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Effect of Supply Chain Management Practices and SMEs Performance: Moderating Role of Information Technology Capability

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ABSTRACT
Small and Medium Enterprises' (SMEs) Performance has emerged as a significant subject of discourse in today's global business environment. This is because some SMEs fail within their first five years of existence while some go into extinction between their sixth and the tenth year. Only a portion scales through, flourishes and grows to maturity. This study examined the effects of supply chain management practices (SCMP) on SMEs performance in Kaduna State, and the moderating influence of IT capability. The study adopted a survey research design and took a quantitative approach. The study population consists of 539 manufacturing SMEs in Kaduna State. A sample size of 223 was arrived at utilising Dillman et al's. (2014) sampling formula. In order to decrease sampling error, the sample size was increased by 30% to 289. A self-administered structured questionnaire was used to solicit responses from respondents. Data was analysed using PLS-SEM version 3.0. The study found that Lean Practice has positive and significant relationship with SMEs Performance while Quality of Information Sharing has positive and insignificant relationship on the performance of SMEs. The interaction between Information Technology Capability, Quality of Information Sharing and SMEs Performance was significant while with Lean Practice it is positive and not significant. The study recommends that Government and Stakeholders should direct their effort to selecting the right capabilities to enhance performance of SMEs.

Keywords: Quality of Information Sharing; Lean Practice, SMEs Performance and Information Technology Capability.

1.0 INTRODUCTION

Performance of SMEs is vital to the accomplishment of sustainable growth and development of every nation. Okafor (2020) states that the wealth of a nation, as well as their growth and development, is strongly associated with performance of SMEs. SMEs are engine room for economic development and growth, being avenues for employment generation, and innovations and wealth creation stimulation (Offiong et al., 2019). SMEs are catalysts for the provision of quality products (Katonáné et al., 2018); they have potentials to enhance progress since they are the backbone of development and industrialisation of economies (Okafor, 2020).

In most countries, SMEs have a large proportion of a country's work force, because they create employment opportunities. The Organization for Economic Cooperation and Development (OECD, 2017) reports that 98% of businesses in OECD countries are represented by SMEs, they create 70% of employment opportunities, 45% of net total employment and 33% of Gross Domestic Product (GDP) in developing countries. SMEs in Nigeria constitute about 80% of total number of businesses and employ 75% of the workforce (PWC MSMEs survey, 2020).

In Nigeria however, Oyelaran (2010) posits that SMEs contribute approximately 1% of the country's GDP compared to 40% in Asia and 50% in the USA. This implies that SMEs in Nigeria face challenges that hamper their performance. SMEs contribute about 57% to GDP of developing countries like South Africa (Gamba, 2019; OECD, 2017); and about 70% to the GDP of Ghana (Emieze 2017; Abor & Quartey 2010). However, taken together Micro Small and Medium Enterprises (MSMEs) contribute 49.78% to GDP in Nigeria (SMEDAN/NBS, 2017). MSMEs account for 99.82%, out of which SMEs account for only 0.18%, which implies that SMEs only contribute 1% of the GDP in Nigeria (Oyelaran, 2010; Banji, 2020). This suggests that there are issues behind the slow growth of SMEs in Nigeria. Based on this, it is clear that the contribution of SMEs to Nigeria's GDP is very poor.

SMEs in Nigeria fail within their first five years of existence while some go into extinction between the sixth and tenth year. Only a portion of about five to ten per cent pulls through, thrives and grows to maturity stage as is expected (Gumel, 2019). The high rate of failure of Nigerian SMEs also signifies that SMEs perform below their potentials (Obim & Atsaye, 2020; SMEDAN/NBS, 2017). Adebiyi et al. (2021) and Okon (2018) attributed poor performance of SMEs and low GDP contributions in Nigeria to numerous challenges, including outdated technology, difficulty in accessing useful and adequate information, and weak application of supply chain management practices (SCMP).

Despite an outstanding improvement in certain areas of SMEs operations in Nigeria, challenges still persist that impede the growth and development of the sector. In line with this, the just concluded SMEDAN/NBS 2021 report revealed that despite the marginal increase of 3.7% in employment between 2017 and 2020, there was a decrease of

3.5% in its contributions to GDP. It also revealed a 4.5% decrease in the number of businesses operating in the country as there were 39,654,385 businesses in 2020 when compared with 41,543,028 in 2017. This implies a decline in the growth and development of SMEs in the country. Shettima *et al.* (2020) showed that there are disparities in the employment generation trends among SMEs operating in Kaduna State. This is as a result of in-equity in finance, policy discontinuity, insecurity, lack of awareness, ineffective Market linkages and many more. Patrick (2014) asserted that, sustainability of emerging SMEs in Kaduna State is greatly threatened by several factors such as poor access to raw materials. In addition, SMEs are struggling to survive by reducing cost thereby producing substandard quality products and also reducing the quantity of what they produce, which results to poor patronage and thereby reducing profit and customer satisfaction.

