

ORGANIZATIONAL PERFORMANCE: THE ROLE OF ENTERPRISE RESOURCE PLANNING AND SUPPLY CHAIN MANAGEMENT

Muthia Roza Linda*

Management Doctoral Program, Faculty of Economics, Universitas Andalas, Indonesia

Department of Management, Faculty of Economics, Universitas Negeri Padang, Indonesia

Gesit Thabrani

Department of Management, Faculty of Economics, Universitas Negeri Padang, Indonesia

Suhery

Sekolah Tinggi Ilmu Ekonomi Perdagangan, Indonesia

Riza Yonita

Universitas Putra Indonesia "YPTK", Indonesia

Thesa Alif Ravelby

Sekolah Tinggi Ilmu Ekonomi Perdagangan, Indonesia

Vera Pujani

Management Doctoral Program, Faculty of Economics, Universitas Andalas, Indonesia

Alizar Hasan

Faculty of Engineering, Universitas Andalas, Indonesia

**Organizational
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Abstract

Technological advances require companies to follow and adapt to technological developments and require companies to move with existing changes. Companies need a strategy to have a competitive advantage and improve organizational performance in dealing with these conditions. The study empirically tested the effect of mediating supply chain management (SCM) implementation on the relationship between Organizational performance and enterprise resource planning (ERP). The sample of this study were employees of PT. Semen Padang is involved in the supply chain management process and runs an enterprise resource planning system with 100 employees. The results of data processing using PLS-SEM showed a positive and significant effect in the direct relationship between ERP to SCM and SCM to performance. Furthermore, SCM mediates the relationship between ERP and company performance.

Keywords: Organizational performance, enterprise resource planning, and supply chain management.



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*Corresponding author. Email address: muthia@fe.unp.ac.id

Each company continually reviews the company's survival every certain period to find out the status of a healthy company and maintain the company's existence (Al-Dhaafri, Al-Swidi, & Yusoff, 2016). Company performance is measured through financial and non-financial methods or approaches. Performance relates to the organization's strength to achieve goals using the company's resources (Abujarad, Yusof, & Nikbin, 2010). In addition, performance is an organizational process from every previous action of the organization (Taleghani & Liyasi, 2013). Many factors affect the company's performance, especially in the era of the industrial revolution 4.0, which is synonymous with automated, fast, and accurate information technology systems. Technological advances require companies to follow and adapt to technological developments and move with existing changes, so that company performance remains good." To compete in the market and have good performance, one way that companies can do this is to implement and develop information technology systems. One of the information technology systems widely used by companies today is the Enterprise Resources Planning (ERP) system. Enterprise resources planning (ERP) is an integrated system for managing and describing all processes and resources contained within the company (Abdo, Aldhoiena, Al-Amrib, & Hashbol, 2019)

Technology plays a vital role in supply chain management. Enterprise resource planning systems have long helped companies monitor and control costs, productivity, and inventory. SCM is a set of approaches to streamline the integration of suppliers, manufacturers, warehouses, and storage to produce and distribute goods in the right quantity, location, and time to minimize costs and provide service satisfaction to consumers (Assauri, 2011). According to (Heizer, Render, & Munson, 2021), supply chain management is an organizational network that involves upstream and downstream relationships in different processes and activities that provide value in products and services to consumers. So supply chain management (SCM) has become a strategy for companies to improve business performance and create competitive advantage (Li, Ragu-Nathan, Ragu-Nathan, & Subba Rao, 2006).

ERP provides complete visibility across the supply chain network, which is impossible in manual processes. ERP implementations can monitor all suppliers, factories, storage facilities, and all members of the supply chain, which facilitates communication across the network. This ERP implementation, in turn, assists in the effective tracking and management of all processes, from order to manufacture and delivery of finished goods to customers (Hasan, 2018).

From several types of companies that implement ERP as well as Supply Chain Management, manufacturing companies have a close relationship with the implementation of information systems due to systematically integrating all production activities to meet customer needs and reduce operational costs by saving operational activities that the use of information systems can replace and also to increase the effectiveness of supply chain activities within the company from upstream to downstream (Wullur & Wardaya, 2015).

