The Impact of Health Supply Chain Management Activities on the Health Service Qualities of the Indonesian Health Industry

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The aim of the current study is to investigate the impact of health care supply chain management (HSCM) activities on the health service quality (HSQ) of Indonesia. For this purpose, data was collected from 500 supply chain managers which yielded a 68% response rate. Structural Equation Modelling (SEM) has shown that there is positive and significant relationship among the specification, after service supply, standard and health service quality in the Indonesian health service sector, while two components, supplier and delivery have insignificant association with the HSQ in the Indonesian health industry. These findings provide information about the importance of health care supply chain management activities to increase the HSQ. These findings could have added a body of knowledge which could provide help to conduct research in future. The research limitations and future directions were also discussed at the end of the study.

Key words: *Specification, supplier, after scale service, standard, delivery, health service quality, Indonesia, health industry.*

Introduction

The Indonesian health department is extensively focusing on the provision of health care services to all of the population in the forthcoming decade. This process identifies the major areas to ensure a highly productive and fair health framework which is sustainable, effective and adaptable to fulfil the health needs of the changing population between now and 2035 (Chen et al., 2019). It is worthy to mention that the Indonesian health sector in the course of the most recent 20 years has seen exceptional extension, especially at the essential

consideration level. Generally, funding was biased which assists the healthcare and focused on urban areas before 2005.

In this regard, the government of Indonesia established this centre along with the implementation of health extension program which boosted health posts from merely 4211 of in 2004/05 to 16048 in 2012-13 along with the availability of advanced health units of specialists to provide the precautionary and advanced level of administration of health (Christensen, Jablonski, & O'Hara, 2019). It has been established earlier before the development of health emphasis and the introduction of the latest level of care inside the necessary medical service units, managers and facilities which require a considerable amount of money and human resources. Over the last two decades, extensive research has highlighted the lack of a basic health care workforce nationwide, along with a need in enhancing the facilities for doctors ((Getele, Li, & Arrive, 2020). Therefore, across the country, assessment of healthcare supply chain management (HSCM) organisation was carried out in order to pinpoint disruptions regarding the purchase, storing and appropriateness of products related to healthcare. These issues are caused due to inappropriate purchasing, lack of transportation management data context and, lack of human resources in the Federal Ministry of Health (FMoH). Services related to supply are not sufficient, and finally, the inappropriate strategies both within the bureaucracy and government of provinces (Patience, Helliwell, & Siddle, 2018). Interestingly, the assessment revealed that the long lead time in procurement, showed that the existing framework had insufficient capacity and unsufficient non-systematic distribution were the leading causes in supply chain management in healthcare across the country (Norazlan, Habidin, Roslan, & Zainudin, 2014). Therefore, it is necessary for the individuals working in the supply chain framework to develop understanding in what personnel cho0se, get, store and deliver in order to meet the needs of customers (Moons, Waeyenbergh, & Pintelon, 2019; Wiyati et al., 2019; Sessu, Sjahruddin & Santoso, 2020). Thus, the present study is focused in examining the present prevalence of supply chain management. Additionally, the study also seeks to create an in-depth understanding and acknowledge the supply chain managements implications in health.

Literature Review and Hypothesis Development

Supply chain management regarding healthcare products has become an important domain for practitioners (Fugate, Sahin, & Mentzer, 2006). These play a vital role and are necessary for the surveillance of world-class medical activity (Simsekler, 2019). These practices require appropriate execution in order to achieve the objectives. Previously, it has been identified that these practices are significantly neglected by the pharmaceutical industry and particularly regarding their usability and capacity prerequisites, and the inclusion of such a large number of players in determining and utilising key process-territories (Seow, Choong, & Chan, 2018). A study has signified the importance of having well-structured inventory management

for hospitals. Further, study has also suggested considerable penalties for old fashioned hospitals acquiring outdate products (Chen et al., 2019; Norazlan et al., 2014).