Healthy supply chain management practices enhance SME performance (Ateke & Nwiepe, 2017). SCMP revolves around efficient flow of goods, service, information and money to the business with the aim of providing right product to right customers at the right cost, right time, right quality and quantity (Thoo et al., 2017). It provides flexibility and swiftness in responding to consumer demand shift without cost overlay in resource utilisation (Curto & Gaspar, 2021). SMEs in Nigerian are bedeviled with scarcity of raw materials, high cost of production, and transporting finished goods to final destinations (Federal Ministry of Labor and Productivity, office Kaduna, 2022; Jacobs, 2018; Raji, 2018). This suggests that the identification and adoption of appropriate SCMP could rewrite the success story of SMEs in the country.

Healthy SCMP like Quality of information sharing and lean practices could enhance performance of SMEs by assisting them to identify needs and requirement of present and prospective customers (Abeh, 2017), creating a system such as introducing information technology capability to harness timely availability of products through good information dissemination, avoiding wastes and delays that add up to quality, value, growth, sustainability and competitive advantage of SMEs. As such, this study examined the effect of supply chain management practices on SMES performance: moderating role of information technology capability.

2.0 LITERATURE REVIEW

2.1 Concept of Supply Chain Management Practices (SCMP)

Supply Chain Management Practices (SCMP) involves company activities aimed at enhancing movement of raw materials from sources of supply through to delivery of finished products to consumers, including sourcing and procurement, production scheduling, order processing, inventory management, transportation, warehousing and customer services (Ateke & Didia, 2017). Thus, SCMP are steps taken by firms to increase their efficiency and effectiveness.

SCMP influences the ability of firms to design, develop and promptly deliver customers value. Li et al. (2015), as cited in Ateke & Didia (2017), states that SCMP is strategic essentials for firms in this era of time-based competition because they influence

the whole supply chain, essential parts of it, or key processes in it. As the operating environment gets more challenging, the demand on firms to improve their business operations in order to remain competitive also gets stronger. SCMP has the potential to stand firms out of the competition (Lori & Daniel, 2011). SCMP relies on business processes and structures that facilitate speed, adaptation and robustness. It is thus multifarious. This study focuses on Quality of Information Sharing and Lean Practice as dimensions of SCMP.

2.2 Quality of Information Sharing (QIS)

Quality of information sharing refers to the extent of which the information flow and exchange is accurate, timely, adequate, and credible (Li et al., 2005). Sanders, Autry and Gligor (2011) anticipated that the ultimate cause of achieving good firms' performance is by sharing truthful information at a strategic and operational level. In a comparison study, the firms that practiced information sharing achieve better performance than the firms that do not. Information quality is a crucial aspect within the organisation. There is a need in the organisation to use information strategically as an asset, that has the potential to impact the performance of organisation (Khan & Siddiqui, 2018). Information shared is problem solved without which can result in a lot of disaster; the vitality of information sharing among supply chain and across department and partners is very crucial for SMEs Performance especially in a developing nation.

2.3 Lean Practices (LP)

Lean practice is an approach to managing an organisation that supports the concept of continuous improvement, a long-term approach to work that systematically seeks to achieve small, incremental changes in processes in order to improve efficiency and quality, thus eliminating all waste in the business processes and strategies. The adoption of lean supply chain practices improves the organisational performance. Lean supply chain needs to be embraced to help the management team appreciate the direct impact of these initiatives (Muchiri, 2023).

Lean practice is regarded as process of eliminating waste time as well as resources in the production process (Wijetunge, 2017). Besides, a lean practice can be considered as a value, an ethos, a philosophy, a management concept, a work culture, and a methodology (Wilson & Roy, 2009). Nowadays, lean practice means a management approach which develops all the processes within the organisation at every level. According to Lewis (2000), the lean practice facilitates in removing all waste, stops shortages, minimises lead time, enhances stock turnover, and ensures customer satisfaction. The lean practice has a positive influence on organisational performance (Wijetunge, 2017). James and Daniel (1996) stated that lean practice can be utilised to solve drastic organisational challenges and can be a powerful tool to harness and combine multiple change initiatives that are running through. Most organisations pursue lean production in response to their need to fundamentally improve business competiveness by reducing costs while increasing quality and customer responsiveness including meeting delivery time. Lean production techniques

provide one of the most significant methods to improve overall business performance in the up and downstream of business. These techniques are applicable to operations, production/maintenance, operations and facilities construction as well as the suppliers (contractors, service companies, construction companies) businesses that support these operations.

