

The Effect of Supply Chain Indicators on the Business Performance of Food Industry in Indonesia

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Abstract-The performance is considered to be an important part of the business for their long term survival. For this purpose, the supply chain integration (SCI) indicators are considered to be an important part to increase the performance of the organization. The organizations which have a little attention on the SCI has low level of their performance. To address this issue, the current study purpose is to investigate the impact of supply chain indicators on the business performance (BP) of food industry. For this purpose, data has been collected from the 450 top and middle managers that were working in the food industry of Indonesia. The Structural Equation Modeling (SEM) of the study has shown that internal integration (INI) and external integration (EXI) have a positive and significant relationship with the BP. On the other hand, information technology integration (ITI) has insignificant relationship with the BP. While, supplier buyer relationship coordination integration (SBRCI) and logistics integration (LOI) have a positive and significant relationship with the BP. These findings indicate that food industry of Indonesia played an important role on the SCI to increase their BP. Therefore, this research is considered to be a pioneer study in which SCI played an important role to increase their BP. The research limitations and future direction were also discussed at the end of the study.

Keywords: *supply chain integration indicators, business performance, food industry, Indonesia*

1. Introduction

Inside of the highly competitive and vigorous business world, there is accurate super vision of supply chain (SC) consider as an essential elements for establishing key competitive advantages as well as enhancing effective management [1, 2]. Therefore, supply chain an integration (SCI) also indicated as a strategic apparatus that is also make efforts for

reducing operational costs plus in this way increases value towards shareholders through connecting entire participating members inside of SC from suppliers towards consumers [1, 2]. Accordingly, this study fascinated various important discussion as well as debate throughout the previous years [3].

Spurred through food infection scandals for example Sanlu milk has contaminated by melamine into 2008 as well as Shuanghui sausage including Clenbuterol in the 2011, legislators and administrators of China also recognized that there is needs to pay more attention on coordination, management, and integration of SC partners in the SCs. Context of SCI is described as a procedure of cooperation with those firms who mutually work in the cooperative way for attaining commonly acceptable results [4]. The upwards stage of literature recommended a significant and positive association among organizations performance (OP) and level of integration through SC [5-7]. In addition, researchers examined SCI by utilizing various dimensions, for example integration of customers plus suppliers [8], furthermore dyadic integration to the upwards direction [9] and downward direction of SCs [10-13].

In this way many studied integration of information [14] as well as logistic integration in SC [15]. Hence, researchers have examined SCI in this place as an individual concept [12, 16]. In recent time, [17] has described three SCI dimensions as well as its influences on operative and OP of manufacturing firms of China. Consequently, their research revealed integration on internal basis and integration of customers remain more powerfully associated towards performance development than integration of suppliers. [18] more observed influences of reliance and association commitment on the performance of

SC in 21 firms of the Zhejiang province, for example household electrical usages and textiles. In this way they also establish that mutual trust plus association commitment have very essential character towards enhancing OP.

On the other hand, various studies have inspected SCI from a model as well as they could not make a distinction difference among downstream also upstream associations. Moreover, but integration on internal or external basis must comprehensively studied in the literature of SCI, positive factors like buyer and supplier relationship (BRS) management, logistic integration, and information integration have been mainly ignored [17]. Furthermore, examined logistic integration equally build embracing of information integration and material integration across the SC as the management practices of suppliers. According to our examination, there deficiency of inclusive empirical studies about dimensions of SCI containing internal downstream plus upstream areas of the food industry in Indonesia.

Thus, the objective of this article is to explore the impact of SCI dimensions (internal and external integration, information technology integration, logistics integration, and SBR coordination) on firm performance using the Indonesia food industry as an example. The selection of Indonesia industry is due to its prominence in worldwide pig production and pork consumption.

2. Literature Review and Hypothesis Development

The current section has described about the literature review and hypothesis development of the study.

Business performance

In determining OP, more emphasis devoted towards three basic elements: financial, strategic, and OP [14]. In this way, organizational theory also suggested three methodologies to calculate OP, specifically goal-based, structure and various constituency method. Therefore, later equating several methods of the execution, [19] recommended various measurements of the executions must be deliberating at promising time, consists on dual measures of financial as well as non-financial. In addition, secretarial-based indicators, such as,

efficiency, profitability, and sales growing rate remain frequently used as a financial indicator. Furthermore, measures of operational performance for example product quality, market share and satisfaction of customers are also commonly investigated [14, 20, 21]. Into the current study mutual indicators of financial as well as non-financial remain utilized to measures manufacturing OP.