A study has presented a framework regarding the association between healthcare supply chain management practices, rules and approaches; as well as its influence in a company related to healthcare (Zhu, Sarkis, & Lai, 2012). It is worthy of mentioning that the health care sector is confronted with the complexities regarding the latest prerequisite which is linked with the service quality of health such as low satisfaction of customers with the quality of service, reimbursement claims and a competitive environment (Kristiansen & Santoso, 2006; Zailani, Jeyaraman, Vengadasan, & Premkumar, 2012). The aforementioned aspects are contributing towards the low quality of hospitals which pressures these organisations to embrace or find their feet in a system which is beneficial for them to fulfil the demands, allocate the resources, embrace persistently happening changes, technology-related developments and continually increase the service quality in healthcare aimed satisfying the customer in the most expedient manner possible. Previously studies have put forward that healthcare supply chain practices are important and it is increasingly becoming necessary for the management of both public and private hospitals to embrace them in order to promote and assist healthcare in Ethiopia (Gbadeyan, Boachie-Mensah, & Osemene, 2017; Morali & Searcy, 2013; Robinson & Malhotra, 2005).

Health supply chain management fundamentally monitors the flow of information, products and services, quality and materials. It is worthy to mention that the healthcare industry in Indonesia is confronted with a bundle of challenges, particularly in the domain of supply chain management. Notably, these issues can be fixed with effective operational and managerial decision making (Rakovska & Stratieva, 2018). In this regard, the prominent issues of the supply chain are associated with the uncertainty which happens due to the decision making by the other partners involved in it. Further, it also happens due to the absence of collaboration among parties (Zahiri, Tavakkoli-Moghaddam, & Pishvaee, 2014). In the global scenario in the healthcare market, almost every patient asks for the optimal quality and services which need to be established in developing countries as well in order to fulfil their needs (Chen et al., 2019; Ensor & Cooper, 2004).

the relevant findings of Hong et al., (2010) found that the healthcare supply chain is confronted with the absence of finance availability and guaranteed collaboration of admin staff and its members. Going on further, the authors also recommended that healthcare supply chain and the association betweentalented individuals will positively affect the system to develop information and also foster the culture of partnership to incorporate the healthcare supply chain and services particularly in Ethiopia. Previously, four models have been debated regarding the healthcare supply chain and more than seven countries in Europe executed these.

The study conducted by James and Ayers (2010) according to whom the (Mishra, Gunasekaran, Papadopoulos, & Childe, 2018; Andriana et al., 2019) provision of optimal healthcare services is vital and must be allocated sufficient resources for the planning and execution of organisational goals, and to harness the ability of individuals as well. However, in order to develop more resources, the association between the public and organisations in healthcare are acting as a key driver in the advancement of the quality of services in such organisations (Cook, Heiser, & Sengupta, 2011). It should be kept in mind that developing an understanding of the healthcare system as it complex system might take a considerable amout of time and cognitive ability. Further, it asks for extraordinary efforts to be carried out in order to promote positive outcomes and it requires the provision of optimal services from administration staff as well (Getele et al., 2020; Kritchanchai, 2012; Yap & Tan, 2012).

Previously a study has examined the interior supply chain facilities and how the innificient operation of these facilities resulted in loss of effectiveness in healthcare organisations (Dobrzykowski, 2010). Going on further, the study also established that there are various supply chain aspects which can lead towards failure such as the absence of standardised processes, non-productive processes, absence of quality, inappropriate usage of equipment and lack of collaboration between the organisational departments when they do not actively emphasise on efficient workflows. The provision of the quality medication has been identified as a responsibility of organisations and need of modern nations. The quality medication must be available persistently. It must be available in appropriate measures and should be affordable for individuals. Sustainability of the supply chain is necessary in order to fulfil the needs of individual for quality medication (Hatt, Makinen, Madhavan, & Conlon, 2013; Robinson & Malhotra, 2005). Accordingly, the ministry established semi-independent elements such as medical stores at a national level and provision of funding to the pharmaceuticals in Ethiopia which oversees the storage, distribution, purchase of medicines and related supplies nationwide (Bimha, Hoque, & Munapo, 2020; Roth, Tsay, Pullman, & Gray, 2008).

Previously a study has compared the healthcare sectors, namely; public and private. Further, the study employed that total healthcare quality management was evident in the aforementioned sector (Obeidat, 2015; Wasswa & Namulindwa). Similarly, another study has investigated the effectiveness in health sectors and assessed the five aspects of wheret his effectiveness is shown namely; how responsive is it, its empathy, assurance and how much reliable the system is; finally, the study examined the tangibility of health sectors (Odhiambo, 2014). The results of the study pointed out that the health sector's quality and its level moderately influence the performance of the health sector. In addition, the study suggested that the quality of services provided, empathy, response and assurance also moderately influence the performance of health sectors. Aforementioned literature specifically discusses

the health supply chain management to show the underlying theoretical mechanism through which products and service quality do influence supply chain management in healthcare.

