the future in their relationship. All of these results are depicted in the following Table 5.

Table 5. indirect moderating effect

Hypothesis	Beta	S.E	T Value	P Value	Decision
SPS*INN -> FP	0.670	0.042	14.861	0.000	Supported
LIS *INN -> FP	0.248	0.059	4.181	0.000	Supported
QIS *INN -> FP	0.068	0.043	1.609	0.108	Not Supported
ISCP *INN -> FP	0.208	0.09	2.305	0.022	Supported
LP *INN -> FP	0.227	0.088	2.577	0.011	Supported

Note: "SPS- Strategic partnership with suppliers, LIS- Level of information sharing, QIS- quality of information sharing, ISCP-internal supply chain process, LP-lean practices, INV-innovation, FP-firm performance".

Figure 2. Indirect moderating effect of the study

6. Discussion and conclusion

The aim of the study was to determine the moderating effect of innovation in the relationship of supply chain management practices (SCMP) and firm performance (FP) in the SMEs of Indonesia. The objective of the study was achieved by the following two structural model, one is direct and other one is indirect. The direct effect of the SCMP have shown the positive and significant association with the FP in the SMEs of the Indonesia. These findings show that SMEs of the Indonesia have a greater attention on SCMP to enhance their FP. All of the following direct hypothesis of the study has been supported. In addition, the indirect effect of the study also shows that innovation (INN) is positively and significantly moderates in most of the SCMP components and FP. On the other hand, one of the SCMP that is quality information sharing (QIS) is significantly with the FP by the innovation. These findings show that INN is not a significantly moderating variable in the relationship of QIS and FP. Thus, based on the findings it has very important managerial implications. Since, most of the firms, as presented through the main part of the Indonesia food industry do not have major resources. From this time, it is very essential that they should be cleared all the significances for the investment of the resources and also emerging the capabilities which could match their strategies of the business.

Based on the findings, this study has some limitations which could become a significant for the future research. Firstly, this study employed a non-probability sampling techniques which has limited generalizability as compare to probability techniques therefore based on this a future research could be an established on the probability sampling. Secondly, the study is based on the cross sectional research design which is based on one-time data collection which has low worth, therefore, a future research could be conducted on the longitudinal research design. Thirdly, study is limited on the Indonesia which is a developing country, in this regards the findings of the current study are limited on the Indonesia that could not

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be generalized on the developed countries that has different organizational cultures. Therefore, a future research could be established on the comparison of the developed and developing country. In addition, the current study used the innovation as a moderating variable in the relationship of SCMP and firm performance in Indonesia SMEs, so in future this relationship could be established along with other moderating variable to generalize the findings.

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