SCI and business performance

Through observation of definition plus classification of the practices of SCI, in this way there is provide may debates on present literature of SC [22]. Therefore, from various perspectives researchers have been studied dimensions of SCI. [10] describe various dimensions of the SCI, between others, supplier's integration, association integration, consumer integration, and integration on internal basis. In addition, [23] also categorized SCI inside integration of logistic-marketing, integration of logistic- production, and integration on external basis. Moreover, [24] examine influences of the capability as well as association assurance on integration among firms and consumers into the SC. According to their conclusions normative associations commitment have higher influences on the integration of customers then an instrumental association commitment. Moreover, due to significances of integrated the informational technology with in SCM, we deliberated IT as an individual dimension considerably than as the integrated dimension of external and internal basis.

[12] examine aspects for supplier-oriented of IT integration as well as customer-oriented of the IT integration through approaches of SCI in worldwide SCs. [25] narrow down as well as re-categorized SCI variables towards four most important categories which are depend on classification of the [26]: integration on internal basis, integration with suppliers, customer integration, and integration on external basis. Furthermore, [27] verified correlation among logistic integration and strategic BSRs with regard towards performance. In addition, a current study which is conducted by the [28] has pay more attention on the significance of association assurance as a most stimulating regions in place of future examination.

[10] recognized SCI as well as IT as a two important dimensions for the integrative approaches

of SC. [26] stated that SCI consists on integration of consumer or market, logistic integration, suppliers' integration, sharing integration, purchasing integration, in addition to information integration. On the word of our examination conducted on influences of different dimensions of SCI and organization performance (OP) with developing countries remain restricted, mainly inside the field of agro-food. Current studies mostly connected towards the electronic, as well as equipment producer firms into the coastal zones of China. Such as, [14] observed service-oriented and SCI transformation in the equipment manufactures of china. They were categories SCI into strategic integration and operational integration. In this way, their research results show that these mutual integrations also direct significant and progressive influence at the customer-based plus product-based facilities.

Moreover, customer as well as product-based services remain positively and significantly associated to OP. [29] have also considered functions of the reliance as well as knowledge into auto-equipment manufacturing of China. In addition, in the existing study, we can define dimensions of SCI as a BSR coordination, logistic integration, internal integration, integration of information technology, and external suppliers as well as customers' integration. After that we will demonstrate in further detail the association among these dimensions as well as OP.

Internal integration, external integration and business performance

There is integration on internal basis can identifies the various functional areas plus department in an organization must execute as a part of the integrated process. For the purpose of meeting customer demands total activities as well as functions should work together relatively than carry out inside functional specialization plus departmentalization. Therefore, joint planning, information sharing, cross-functional, and operational collaboration are very important aspects of this procedures [30]. However, external integration performs various character within SCI context. That is also identifies significances of the establishing close and interactive association between consumers and suppliers. As a result of progressively environment of dynamic market which are facing by organizations, they were respond

through emerging, selecting, for maintain fit also applying strategies, not only between internal environments, on the other hand in its outer characteristics [31]. Furthermore, in the combined SC, improvement a durable strategic associations by consumers as well as suppliers also simplify to perceptive as well as anticipation of producer's requirements, in this way too well come across its changing necessities [15].

Interchange of information on mutual basis related to products, schedules, abilities, and processes facilitates manufacturers to improve their production strategies, enhance delivery performance and productions of goods at a time. The theory of SC pay more attention on the necessities for internal functions integration, and integration with different other SC members [15]. The empirical substantiation also indicated assimilating of particular inside functions of SC which are lead to the performance on higher level [32]. Furthermore, [33] showed the various effective SCs remain those that integrated the internal procedures with their customers and suppliers. Therefore, we suggest a significant and positive association among level of the internal integration as well as external integration of OP in the context of Indonesia.

H1: The internal integration is significantly associated with the business performance of food industry of Indonesia.

H2: The external integration is significantly associated with the business performance of food industry of Indonesia.