With this situation, there is a need for Supply Chain Management where relationship management from all elements involved, both direct and indirect, is needed to meet customer needs. Optimal Supply Chain Management of a company can affect several essential aspects of product production activities and customer satisfaction (Linda, Thabrani, Chandra, & Firman, 2020). Supply chain management requires an appropriate and credible information system. Therefore, the use of information systems has a close relationship with the company's goals to achieve effectiveness and efficiency (Hassab Elnaby, Hwang, & Vonderembse, 2012).

A reliable information system gives the company more value in terms of competitive advantage than other companies. (Tseng, Wu, & Nguyen, 2011) suggests that information obtained from parties in the supply chain will be realized according to the company's wishes. It directs leaders to the right decision-makers and creates a low-risk company (Sumangkut, 2013).

Supply Chain Management requires the help of an Information system that can work reliably. Information systems are needed because of the complex activities and the pressure from the leadership in making decisions and controlling the supply chain. The development of Information systems in the last year provides an overview of technological developments that are getting further ahead, including Enterprise resource planning. Organizations now widely use enterprise resource planning in planning, inventory control, and logistics. Software companies providing ERP services, including JDA Software, Microsoft, Oracle, and SAP, provide state-of-the-art services. A system that is applied to provide real-time information provides supporting information for the right decision-makers, simplifying transaction processes, merging across functions or departments in the company, and increasing knowledge about how businesses can run well (Aremu, Shahzad, & Hassan, 2020).

This research is important because SCM in the company will run well if it is supported by information technology. Using appropriate and integrated Information Technology, in this case, ERP-SCM for companies engaged in manufacture, can improve overall organizational performance (Siregar, 2019). This research contributes to the availability of models for implementing SCM to enhance business performance in companies by implementing an ERP system that can be used as a reference and studied by businessman and academics. Previous research only looked at the effect of ERP on competitive advantage or performance. Based on the authors' knowledge, no one has investigated the relationship between ERP and performance that mediated SCM. The findings in this study contribute to the theory base by linking the concept of ERP, SCM, to Performance.

Research was conducted on employees who work at PT. Semen Padang and are involved in supply chain management practices. The selection of employees as research subjects was deemed appropriate to assess how to implement enterprise resource planning systems and supply chain management practices. Selection of PT. Semen Padang is the object of research because PT Semen Padang has been using an enterprise resource planning system since 2008, so it can be said that PT Semen Padang has been implementing ERP for quite a long time. The structure of this research is preceded by an introduction that explains the background of this research. Then proceed with a literature review that contains the theories used and the elaboration of hypotheses. Then proceed with the research methodology and results and end with conclusions and future research.

LITERATURE REVIEW

Organizational Performance

Organizational Performance is a picture produced by an organization. In general, the company must have goals to be achieved, determined by the desires to be fulfilled (Abujarad et al., 2010). Assessment of company performance can be seen what factors affect company performance and their impact on company or organization profits, solve problems that occur within the company and solving to improve company performance for the better, and provide clear information to bridge the implementation of cooperation and enhance Performance such as improvement after evaluating the results of the performance appraisal (Siahaan T, Nazaruddin, & Sadalia, 2020)

According to (Siahaan T et al., 2020), company performance can be measured through (1) Operational performance, which refers to the organization's ability to be more efficiently produce and deliver products to customers with better quality and in a shorter time (Younis, Sundarakani, & Vel, 2016). This performance can be assessed through several factors such as market share, new product launches, quality, marketing effectiveness, and consumer satisfaction (Taleghani & Liyasi, 2013). (2) Financial performance leads to an increase in the company's position compared to the industry average. Financial improvements include increased costs for purchasing materials, decreased production costs, increased average return on sales, profit growth, and increased market share growth (Younis et al., 2016). Financial performance is not only measured based on accounting data alone. Some accountants use return on sales, profitability, sales growth, work productivity improvements, and production cost improvements to measure financial performance (Hassab Elnaby et al., 2012).