First of all, information streams into an organisation in healthcare regarding the required product. Later on the product is produced and distributed among the distributors, and finally, it is distributed among the hospitals and in similar sectors. Previously various studies (Bhakoo & Choi, 2013; Gbadeyan et al., 2017; Kwon, Kim, & Martin, 2016) reported that the productive role of suppliers of the healthcare supply chain has significantly altered healthcare quality globally. The study also contended that the healthcare supply chain details also do influence the quality in Indonesia's health sector. Therefore, the present study hypothesises that:

H1: Quality of healthcare services is positively and significantly influenced by the healthcare supply chain specifications

Currently, healthcare companies and hospitals are in search of the latest sources to reduce their costs and become competitive. Therefore, it is very necessary to study the aspects of the healthcare supply chain and put forward the aspects which can improve the service quality for optimal patient care (Adebanjo, Laosirihongthong, & Samaranayake, 2016; Jayachandran, 2009). The supply chain of healthcare should assure the accomplishment of end-to-end sensitivity of information among the supply chain members. Based on the above-mentioned literature, it is hypothesised that:

H2: Quality of healthcare services is positively and significantly influenced by the suppliers
The study also acknowledged that the dimensions of supply chain do influence the healthcare system, particularly in Indonesia's context. The study findings are consistent with the existing literature on the supply chain in healthcare. The dimensions of the supply chain tend to improve the healthcare quality and standard of such organisations as well. These arguments are backed by the previous study (Odhiambo, 2014), which also contends that the healthcare supply chain will enhance the Indonesian healthcare service quality.

The current study postulates that the maintainability and competence of a diagonal investment lie in the reinforcement of the PHC system, as demonstrated, in sub-Saharan African countries. Additionally, it is also anticipated that Indonesia's health sector can also scale up the revenue of the public and uplift their livelihood by providing them with access to various opportunities regarding employment in healthcare. It is established that the healthcare supply chain standard has a positive influence on the Indonesian healthcare sector and these arguments are supported by previous studies (Ensor & Cooper, 2004; Lu et al., 2020; Mustaffa & Potter, 2009; TESFAYE, 2015; Santoso et al., 2020).

Therefore, from the above-mentioned literature, it is hypothesised that:

H3: Healthcare supply chain management positively and significantly influence the healthcare supply chain standard

Supply chains regarding healthcare also do influence the eastern Indonesian healthcare quality. It is backed by the previous study (Gbadeyan et al., 2017; Hameed & Mohammed, 2017; Scavarda, Daú, Scavarda, & Korzenowski, 2019) according to whom the on-time delivery of health-associated facilities in Ethiopia is linked with the optimal healthcare and after-sale services as well. The study also contended that after-sales service also influences the quality of services in Indonesia's healthcare sector. Hence, in light of the above-mentioned literature, it is hypothesised that:

H4: There is a constructive and significant influence of healthcare SC delivery on the HSQ.
H5: There is a positive and significant effect of healthcare SC after-sale service on HSQ.