Supplier Buyer Relationship coordination and business performance

At a current stage, background of the SBR establishment obligates undergone important variations. There are SC examiners often define these associations as a becoming closer, on the other hand terms for example alliances and association remain being used at that place opposite to traditional market interchange place [34]. Organization looking of SC influence as the sources to enhance performance have pay more attention on establishing a near associations with distributors, consumers and suppliers [35]. Consequently, there are a movement in the direction of developing long-term reliable corporations. The development of a successful BSR has also depend on

commitment, collaboration and trust between the partners of firm [36].

A trusting interdependencies in addition associations between SC participants will decrease transaction costs and enhance coordination [37]. Advantages of BSR objectives are very comprehensively documented. In this way suppliers and customers mutually perform for achieving common objectives that generate extra mutual benefits for them [38]. Therefore, cooperative associations facilitate the organizations to decrease transaction costs, attain a superior competitive position and access to the complementary resources [39]. On the other hand, establishing collaboration is very difficult task for the partners of SC and various studies reveals these related difficulties. Such as, substantial antagonism be presented in the BSR because of common distrust as well as association problems during and earlier cooperation [37, 40]. That opinions also directed towards examination to a fundamental association among BSR coordination as well as OP inside of that study. Therefore, the above discussion has become current study proposed hypothesis.

H3: The SBR coordination is significantly associated with the business performance of food industry of Indonesia.

Information technology integration, logistics integration and business performance

This study recommended that dual correlated procedures of the assimilation that producers frequently work. There are initial kind of the integration consist of organizing as well as assimilating carry out a actual flow of the distributions among consumers, manufacturers as well as suppliers [41]. There are further key types of the integration consists of backward association of IT as well as data flow from consumers towards suppliers. In this way IT contains electronic data of interchange (EDI) [42], the enterprise resource of planning (ERP) [43], and sharing of data from traditional system of control as well as planning [44]. Organizations make investment in IT for establishing the seamless entities integration within SC, by presumption of that technologies also eventually enhance OP. Several empirical studies were investigating association between integration of IT and OP.

[45] has discovered that enhanced exchanges of the information for example schedules of production, sales forecasts and levels of inventory with consumers and suppliers result in improve operational performance of firms. Therefore, we expected that a positive and significant association between IT integration and OP. So the organizations seek to develop its operational performance, this is come to be a very essential for seek inter-firms answers towards logistic difficulties. Solutions by outer emphasis appear, categorized through sharing resources, using logistics third-party as well as strong reliance on the bought-in capabilities [42].

Substance of the logistic integration also well-organized materials flow towards suppliers that also permits organizations to need a smooth procedures of production [46]. Better practices of logistics hold the transaction of trade that is permits simultaneous enhancement in service quality and economic performance [40]. Prior study recommended the logistics integration provides operating advantages through reducing entire distribution costs as well as keeping desired service levels of consumers [47]. On the other hand, preceding literature indicated that just a minimum handful studies which reveals China logistics problems [48] specifically a logistic integration by organization's consumers and suppliers. The reason is that, there is very essential to more look at the fundamental association among logistic integration as well as OP inside framework of Indonesia. Based on the previous discussion, the current study has formulated a current study hypothesis.

H4: The information technology integration is significantly associated with the business performance of food industry of Indonesia.

H5: The logistics integration is significantly associated with the business performance of food industry of Indonesia.

3. Research Framework

The above discussion has become the foundation for the development of the current study framework. The current framework is consisting of five supply chain integration (SCI) indicators namely, information technology integration (ITI), logistics integration (LOI), supplier buyer relationship coordination integration (SBRCI), internal integration

(INI), external integration (EXI). These are the independent variables of the study. On the other hand, business performance (BP) is the dependent

variable of the study. The variables are depicted in the following Figure 1.