2.4 Concept of SMEs Performance

Performance is a fundamental area of interest in any organisation that has been studied for a long time (Aboazoum et al., 2015). Lebas and Euske (2002) defined performance as "doing today what will lead to measured value outcomes tomorrow." A firm's performance is an important dependent variable in business research (Rauch et al., 2007). The performance of a firm can be viewed from several different perspectives, and various aspects can jointly be considered to define firm performance. Assessing a firm's performance and its measurement is difficult, because performance refers to several organisational outcomes, which include both subjective and objective elements.

SME performance basically measures the extent of the performance of a firm - either increase or decrease measure in financial and non-financial indicators. However, as performance measurements are used at each level of the firm (Fakhri et al, 2009), SME performance in this study represents non-financial performance pointers, including customer satisfaction, growth, sustainability and quality.

2.5 Supply Chain Management Practices and SMEs Performance

The fundamental principle of SCMP involves system that integrates thinking of material flows from producers of raw materials down the chain to final consumers (Mukhamedjanova, 2020). The contemporary assessment of SCM focuses on partnership with suppliers, procedure for outsourcing, solidifying cycle time, continuous process flow, as well as technology and information sharing (Ibrahim & Hamid, 2014).

Also, the studies on procuring quality by Mohammadi, Sahrakar &Yazdani, (2012); Akani, & Agburum, (2020), revealed that information sharing positively and significantly relates with customer satisfaction. The study therefore concludes that, there is a significant relationship between information sharing and marketing effectiveness of SMES in Rivers State of Nigeria and recommends amongst others that adoption and usage of information sharing that will enhance customer satisfaction in SMEs should be implemented by SMEs. That is, SMEs should be in position to continuously weigh the benefits that accrue from application of information sharing to ensure periodic redesign and improvement to attract customers' satisfaction. The results indicate that using information technology tools is effective on the capabilities and hence performance of the supply chain. It is not enough to utilise quality of information sharing because information is based on the power of IT capability to capture the necessary information needed within and outside the organisation to improve performance.

Hypothesis was stated thus: Empirical studies have been carried to unlock the connection between SCMP and firm performance in a rapidly changing business

environment mostly in less developed countries, (Gudda & Deya, 2019; Mutuera & Iravo, 2019),thus eliminating all wastes in the business processes and strategies (Muchiri, 2017). The adoption of lean supply chain practices improves the organisational performance. These practices enable firms to collect and accumulate information related to both external and internal environments in order to provide effective and efficient services by knowing when to delay a production process or go ahead and reduce damage.

SCMP encompasses a complete process and strategy that allows an organisation to harness and deploy information within its reach to make strategic decisions and minimise delay wastages. The following hypotheses were stated thus:

Ho_1: Quality of Information Sharing does not have significant effect on SMEs performance

Ho2: Lean Practice does not have significant effect on SMEs performance

2.6 Information Technology Capability as a Moderator

Ross et al. (1996) define IT capability as a firm's ability to assemble, integrate, and deploy IT based resources. Bharadwaj (2000) defines IT capability as a firm's ability to mobilise and deploy IT-based resources in combination or co-present with other resources and capabilities. In short, the IT capability is embedded within the fabric of the firms. IT capability is a firm's ability to acquire, deploy, combine, and reconfigure IT resources in support and enhancement of business strategies and work processes (Lu & Ramarmurthy, 2011).

IT capability has the potential to improve the performance of organisations (Nabeel - Rehman & Nazri, 2018). While there is still scarcity of studies on how IT capability directly affects performance of SME (Azyabi, 2017), SCM literature suggests that IT-capability may enhance growth and sustainability of firms. Melián-Alzola et al. (2020) examined the relationship between IT capability and organisational agility. The study suggested that different capabilities may yield different results, another set of capabilities should be applied in future studies, their study was in developed country. Thus, capability is primarily considered a critical factor that enables firms to acquire and apply knowledge as well as information during collaboration (Wade & Hulland, 2004). Inter-firm collaboration focuses on the interchange of resources; therefore, IT capability plays a facilitating role in generating benefits for parties involved (Liu et al., 2015).