Research Framework

Based on the previous discussion, the research framework of the study has been formulated. The current framework of the study consisted of five independent variables and one dependent variable. The specification, delivery, supply, standard, after supply service, are independent variables while health service quality is the dependent variable of the study.
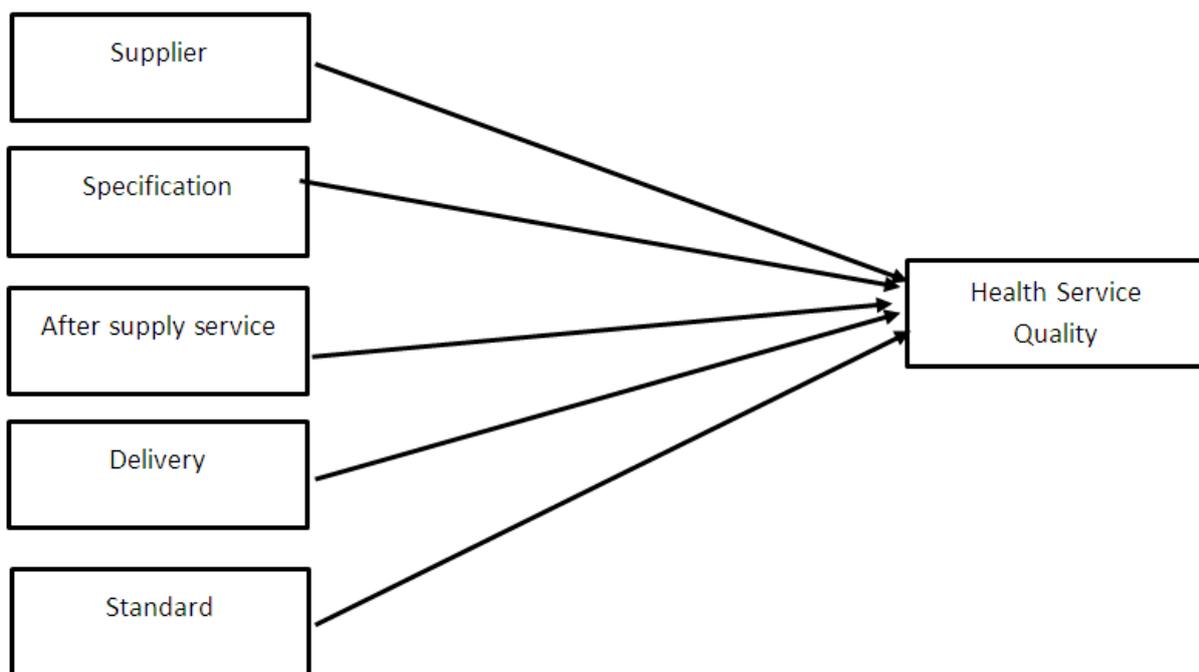
Figure 1. Research Model

Figure 1 is showing the research model and also describing the association between the independent and dependent variables.

Research Methodology

The current study used cross-sectional research design and a quantitative research approach. In the current study, the model and hypothesis was tested in the health care sector of Indonesia. The health care sector of Indonesia has been recognised as an important sector in Indonesia. For the data collection, the 500 questionnaires were distributed among the supply chain and procurement managers of the health care sector of Indonesia by using the purposive sampling technique. Among the 500 questionnaires, 340 questions were returned ,which yielded a 68% response rate. As, a questionnaire was used for data collection and it consisted of two sections which are as follows: The first section consisted of the demographic information of the respondents. The second section consisted of the questions regarding the variables under study. The questionnaire was measured by a five-point Likert Scale which was ranged from 1 strongly disagree to 5 strongly agree.

Analysis and Discussions

In the contemporary environment, PLS-SEM is an important technique for data analysis in the field of social sciences. Therefore, various previous researchers Patidar and Din (2018) and Ahmed, Zin, and Majid (2016) have suggested that when there is need ofnovelty in the research model or any new advancement in the existing phenomena, then the PLS-SEM technique is considered to be important for multiple regression analysis (Hair, Sarstedt, Hopkins, & G. Kuppelwieser, 2014b). The PLS-SEM is considered to be a two-step process, in which one is the inner model and another one is the outer model as evident in previous studies Patidar and Din (2018) and Ahmad, Bin Mohammad, and Nordin (2019) and Henseler, Ringle, and Sinkovics (2009). In the first step of the model, we check the model reliability and validity. In the second process, the structural model of the study is formulated to test the study hypothesis. In the assessment model, there are the following criteria's, if these criteria's are being fulfilled then, the model is considered to be validated. The minimum value for the factor loading is 0.5, for the average variance extracted is 0.50, for the composite reliability is 0.70 and for Cronbach alpha the result is 0.70 (Hair, Hollingsworth, Randolph, & Chong, 2017). Table 1 predicted the value of all the above discussed suggestions. Therefore it could be explained that the model has convergent validity. On the other hand, the discriminant validity of the model is measured by following three criteria's. One is the fornel lacker which shows that all the diagonal values should be greater than the other values. In addition, for the HTMT the correlation among the construct should be less than 0.85 (Hair, Hult, Ringle, & Sarstedt, 2014a; Hair et al., 2014b). Table 2 and Table 3 show that the construct has fulfilled the criteria of all the recommended values

which show that the construct has discriminant validity. Therefore, it could be argued that construct is considered to be important because it fulfilled all the criteria's of the study (Henseler, Ringle, & Sarstedt, 2015). All of the values for the convergent and discriminant values are depicted in the Table 1, 2 and 3.