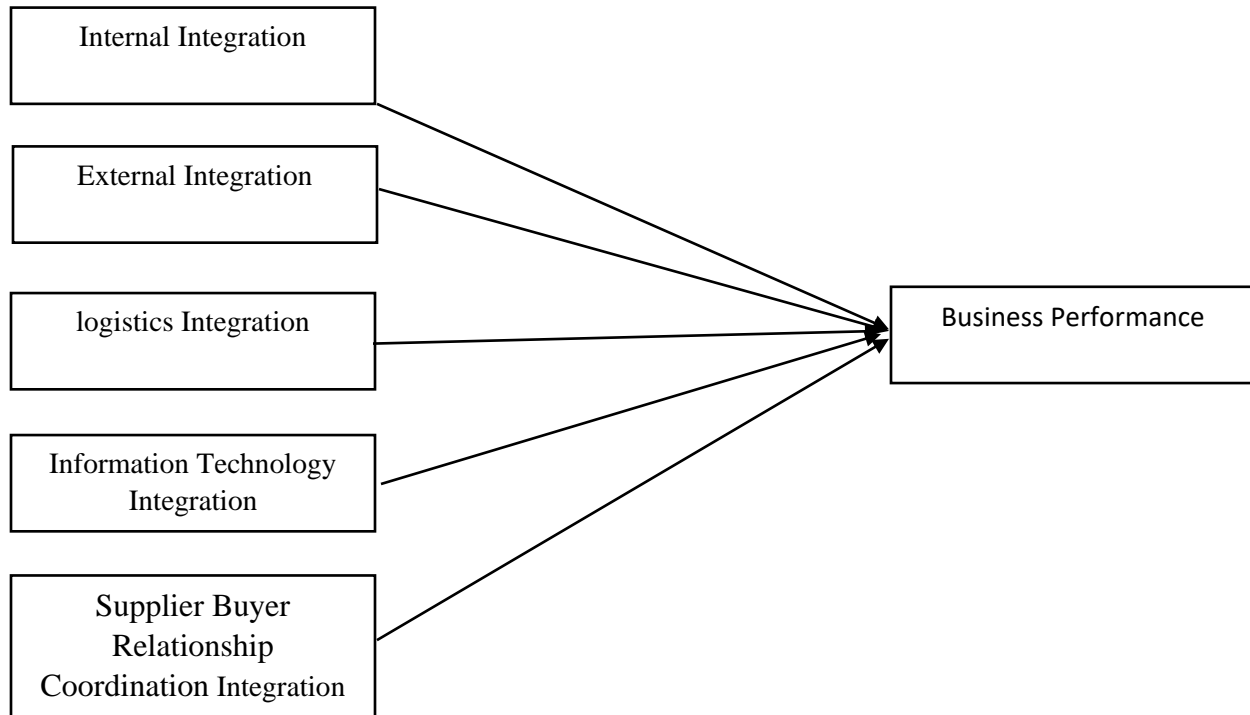


Figure 1. The research framework

4. Research Methodology

The methodology of any research is considered to be very important part of the study. There are three approaches which are used in the methodology namely, qualitative, quantitative and mix method. The qualitative research is consisting of collect data through the interview etc, in the quantitative approach the data is collected through the self-administered while the mix method is consisting of quantitative and qualitative approach. In the current study we have applied the quantitative research approach and used the cross sectional research design. As the current study is consisting of primary data. For this purpose, the data was collected from the top and middle managers by using a simple random sampling technique. The 600 self-administered questionnaire was distributed among the top and middle managers which were working in the food industry of Indonesia. Among 600 distributed questionnaires there were 450 questionnaires were valid for the analysis which yield a 75 percent response rate. The construct of the current study was

adopted from the previous studies where this instrument was already used. Therefore, this construct validity and reliability is more as compare to others. In the research instrument, internal integration was measured by three items, logistics integration measured by two items, information technology integration was measured by three items, supplier buyer relationship measured by four items, external integration was measured by four items. On the other hand, business performance was measured by ten items which were adopted from the study of [49, 50].

Analysis and Interpretation

The current study has applied the Partial Least Square (PLS)-Structural Equation Modeling (SEM) by using a smart PLS 3.2.8. In the analysis, the measurement and structural model of the study was tested. The measurement model of the study asses the reliability and validity of the model while in the structural model we test the study hypothesis. These two model are discussed below.

Measurement model

In the measurement model, we assess the convergent and discriminant validity of the study. In the convergent validity fulfill the criteria of Cronbach alpha, composite reliability (CR), factor loadings, and average variance extracted (AVE) [51, 52]. The minimum value for the Cronbach alpha is 0.7, CR is 0.7, factor loadings is 0.5 and lastly for the AVE is 0.5 [52]. The Table 1 predicted the findings of all these indicators which fulfill all the above discussed criteria's. On the other hand, for the discriminant validity there are three criteria's which are discussed in the extant literature namely, Fornell & Lacker,

cross loadings and HTMT [52, 53]. The Fornell & Lacker is square root of the AVE which have the big values among all the below values. The Table 2 has shown that all the diagonal values are greater than from the below values. Therefore, the Fornell & Lacker Criteria is fulfilled in the current study. On the other hand, for the HTMT the correlational among the construct could not be exceed from the values of 0.85 or 0.90 [53]. The Table 3 has shown that all the correlational values are lower than 0.85 which shown that construct has the discriminant validity [53]. These following results are predicted in the Table 1, 2 and 3.