The basis of gaining competitive advantage and enhanced organisation performance comes with application of IT capability, the place of IT capabilities in enhancing SME performance is well established in the literature. Various IT studies like that of Ashrafi and Mueller, (2015) opined that IT capabilities provide a basis of gaining sustainable growth, competitive advantage and enhancing general performance of a firm. IT capability is considered as one of the major factors in SCM and plays a critical factor to improve performance.

In lieu of the foregoing, the study hypothesises as follows:

H_{O3}: IT Capability does not significantly moderate the relationship between Quality of Information Sharing and SMEs performance.

H_{O4}: IT Capability does not significantly moderate the relationship between Lean Practice and SMEs performance.

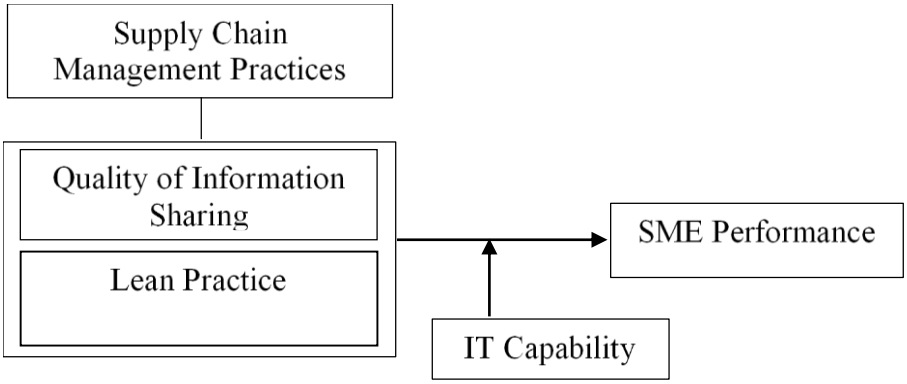

Fig. 1: Research model

3.0 THEORETICAL FOUNDATION OF THE STUDY: RESOURCE BASED THEORY

Wernerfelt (1984) postulated the resource-based view (RBV) theory, as a basis for the competitive advantage of a firm. The theory essentially holds that the competitive advantage of firms primarily lies in their application of a bundle of valuable tangible and intangible resources at their disposal (Kozlenkova et al, 2014). To transform a short-run competitive advantage into a sustained competitive advantage requires that these resources are heterogeneous in nature and not perfectly mobile. Effectively, this translates into valuable resources that are neither perfectly imitable nor substitutable without great effort (Kozlenkova et al., 2014).

4.0 METHODOLOGY

This study adopted a quantitative research design which involves collecting data from a study population at a point in time (Wang & Cheng, 2020). The study employed a quantitative methodology which involves the collection and analysis of numerical data to describe a particular construct (Lancaster, 2005). Primary data was collected using questionnaire. The data collected was analysed using PLS-SEM version 3.0. The study was conducted in Kaduna State. Hence, population of the study comprises five hundred and thirty-nine (539) registered manufacturing SMEs in Kaduna state (SMEDAN Office Kaduna, 2022). The selected sample size of the study was mathematically validated which was developed by Dillman et al. (2014) for computing small and large samples as follows:

$$n = \frac{(N*p*q)}{(N-1)\left(\frac{MoE}{z}\right) + (p*q)}$$

Where:
n = is the computed sample size needed for desire level of precision
N = is Population size of the study
P = is the proportion of the population expected to be chosen. However, since the actual number of respondents who may consent to participate in the study is unknown, Dillman, et al. (2014) suggested that using 50/50 chance will be more justifiable than using 80/20 for a more homogenous sample. That is 0.5 will be used instead of 0.80. Using a higher level of precision (0.5) which will require larger sample sizes (Westfall 2009). And equally provides adequate sample size just adequate for the study population.

$q = 1 - p$

MoE = the desired margin of sampling error at 0.05 (5%)
z =the z-score or critical value for the desired level of confidence at 0.05 is 1.96
The said formula can be computed mathematically as follows:

$$\boldsymbol{n} = \frac{(\mathbf{539} * 0.5 * 0.5)}{(\mathbf{539} - 1)\left(\frac{0.05}{1.96}\right) + (0.5 * 0.5)}$$

$$\boldsymbol{n} = \frac{134}{(538)\ (0.0255102041) + 0.25}$$

$$\boldsymbol{n} = \frac{134}{(538)(0.0006507705) + 0.25}$$

$$\boldsymbol{n} = \frac{134}{0.600114529}$$

$$\boldsymbol{n = 223}$$

However, Israel (2013) suggests that in order to provide for nonresponse, the sample size can be increased by 10% to 30% of the sample size for the purpose of anticipated non-response bias and none return of completed questionnaire. This will also take care of other unavoidable errors such as incorrect filling and failure of some respondents to return the questionnaires (Israel, 2013).