Table 1: Confirmatory Factor Analysis

Constructs	Items	Loadings	Alpha	CR	AVE
Specification	SPE1	0.785	0.776	0.85	0.554
	EP2	0.827			
	EP3	0.840			
Supply	SUP1	0.675	0.885	0.898	0.565
	SUP2	0.433			
	SUP3	0.504			
Standard	STA1	0.692	0.903	0.915	0.524
	STA2	0.717			
	STA3	0.589			
Delivery	DEL1	0.791	0.845	0.884	0.526
	DEL2	0.807			
	DEL3	0.723			
After scale service	ASS1	0.617	0.76	0.821	0.53
	ASS 2	0.784			
	ASS3	0.757			
Health service quality	HSQ1	0.764	0.770	0.833	0.50
	HSQ2	0.754			
	HSQ3	0.685			
	HSQ4	0.748			
	HSQ5	0.780			
	HSQ6	0.670			
	HSQ7	0.780			
	HSQ8	0.890			
	HSQ9	0.790			
	HSQ10	0.893			
	HSQ11	0.710			
	HSQ12	0.723			
	HSQ13	0.745			
	HSQ14	0.872			
	HSQ17	0.902			
	HSQ24	0.913			

Note: is presenting the values for 'factor loadings', 'composite reliability (CR)' and 'average variance extract (AVE)'. If factors loadings are greater than 0.50 it adds to the convergent validity of measurement [35]. Table 1 and figure 2 show that all the factor loadings are in an acceptable range. For convergent validity, the values for CR and AVE should be greater than 0.8 and 0.5 respectively [36], and all the values for CR and AVE are within an acceptable range which established the studies' convergent validity.

Table 2: Forner Lacker Discriminant Validity

	ASS	DEL	HSQ	SPE	STA	SUP
ASS	0.896					
DEL	0.676	0.895				
HSQ	0.386	0.748	0.687			
SPE	0.751	0.797	0.631	0.899		
STA	0.716	0.754	0.670	0.834	0.763	
SUP	0.763	0.790	0.450	0.804	0.603	0.811

Note: after supply service, Del-delivery, HSQ- health service quality, SPE-specification, STA-standard, SUP-supply.

Table 3: HTMT Discriminant

	ASS	DEL	HSQ	SPE	STA	SUP
ASS						
DEL	0.476					
HSQ	0.286	0.248				
SPE	0.551	0.297	0.231			
STA	0.312	0.554	0.457	0.614		
SUP	0.264	0.69	0.35	0.684	0.303	

Note: after supply service, Del-delivery, HSQ- health service quality, SPE-specification, STA-standard, SUP-supplier.

Structural Model

The next steps in assessing the structural model are to examine the hypothesised relationships among constructs in the measurement model. The model explanatory power was resolute through inspecting how well the observed data fit the hypothesised relationship among the constructs. Following, (Min & Mentzer, 2004), bootstrap the re-sampling approach has been hired to test the significance of each coefficient. As recommended by (Lee & Fernando, 2015), five thousand duplications using the randomly selected subsamples which were performed to test all the hypothesised relationships. Table 4 depicts the beta coefficients and t-values for the first 4 direct hypotheses.

The SEM analysis has shown that after scale service (ASS) has a positive and significant association with the health service quality (HSQ). Similarly, specification (SPE) also showsa positive and significant association with the HSQ. In the same vein, standard (STA) also has shown positive and significant association with the EP. On the other hand, delivery (DEL) has an insignificant association with the HSQ. Also, supplier (SUP) has an insignificant association with the HSQ. Thus, these findings indicate that Indonesia's health care sector has paid a significant role in health care supply chain management activities which provide help to increase the health service quality. All of the results are depicted in the following Table 4.

Table 4: Direct Effect of the Model

	Beta	SD	T Statistics	P Values
After scale service -> Health service quality	0.574	0.07	8.159	0.000
Delivery -> Health service quality	0.135	0.075	1.796	0.073
Specification -> Health service quality	0.192	0.076	2.516	0.012
Standard -> Health service quality	0.218	0.064	3.426	0.001
Supplier -> Health service quality	0.119	0.087	1.364	0.173

Note: after supply service, Del-delivery, HSQ- health service quality, SPE-specification, STA-standard, SUP-supply, p<0.05

