

## The effect of digital procurement and supply chain innovation on SMEs performance

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### ABSTRACT

Technological changes accompanied by rapid market changes have made it increasingly difficult for SMEs to develop their business in the future. Today, many organizations are shifting to e-procurement as an integrated supply chain support function to achieve strategic business goals. E-procurement or electronic procurement and supply chain Innovation have allowed for more flexibility in responding to market changes and improving the performance of the company's supply chain. The purpose of this study was to determine the impact of the implementation of e-procurement and supply chain innovation on the supply chain performance of SMEs in Indonesia. The method used in this study is a quantitative survey method using structural equation modeling (SEM) and partial least squares (PLS) with data processing tools, namely SmartPLS 3.0 software. Respondents in this study were 390 employees of SMEs in Indonesia determined by the simple random sampling method. The research data was obtained through an online questionnaire distributed through social media. From the results of the analysis, it can be concluded that the implementation of e-procurement has a significant effect on supply chain performance. Supply Chain Innovation has also a significant influence on SMEs supply chain performance.

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## 1. Introduction

In the era of industrial 4.0 revolution, fierce competition among SMEs has become a challenge for SMEs in developing their business in the future (Barngatun & Kimutai, 2015). According to Albinkhalil et al. (2021) supply chain needs may become efficient by implementing the right strategy. The need for improvements in terms of efficiency and quality has led logistics to adopt new solutions and strategies that are able to give buyers flexibility in choosing suppliers and sourcing products. Today's rapid technological developments require companies to provide technology-based services with innovative ideas to improve company performance. Therefore, it is evident that the focus of many organizations has shifted to e-procurement as an integrated supply chain support function to achieve strategic business objectives, such as operational efficiency, sustainability and profitability. The global economic downturn also affects the changes in the dynamics of this business. Procurement is a crucial and expensive business activity for every organization (Croom et al., 2007; Eei et al., 2012). Traditional procurement is an activity that spends more time on non-value added value. In traditional procurement, it is possible to buy out of order at a higher price. E-procurement has allowed for more flexibility in responding to volatile market changes. The rapid development of the electronic market has had an impact on suppliers and buyers to sell and buy products online. This activity in the e-marketplace generally refers to e-supply chain management. In the supply chain process, e-procurement provides advantages to companies that adopt it. The process of electronic procurement (e-procurement) involves goods or services at the best cost to meet the needs of buyers in terms of quality and quantity, time, and location.

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According to Croom et al. (2007) and Eei et al. (2012), the traditional purchasing process has inefficiency and takes a long time to process orders, both internally and externally. Thus, e-procurement is very supportive and improves supply chain performance and logistics strategies. In addition, e-procurement also has a positive impact in increasing productivity, reducing lead times, and reducing errors in inventory management, so that e-procurement can change the way businesses are run. Therefore, the authors want to know whether there is a relationship between implementing e-procurement and supply chain performance.

## 2. Literature Review

### 2.1 E-Procurement

Procurement is the process of obtaining goods or services from external sources. In the process, it should be noted that the goods or services must be suitable and obtained at the best cost to meet the needs of the buyer in terms of quality, quantity, time and location. To improve the procurement process, the company uses electronic procurement innovation or e-procurement. According to Gunasekaran et al. (2009) e-procurement is one of the biggest drivers of change in any industry. Many businesses are starting to adopt technology due to factors to reduce costs and improve the quality of customer service. E-procurement enables companies to decentralize operational procurement processes as well as centralize strategic procurement processes, thereby increasing supply chain transparency. According to Mafini et al. (2020) e-procurement (electronic procurement) is a business-to-business purchasing practice that utilizes electronic commerce to identify potential supply sources, to purchase goods and services, to transfer payments and to interact with suppliers. This electronic procurement system focuses on the division of functions, including e-sourcing, e-negotiation, e-design, and e-valuation. According to Gunasekaran et al. (2009) and Mafini et al. (2020), electronic procurement helps improve collaboration between suppliers and buyers, reduces personal requirements, reduces transaction costs, accepts more bids from multiple potential bidders, improves coordination, shortens procurement cycles, increases audit trails, and greater transparency. This collaboration between buyers and sellers positively affects innovation as well as organizational performance. Haudi et al. (2022) and Mafini et al. (2020) mentioned that e-procurement can help in improving quality, processing time, and saving costs. The e-procurement system can increase the effectiveness of the operation process and supply chain transparency. Other studies, according to Gunasekaran et al. (2009) and Fernandes et al. (2015) also mentioned that e-procurement helps in overall cost savings in the purchasing process and facilitates supply chain transparency in terms of product specifications, prices, contract details, and faster decisions for issues through real-time information.