Thus, the sample size was increased by 30% thereby making the total sample size to become 289, Overall, a 5-point Likert-type scale ranging from '1' "Strongly Disagree" to '5' "Strongly Agree" was used to measure the discussed constructs. The respondents were asked to rate their SME indicating the extent of perceived agreement or disagreement with the statements under each construct. The scale for measuring Information Technology Capability was adapted from the study of Nabeel-Rehman & Nazri (2018). The measurement scale for SCMP with 11 items was adapted from previous study of Li *et al*. (2005). This measurement has been validated across different studies and result indicates a satisfactory level of validity and reliability.

Prior to the main analysis, this study ensured assumptions about outlier check, normality and multicollinearity (Hair et al. 2017). After successfully satisfying all assumptions, we adopted the partial least squares (PLS) path modelling method. The method is used because the study is aimed at predicting the dependent variable and PLS is also a non-parametric technique (Ruiz et al. 2013). In order to validate and evaluate the research model, Hair et al. (2017) suggested using two stages of evaluation. They are measurement models (also called external models in PLS-SEM) and structural models (also called internal models in PLS-SEM).

4.1 Measurement Model

In order to evaluate the measurement model of this study, the researchers evaluated the reliability of the individual items measuring each potential structure, the internal consistency reliability (i.e., the composite reliability), the discriminant validity, and the convergence validity of each reflective construct (Hair et al., 2017). Although, Hair et al. (2017) recommends using an outer loading of 0.70 as reliable and acceptable, they argued that an indicator should be deleted only if deleting the item increases the constructs Average Variance extracted Value Equivalency (AVE) or Composite reliability.

Table 1: Measurement Modal

Constructs	Indicators	Outer Loadings	Cronbach's Alpha	Composite Reliability	Average Variance Extracted AVE
IT Capability	IT2	0.90	0.82	0.89	0.73
	ITC1	0.87			
	ITC3	0.79			
Lean Practice	LP1	0.91	0.90	0.92	0.66
	LP2	0.88			
	LP3	0.89			
	LP4	0.92			
Quality of Information Sharing	QIS1	0.94	0.95	0.96	0.87
	QIS2	0.93			
	QIS3	0.94			
	QIS5	0.92			
SME Performance	SP1	0.83	0.92	0.94	0.81
	SP2	0.82			
	SP3	0.83			
	SP4	0.84			
	SP5	0.81			
	SP6	0.74			

Source: Output of data analyses (2023).

In addition, the composite reliability and Cronbach's alpha value were evaluated to determine the internal consistency of the reflective structure (between 0 and 1), the higher values represent higher reliabilities. In conclusion, all of these constructs are reliable because their respective composite reliability and Cronbach alpha values are above the threshold of 0.70. Again, the convergent validity has also been met as all the AVE values were all above 0.50.

Furthermore, to ascertain the discriminant validity, Duarte and Amaro (2018) proposed the use of multitrait-multimethod (MTMM) matrix as a more adequate and sensitive approach to detecting discriminant validity.

Table 2: Heterotrait Monotrait Ratio (HTMT)

Constructs	IT Capabi-lity	Lean Practices	Quality Of Info. Sharing	SME Performance
IT Capability				
Lean practices	0.27			
Quality of info. Sharing	0.05	0.41		
SME performance	0.36	0.63	0.56	

Source: Output of data analyses (2022).

As can be seen from Table 2 above, the HTMT statistics are given based on the correlation between their reflective construction items. Since the HTMT value is lower than the 0.85 threshold proposed by (Hair et al., 2017), the reflective latent variable of this study has discriminant validity.

4.2 Structural Model

After all the requirements of the measurement model are met, the structural model is evaluated. The first part of the structural model evaluation involves the testing of theoretical relationships. Specifically, the direct and moderating effect was assessed on 289 cases using 5000 bootstrap samples (Hair et al. 2017).