Table.1 Reliability and Validity results

Constructs	Items	Loadings		CR	AVE
EXI	EXI1	0.593	0.918	0.932	0.58
	EXI2	0.763			
	EXI3	0.84			
SBRCI	SBRCI1	0.623	0.782	0.862	0.613
	SBRCI2	0.869			
	SBRCI3	0.874			
	SBRCI4	0.738			
ITI	ITI1	0.717	0.901	0.911	0.539
	ITI2	0.834			
	ITI3	0.815			
LOI	LOI1	0.879	0.886	0.929	0.813
	LOI2	0.903			
INI	INI1	0.897	0.881	0.927	0.808
	INI2	0.91			
	INI3	0.89			
BP	BP1	0.57	0.705	0.836	0.629
	BP2	0.581			
	BP3	0.514			
	BP4	0.501			
	BP5	0.603			
	BP6	0.571			
	BP7	0.706			
	BP8	0.746			
	BP9	0.746			
	BP10	0.795			

Note: EXI-external integration, INI-internal integration, SBRCI-supplier buyer relationship coordination integration, LOI-logistics integration, ITI-information technology integration, BP-business performance.

Table.2 Fornell & Lacker Criterion

	EXI	SBRCI	ITI	LOI	INI	BP
EXI	0.84					
SBRCI	0.099	0.902				
ITI	0.704	0.231	0.899			
LOI	0.351	0.153	0.173	0.762		
INI	0.486	0.29	0.398	0.577	0.783	
BP	0.065	0.599	0.122	0.207	0.182	0.734

Note: EXI-external integration, INI-internal integration, SBRCI-supplier buyer relationship coordination integration, LOI-logistics integration, ITI-information technology integration, BP-business performance.

Table.3 HTMT Criterion

	EXI	SBRCI	ITI	LOI	INI	BP
EXI						
SBRCI						
ITI	0.13					
LOI	0.842	0.254				
INI	0.402	0.171	0.189			
BP	0.639	0.343	0.504	0.679		

Note: EXI-external integration, INI-internal integration, SBRCI-supplier buyer relationship coordination integration, LOI-logistics integration, ITI-information technology integration, BP-business performance.

5. Structural Model

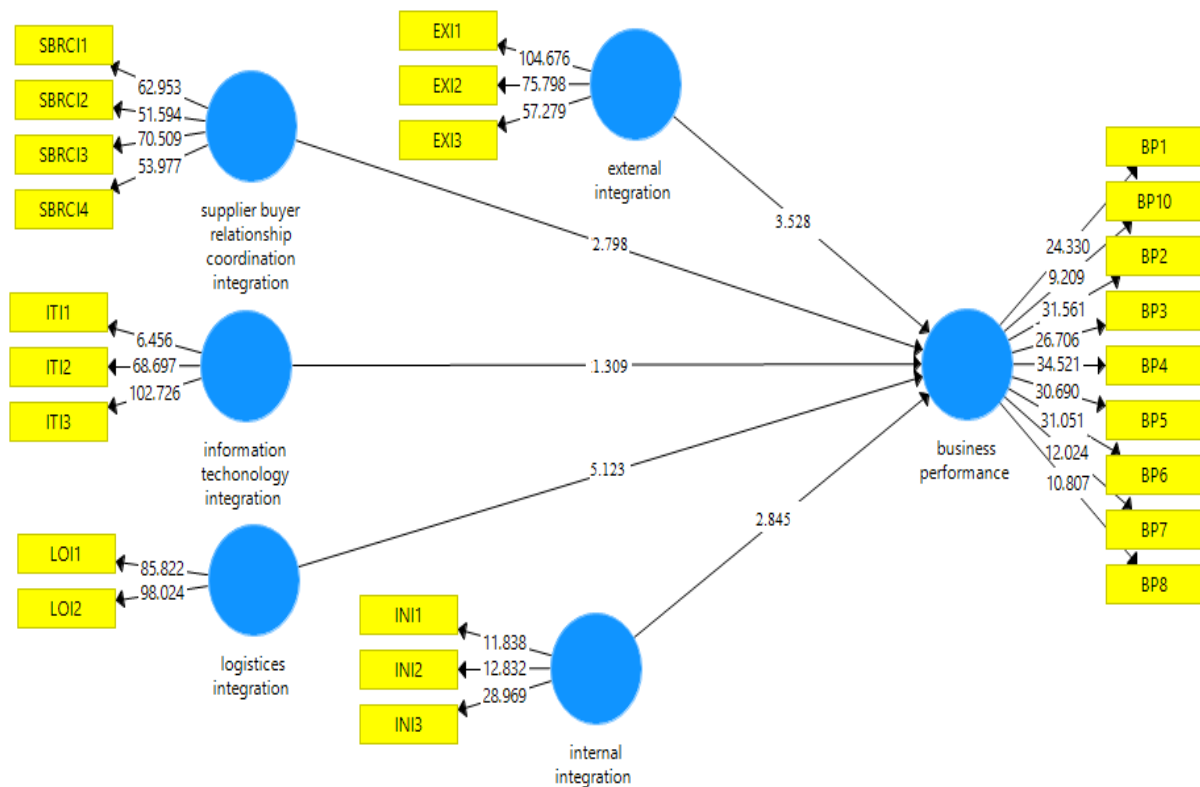
After the assessment of the measurement model, the next step is to test the structural model of the study. The structural model of the study was run by using a bootstrap 500 sampling technique. The SEM analysis of the study has shown that external integration (EXI) is significantly and positively associated with the business performance (BP) which supports the study hypothesis. Similarly, internal integration (INI) also has a positive and significant relationship with the BP that also supports to the research hypothesis. In contrast, information technology integration (ITI) did not have a significant association with the BP that does not support to the research hypothesis. A possible reason for this finding is that food industry of Indonesia has a little attention on the ITI to increase the BP. Another possible reason might be that the respondents did