Figure 2. Direct effect of structural model
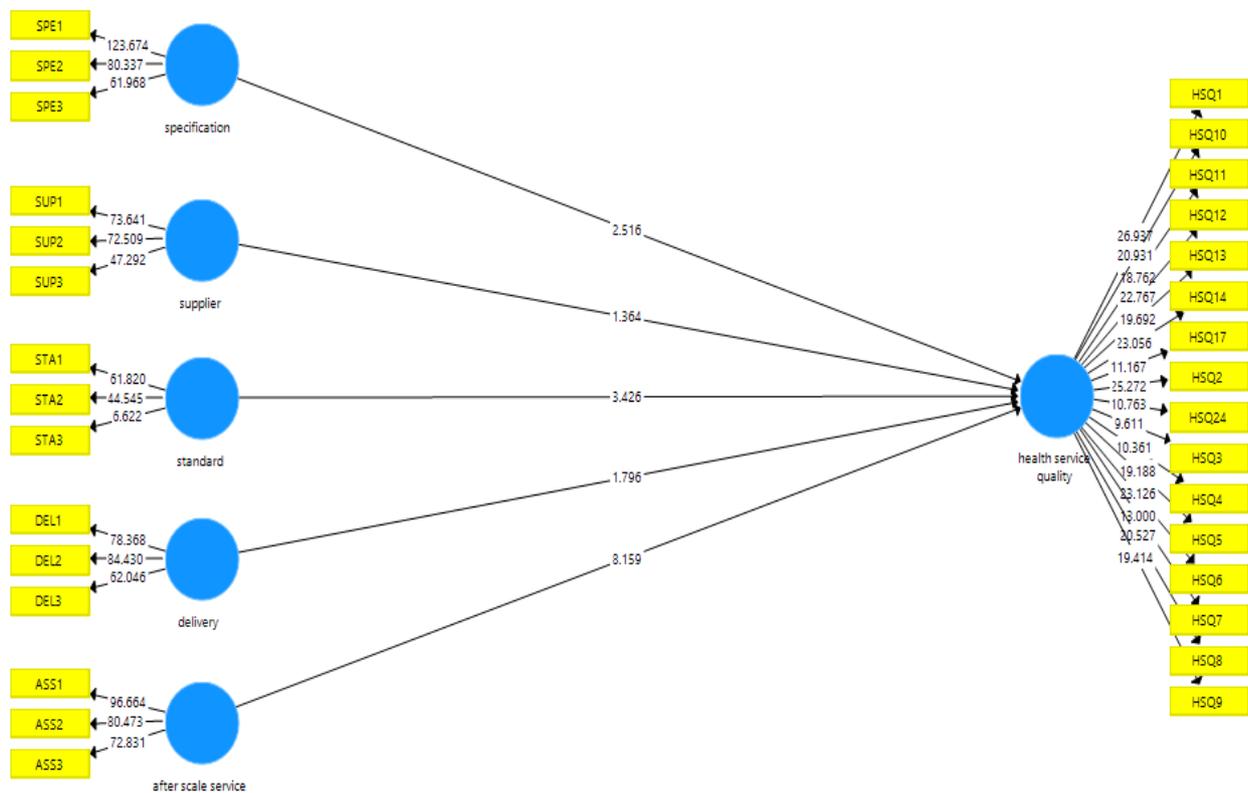
Conclusion

The aim of the current study is to investigate the impact of health care supply chain management (HSCM) activities on the health service quality (HSQ) of Indonesia. To achieve this objective, five hypotheses were formulated. Among the five hypotheses, three hypotheses of the study were accepted, but two hypotheses of the study were rejected. The three hypothesis, after supply service, specification and standard have a positive and significant association with the health service quality, while two hypotheses, delivery and supplier have an insignificant association with the HSQ. Thus, these findings indicate that the health sector of Indonesia must realise the significant role that health related supply chain activities have on quality because most of the components have a positive and significant association with HSQ. These findings could also provide help to the supply chain managers to know about the importance of supply chain-related activities which could increase the HSQ. Based on the findings of the study, there are some limitations which could provide help for future research. Firstly, the study was limited on one industry which could not be generalised on other sectors which are service nature, therefore, to increase the generalisability, a comparative study could be conducted on the manufacturing and service sector. Secondly, the study was limited on direct effect, several other variables could contribute to this relationship, therefore, future research with the moderating and mediating variables could be established. Thirdly, the study was cross-sectional in nature in which data is collected at one time, to increase the generalisability of the findings, future research could be established as being longitudinal in nature.

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