Table 3: Structural Model

Relationship	Beta Values	Standard Deviation	T Statis-tics	P Values
IT Capability -> SME Performance	0.20	0.04	4.72	0.00
ITC*LP -> SME Performance	0.01	0.04	0.16	0.87
ITC*QIS -> SME Performance	0.12	0.03	3.43	0.00
Lean Practices -> SME Performance	0.41	0.05	8.99	0.00
Quality of Info. Sharing -> SME Performance	0.36	0.04	9.19	0.00

Source: Output of data analyses (2023).

The bootstrapping results presented in Table 3 indicate the strength and significance of the relationships between the factors and SME performance. The t statistics provide information about the significance of each relationship, while the p-values indicate the probability of obtaining the observed results by chance. In this case, the relationships between IT Capability, ITCQIS, Lean Practices, and Quality of Information Sharing with SME Performance are statistically significant ($p < 0.05$), suggesting that these factors have a meaningful impact on SME performance. However, the relationship between ITCLP and SME Performance is not statistically significant ($p > 0.05$), indicating that this factor may not have a significant influence on SME performance in this model. All the hypotheses were assessed at 5% level of significance.

4.3 Effect Size and Predictive Relevance

The effect size outlines the potential effects of specific exogenous latent variables on endogenous variables. The general criteria for evaluating $f2$ includes the values of 0.02(small), 0.15(medium), and 0.35(large) (Cohen, 1988). The predictive correlation of the variables was assessed using a cross-validated redundancy criterion (Q2) (Hair et al., 2017).

Table 4: f-Square, R-Square and Q-square

Constructs	**SP**	**Effect Size**
QIS	0.21	Medium
LP	0.29	Medium
R-Square		
Construct	**R Square**	**R Square Adjusted**
SP	0.50	0.49

Source: Output of data analyses (2023).

As can be seen from Table 4 above, based on the standards highlighted by Cohen (1988) for direct relationship respectively, it can be seen that Lean Practice and Quality of Information Sharing has medium effect on the Performance of SMEs**.** These values indicate that the independent variables included in the model (QIS and LP) accounted for approximately 50% of the variance in SME Performance. The adjusted R-square takes into account the degrees of freedom and penalises for the number of predictors in the model.

5.0 CONCLUSION AND RECOMMENDATIONS

In conclusion, based on the findings, it can be suggested that SMEs should focus on improving their IT Capability, implementing lean practices, and enhancing the quality of information sharing to enhance their performance. These factors have been shown to have significant positive effects on SME Performance, highlighting their importance in driving success in small and medium-sized enterprises.

To improve SME performance, it is recommended to prioritise enhancing IT Capability by investing in advanced technologies and systems, implementing lean practices

to eliminate waste and enhance efficiency, fostering a culture of quality information sharing through effective communication channels and knowledge management systems, and monitoring performance through regular evaluation. Seeking external expertise and collaboration can also provide valuable insights and resources. By focusing on these recommendations, SMEs can optimise their operations, drive innovation, and ultimately achieve sustainable growth and competitiveness in the dynamic business landscape.

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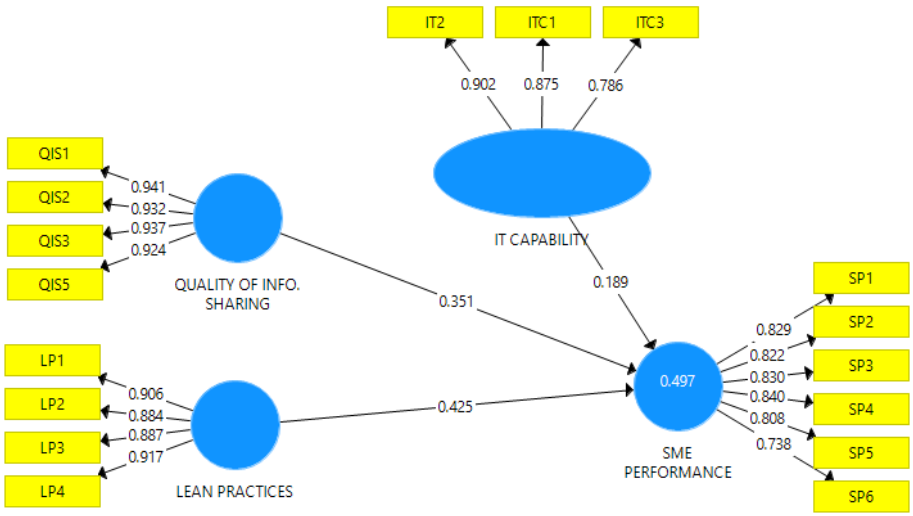
APPENDIX

Measurement Model



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Structural Model