not give importance on the ITI to increase the BP. On the other hand, the logistics integration (LOI) has a positive and significant relationship with the BP that supports to the research hypothesis. In the same vein, supplier buyer relationship coordination integration (SBRCI) also has a positive and significant relationship with the BP that supports the hypothesis of the study. The overall findings of the study have shown that (H1, H3, H4, H5) are supported while (H2) is rejected. Therefore, these findings indicate that food industry of Indonesia paid a greater importance on supply chain integration (SCI) to increase the BP because most of SCI indicators have a positive and significant relationship with the BP. This shows that food industry of Indonesia has paid a greater importance on the SCI to increase the BP. All of the results are depicted in the following Table 4.

Table.4 The structural Model Results

	Beta	S.D	T Statistics	P Values	Results
EXI->BP	0.250	0.071	3.528	0.000	Supported
INI> BP	0.255	0.087	2.845	0.005	Supported
SBRCI-> BP	0.203	0.076	2.798	0.007	Supported
ITI>BP	0.065	0.050	1.309	0.191	Not Supported
LOI-> BP	0.291	0.056	5.123	0.000	Supported

Note: EXI-external integration, INI-internal integration, SBRCI-supplier buyer relationship coordination integration, LOI-logistics integration, ITI-information technology integration, BP-business performance.

**Figure.2** Structural Model

6. Conclusion

The performance is considered to be an important part of the business for their long term survival. For this purpose, the supply chain integration (SCI) is considered to be an important part to increase the performance of the organization. To address this issue, the current study purpose is to investigate the impact of supply chain indicators on the business performance (BP) of food industry. For this purpose, data has been collected from the top and middle managers which were working in the food industry of

Indonesia. The key findings of the study have shown that all the SCI indicators have a direct positive and significant relationship with the BP except information technology integration which has insignificant association with the BP. Therefore, this hypothesis is rejected while other four hypothesis of the study is accepted. Based on these findings, the current study contributed a body of literature in the form of empirical findings in the field of SCM which could become a new area of research in future. Moreover, the current study could provide help to the researchers and policy makers to know about the

importance of the SCI for the BP in future research. Along with these contributions, the current study still has some limitations which could explore the new area of research in future. Firstly, the current study was limited on the direct effect, there are various other moderating and mediating variable which could provide help to increase the BP. Therefore, a future study along with these exogenous variables could be established with the moderating or mediating effect. Secondly, the current study is limited on the cross sectional research design in which data is collected at first time, a future research could be established on the longitudinal research design.

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