### 2.2 Supply Chain Performance

According to Otieno et al. (2014), supply chain is defined as a network of organizations that are involved, through upstream and downstream relationships in various processes and activities that produce value in the form of goods or services in the hands of end customers. Supply chain performance refers to both tangible (cost and quality) and intangible (capacity utilization and resource utilization) results through the effective use of supply chain management. Supply chain-driven enterprise performance is divided into resource performance, output performance, and flexibility performance. According to Sigala et al. (2005) and Smith and Flanegin (2004), resource performance is an added value in terms of achieving efficiency; output performance is an added value in terms of the company's ability to provide services; while the performance of flexibility is an added value in terms of the company's ability to respond to changes. According to Kusuma and Soediantono (2022) and Permana and Soediantono (2022), in project-based organizations, measuring supply chain performance is difficult because of the many actors involved and the potential for uncertainty in the supply chain.

## 3. Method

The method used in this study is a quantitative survey method using structural equation modeling (SEM) and partial least squares (PLS) with data processing tools, namely SmartPLS 3.0 software. Respondents in this study were 390 selected employees of SMEs in Indonesia determined by the simple random sampling method. The research data was obtained through an online questionnaire distributed through social media. The distribution was carried out during February 2022, using the google form due to the pandemic conditions. The collected data were analyzed using Structural Equation Modeling with SmartPLS version 3.0 software.

### 3.1 Hypothesis

Structural Equation Modeling (SEM) is used in testing the hypothesis with the consideration of having the ability to combine measurement models and structural models simultaneously. The software used to process the data is SmartPls 3.0. The hypothesis in this study is as follows:

1. There is a significant effect of E-Procurement Implementation on SMEs Supply Chain Performance.
2. There is a significant effect of Supply Chain Innovation on SMEs Supply Chain Performance.

3. There is a significant effect of E-Procurement Implementation on SMEs Supply Chain Performance through Supply Chain Innovation as an intervening variable.

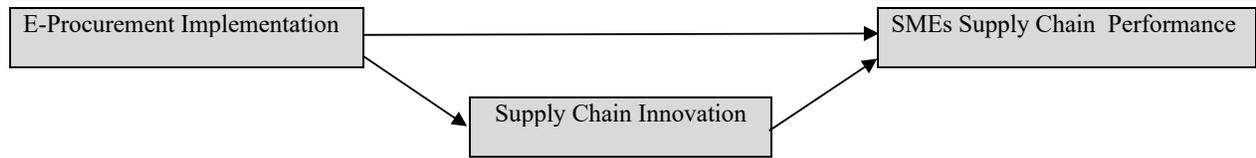


Fig. 1. Research Framework

4. Results and discussion

4.1 Data description

Fig. 2 presents details of the personal characteristics of the respondents. According to our survey, more than half of the participants were female aged less than 50 years.

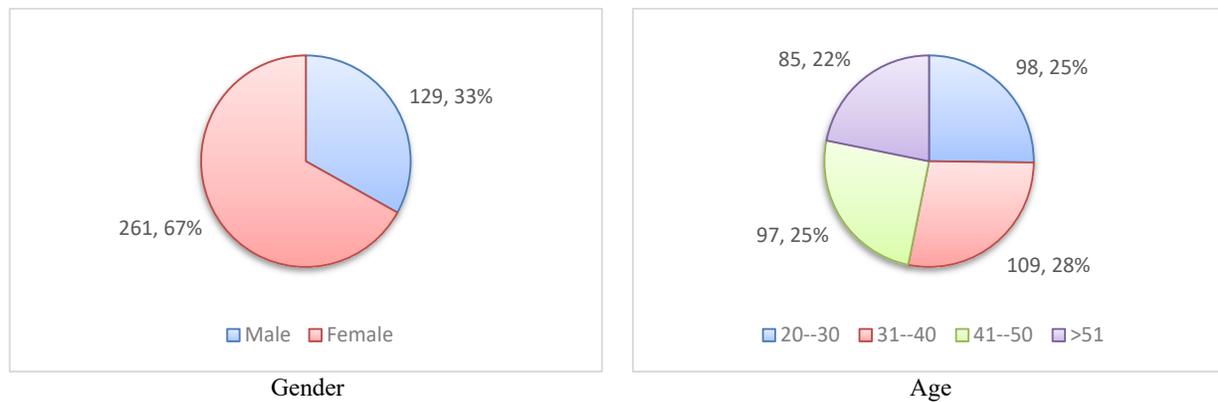


Fig. 2. Personal characteristics of the participants

4.2 Model validity

Ghozali and Latan (2015) explain that an indicator could be declared valid if it had a loading factor above 0.70. Here are the results of the validity test.