Supply Chain Management

Supply chain management (SCM) manages supply chain activities to increase customer value. SCM is useful for integrating supply chain activities to increase the company's competitive advantage (Chopra, Meindl, & Vir Kalra, 2017). In addition, SCM is a collection of networks of several organizations and members of a business ranging from suppliers to consumers that aim to produce value in the form of products and services to consumers (Assauri, 2011). In addition, the supply chain helps minimize waste from company activities that cause additional costs along the supply chain path. The parties involved in the supply chain include suppliers, manufacturers, distributors, retailers, sellers, and finally, consumers (Jacobs & Chase, 2018). All of these parts must be considered because they are closely related to the company's survival in the business world, so coordination is needed between supply chain members.

According to (Li et al., 2006), in the supply chain, there is often uncertainty in business competition in the same line of business with unhealthy competition. Uncertainty impacts increasing costs, one of which is due to running out of raw material supplies. When the level of uncertainty is high and consumer demand is uneven, the company's performance will fluctuate (Zhou & Li, 2020). Uncertainty in the supply chain is divided into three: supplier uncertainty, process uncertainty, and supply uncertainty. Supplier uncertainty includes delivery problems, inappropriate materials, and uncertain lead times. Uncertainty process, such as engine failure. Supply uncertainty is when demand sometimes tends to be high and sometimes tends to be low (Chopra et al., 2017).

Companies must be able to respond to changes in demand and also respond to complaints about products, so that product quality is guaranteed (Al-Dhaafri et al., 2016). One way that can be done is to work with partners in the supply chain.

Good cooperation with partners will produce up-to-date information on market conditions and customer demands to determine the best future policy for the company. Data quality can provide a low-risk value caused by supply and market uncertainty and reduce the bullwhip effect (Al-Shboul, Barber, Garza-Reyes, Kumar, & Abdi, 2017).

(Al-Shboul et al., 2017) says, good SCM practices can be seen from (1) Strategic supplier partnership, strategic partnerships with suppliers make the company work well where several suppliers will provide information regarding product success strategies; (2) Customer relationship, explains the practice of maintaining customer loyalty to the company's products by responding to customer complaints, requests and suggestions so that the products we produce are as expected and become better; (3) Level of Information Sharing, sharing information with partners related to market conditions, customer demand, product innovation so that the information obtained is expected to become a reference for better products and continuous improvement; (4) Quality of Information Sharing, including factors such as time, accuracy, adequacy and reliable information exchanged; (5) Internal Lean Practices, explains that this practice aims to eliminate waste throughout the product value stream, but this is not only internal but also includes all members of the supply chain; (6) Postponement, defined as a step to accelerate one activity from another; and (7) Total Quality Management is a management philosophy that specializes in meeting the needs of internal and external customers and the importance of doing things right the first time (Chopra et al., 2017).

SCM has consequences at the corporate level; therefore, it is necessary to measure the effect of SCM practices on organizational performance (Green, McGaughey, & Casey, 2006). The results of research conducted by (Gandhi, Shaikh, & Sheorey, 2017), and (Truong et al., 2017) show that it has a positive and significant effect on organizational performance.

H1: SCM has a positive and significant effect on organizational performance

Enterprise Resource Planning

An Enterprise Resources Planning (ERP) system is defined as “a system based on computer information technology that offers integration of various company business processes that increase time and cost savings. An ERP system refers to a comprehensive software package that seeks to integrate all business processes and functions (Abdo et al., 2019). ERP systems use one database. More specifically, ERP consists of several modules in finance, HR, inventory, planning, etc., with one integrated software divided into several modules (Abdo et al., 2019). ERP integrates all business processes throughout the company to increase its efficiency (Aziz, Ragheb, Ragab, & Mokadem, 2018). (Al Zoubi, 2018), and (Altamony et al., 2016) argue that ERP is a computer-based integrity system designed to process company transactions and facilitate integrated and real-time planning, production, and consumer response. ERP systems in organizations provide benefits and impacts on other parts of the organization or other IT systems, such as the Supply Chain Management (SCM) system that is integrated with it (Tarhini, Ammar, Tarhini, & Masa'deh, 2015), and ERP implementation will improve SCM performance (Putra & Fioltya, 2018).