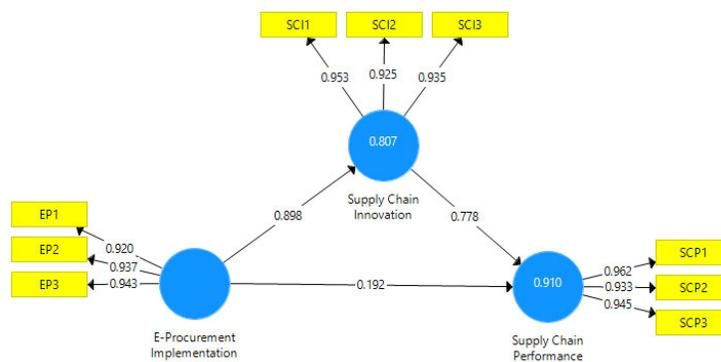


Fig. 3. Validity Test After Selection

Based on Fig. 3, all statements are declared valid since they already have a loading factor above 0.70.

4.3 Evaluation of the Measurement Model (Outer Model)

Discriminant validity on the reflection model can be seen by using the cross-loading method. Table 1 demonstrate the summary of the results.

**Table 1**  
Discriminant validity

	E-Procurement Implementation	Supply Chain Innovation	Supply Chain Performance
<b>EPI1</b>	<b>0.792</b>	0.419	0.421
<b>EPI2</b>	<b>0.863</b>	0.339	0.270
<b>EPI3</b>	<b>0.865</b>	0.397	0.332
<b>SCI1</b>	0.383	<b>0.835</b>	0.473
<b>SCI2</b>	0.383	<b>0.800</b>	0.474
<b>SCI3</b>	0.322	<b>0.739</b>	0.544
<b>SCP1</b>	0.476	0.626	<b>0.871</b>
<b>SCP2</b>	0.349	0.518	<b>0.871</b>
<b>SCP3</b>	0.277	0.538	<b>0.885</b>

Source: processed data (2022)

Table 2 shows that each latent variable can predict the size of each block better than the other block sizes, so the Evaluation of the Measurement Model (outer model) with Discriminant validity is valid. Furthermore, composite validity can be measured from the Average Variance Extract (AVE) value which must be above 0.5 and Composite Reliability must be above 0.7 (Ghozali & Latan, 2015).

**Table 2**  
Reliability Test

	Cronbach's Alpha	rho A	Composite Reliability	Average Variance Extracted (AVE)
E-Procurement Implementation	0.797	0.797	0.881	0.712
Supply Chain Innovation	0.819	0.836	0.880	0.648
Supply Chain Performance	0.850	0.860	0.908	0.767

Source: processed data (2022)

According to the standard set by Ghozali and Latan (2015) in Table 2 it is known that the AVE value is above 0.5 and the Composite Reliability value is above 0.7, so all variables meet the reliability requirements.

4.4 Evaluation of the Structural Model (Inner Model)

R-Square is used to evaluate the structural model for the independent variables/inner model, here are the results of the inner model test.

**Table 2**  
Evaluation of the Structural Model (Inner Model)

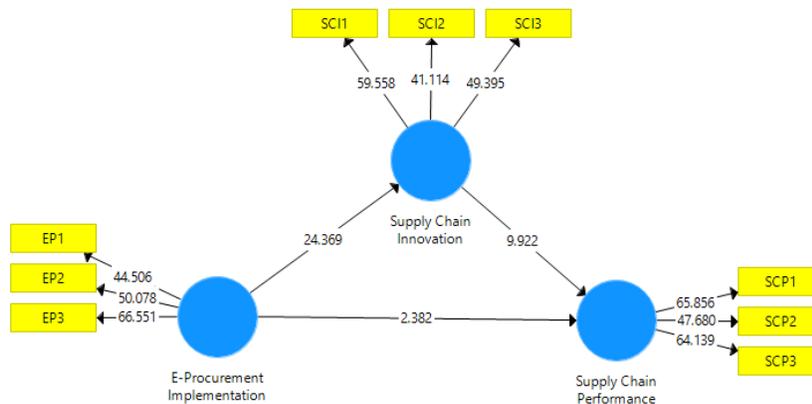
	R Square	R Square Adjusted
Supply Chain Performance	0.910	0.908
Supply Chain Innovation	0.807	0.803

Source: processed data (2022)

Based on Table 2, the Supply Chain Performance variable can be explained by 91% in this model, while the Supply Chain Innovation variable can be explained by 80.7% by this research model,

4.5 Hypothesis testing

The following are the results of data processing for hypothesis testing using the PLS Bootstrapping method.