Supply chain management is a necessary business process in every company today. SCM, through its network, connects consumer needs with suppliers through channels. Companies need to implement information technology to improve the performance of SCM, which consists of many subprocesses. The use of Information Technology can improve the supply chain performance of the production-distribution system. Of all the technologies, ERP has the most tangible impact on the supply chain, improving its operations and maturing its practitioners (Banerjee, 2018). Many previous research findings support that ERP has a positive effect on the company's supply chain performance

There are several elements needed in carrying out the ERP process consisting of (Nah, 2002): (1) Physical Components (server, network, storage, client), (2) People (Business staff, operation staff, development staff), (3) Organizational Process (program and project management, change management, support service) (Elfarmawi, 2020). Companies that implement ERP can improve innovation performance and the quality of their performance, which will directly impact company performance. (Sutdewan, Singa, Sriyakul, & Jermisittiparsert, 2019); (Tarhini et al., 2015); (Tian & Xu, 2015); (Umble, Haft, & Umble, 2003) found that Enterprise Resource Planning affected increasing company performance. Likewise, the results of research conducted by (Shatat & Udin, 2012) suggest a significant relationship between ERP and SCM. In addition, the results of a study conducted (Al-Dhaafri et al., 2016), and (Madapusi & D'Souza, 2012) state that the implementation of the Enterprise Resource Planning System has a significant positive effect on organizational performance. Research (Zhou & Li, 2020), (Al-Shboul et al., 2017), and (Al-Dhaafri et al., 2016) that explains ERP implementation and supply chain management have a positive influence on organizational performance.

Any kind of information, including sales data, can be accessed by all actors in the supply chain at various levels through the use of ERP systems to avoid demand falsification of information and prevent the bullwhip effect. Effective information sharing among supply chain actors enables production and delivery synchronization, better forecasting, coordination of inventory-related decisions, and facilitation of a shared understanding of performance bottlenecks (Rai et al., 2006). Based on the opinion (Rai et al., 2006), it can be concluded that the implementation of an ERP system can improve the performance of SCM, which in turn will have an impact on increasing the performance of companies in the supply chain. Research conducted by (Acar, Zaim, Isik, & Calisir, 2017) shows that the indirect effect of ERP implementation on performance is more robust with the supply chain mediating impact than the direct effect.

H2: ERP has a positive and significant effect on SCM

H3: ERP has a positive and significant effect on performance mediated by SCM

METHOD

This type of research is a case study conducted at PT Semen Padang so that the population in this study are employees who are users of the enterprise resources planning system and are involved in supply chain management practices in the company at PT Semen Padang. This study uses a survey-approach method in data collection. The number of respondents for survey research is at least 30 people (Hair, Black, Babin, and Anderson, 2010). Therefore, the researchers tried to get more respondents than the minimum requirements. With a sample of 100 employees. In this study, researchers used questionnaires to collect information related to research variables. A questionnaire is several questions related to the indicators of research variables. The questionnaire was designed to investigate the impact of ERP and SCM system implementation on company performance. The survey was conducted on members of a cement company located in Padang, Indonesia, implementing an ERP system to manage its business. This study used PLS-SEM to test all hypothesized relationships. PLS-SEM was chosen because it can test complex reflective models, does not require normality assumptions, and is suitable for small amounts of data. In addition, because of the high predictive criteria of the nature of PLS, it is most appropriate and efficient for testing causal relationships between constructs (Ringle, Wende, & Becker, 2015).