**Fig. 4.** PLS Bootstrapping

Table 3 is presented to clarify the picture of the hypothesis test above.

**Table 3**  
Hypothesis Test

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values
E-Procurement Implementation → Supply Chain Performance	0.132	0.141	0.161	5.821	0.000
E-Procurement Implementation → Supply Chain Innovation	0.457	0.062	0.115	4.498	0.009
Supply Chain Innovation → Supply Chain Performance	0.359	0.362	0.114	3.141	0.002

Source: processed data (2022)

Based on Table 3, the regression equation formed is as follows:

$$\text{Supply Chain Innovation} = 0.457 \times \text{E-Procurement Implementation} + \text{error} \quad (1)$$

$$\text{Supply Chain Performance} = 0.132 \times \text{E-Procurement Implementation} + 0.359 \times \text{Supply Chain Innovation} + \text{error} \quad (2)$$

Based on the results of statistical testing, the explanation of each influence variable is explained as follows:

1. E-Procurement Implementation has a positive and significant effect on Supply Chain Performance because the p-value of 0.000 is smaller than 0.05 ( $0.000 < 0.05$ )
2. E-Procurement Implementation has a positive and significant effect on Supply Chain Innovation because the p-value of 0.009 is smaller than 0.05 ( $0.009 < 0.05$ )
3. Supply Chain Innovation has a positive and significant effect on Supply Chain Performance because the p-value of 0.002 is smaller than 0.05 ( $0.002 < 0.05$ )

The results of the intervening effect test using the Sobel test, the results of which can be seen in Table 4 as follows,

**Table 4**  
Sobel Test Results

Variable	Test Statistics	P-Value
E-Procurement Implementation → Supply Chain Innovation → Supply Chain Performance	3.803	0.001

Source: processed data (2022)

The results of the study using the Sobel test showed that the variable Supply Chain Innovation is significantly mediate the service quality and price variables on consumer loyalty because the p-value was smaller than 0.05 ( $P \text{ Value} < 0.05$ ).

## 5. Discussion

The study has provided some empirical evidence on the research model framework between supply chain management, innovation and organizational performance in manufacturing companies and service companies. The study supports the research of Otieno and Iravo (2014); Purwanto et al. (2020) and Rudyanto et al. (2021). However, this strategy will not last long in the future, companies must operate effectively and efficiently by implementing supply chain management. The relationship between supply chain management and innovation has been built and applied to manufacturing companies and service companies. According to Sánchez et al. (2019), Sigala et al. (2005); Smith and Flanegin (2004) suggested that innovation can be increased through Total Quality Management (TQM), this study proves that the implementation of Supply Chain Management has a positive and significant impact on innovation. The company's production is more efficient and able to meet customer needs better. The combination of the use of Information Technology and the strategy of sharing information with suppliers enables the company to create product/service innovations. Research proves the higher the level of innovation, the higher the level of organizational performance. This study shows that the implementation of Supply Chain Management affects Innovation and Organizational Performance is Internal Operations. The results of the study support the research of Sigala et al. (2005); Smith and Flanegin (2004) which states that it is very important for companies to improve internal integration before carrying out external integration. Information sharing and Information Technology affect Organizational Performance and Innovation. The results of the study support the research of Sánchez et al. (2019); Sigala et al. (2005); Smith and Flanegin (2004) which state that they share information among supply chain partners and form supply chain collaborations. Rudyanto et al. (2021) and Sánchez et al. (2019) also state that information technology is shifting beyond B2B and now the focus on electronic marketing technology (e-commerce) emphasizes collaboration. Training is also needed to ensure that Supply Chain Management is implemented properly.

## 6. Conclusion

E-Procurement Implementation has a positive and significant effect on Supply Chain Performance, E-Procurement Implementation has a positive and significant effect on Supply Chain Innovation. Supply Chain Innovation has a positive and significant effect on Supply Chain Performance. Technological developments have brought convenience to services so that many companies are adopting e-procurement as a supply chain support to be able to adapt to market changes and to achieve business goals, such as operational efficiency, sustainability, and profitability. Many companies are adopting e-procurement because of its ability to streamline supply chain networks. The advent of e-procurement has created a higher profile for supply management as well as increased visibility to top management of the company. By adopting this technology, it has affected organizational performance, either directly or indirectly. This e-procurement brings transparency and effectiveness in the supply chain and makes a significant contribution to supply chain performance. In addition, e-procurement also allows companies to measure and monitor orders, such as processing time, order delivery time, and current status. Therefore, implementing e-procurement in companies plays an important role and will have an impact on improving supply chain performance.

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