Variabel	Definisi Operasional	Indikator
Organizational Performance	The benchmark of how the company can achieve its goals so that it becomes a consideration in the next period both in terms of financial and non-financial	<ol style="list-style-type: none"> 1. Operational Performance (market share, new product launches, Quality, marketing effectiveness, and customer satisfaction) (Taleghani & Liyasi, 2013). 2. Financial Performance (increase in material purchasing costs, decrease in production costs, increase in average return on sales, profit growth, and increase in market share growth (Younis, Sundarakani, & Vel, 2016)
Supply Chain Management	a collection of networks of several organizations that are members of a business ranging from suppliers to consumers that aim to produce value in the form of products and services to consumers	<ol style="list-style-type: none"> 1. Strategic supplier partnership 2. Customer relationship 3. Information Sharing 4. Quality of Information Sharing 5. Internal Lean Practices 6. Postponement 7. Total Quality Management (Al-Shboul, 2017)
Enterprise Resource Planning	Systems based on computer information technology that offer integration of various company business processes increase time and cost savings.	<ol style="list-style-type: none"> 1. Physical Component (server, network, storage, client) 2. People (Business staff, operation staff, development staff) 3. Organizational Process (program and project management, change management, support service). (Nah, 2002)

Table 1.
Variable
Operational
Definition

Measurement Model

Before testing the research hypothesis, the validity and reliability of the research instrument were first tested, which consisted of construct reliability tests, convergent validity, and discriminant validity to ensure that the data obtained could be used to predict research objectives.

Construct Reliability dan Convergent Validity

Construct validity is based on Cronbach's alpha value which is greater than 0.7, and composite reliability above 0.6 (Hair et al., 2019), and (Sarstedt, Hair, Ringle, Thiele, & Gudergan, 2016). Convergent validity is estimated with an AVE value and a Loading factor of more than 0.5.

Table 2.
Construct Reliability
and Convergent
Validity

Construct	Factor Loading	Cronbach's Alph	Composite Reliability	AVE
Organizational performance (OP1) (OP2) (OP3) (OP9)	0.827 0.835 0.681 0.772	0.837	0.880	0.551
Supply Chain Management (SCM8) (SCM11) (SCM12) (SCM14) (SCM15) (SCM17)	0.758 0.707 0.767 0.761 0.741 0.758	0.787	0.862	0.610
Enterprise Resource Planning (ERP3) (ERP5) (ERP6) (ERP9) (ERP11)	0.606 0.774 0.721 0.656 0.779	0.761	0.835	0.504

Table 1 shows that Cronbach's alpha value meets the minimum measurement requirements where all values are above 0.7, 0.837, 0.787, and 0.761, respectively. Likewise, the composite reliability value meets the acceptable requirements (all values are within 0.880, 0.862, and 0.835). Table 1 shows that the factor loading is within an acceptable range (above 0.6) regarding convergent validity. It is important to underline that all factor loadings that do not meet the threshold are carefully removed to strengthen the AVE, and the entire model is reflective. Finally, all the AVE values exceed the set minimum conditions (at 0.551, 0.610, and 0.504). Based on the results of this data analysis, we can confirm that our model has no problems with construct reliability and convergent validity.

Discriminant Validity

Discriminant validity is the level of uniqueness of a given construction relative to all other constructs in the reflective model by looking at the Fornell-Larcker Criterion value and the HTMT ratio. The Fornell-Larcker Criterion value compares the square root of the AVE value with the correlation of the latent construction. Table 2 shows that the Fornell-Larcker values are met in this study.

Table 3.
Fornell-Larcker
Criterion

	ERP	Organizational performance	SCM
ERP	0,710		
Organizational performance	0,325	0,781	
SCM	0,610	0,511	0,742

Besides the Fornell-Larcker Criterion value, discriminant validity is also conducted by looking at the HTMT ratio. The HTMT ratio value is smaller than 0.85 (Benitez, Henseler, Castillo, & Schuberth, 2020). Table 3 shows that the value of the HTMT ratio is below the recommended threshold (ranging between 0.420 and 0.706). Therefore, it can be concluded that the data meets the requirements of discriminant validity.

	ERP	Organizational performance	SCM
ERP			
Organizational performance	0,420		
SCM	0,706	0,608	

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Table 4.
The Heterotrait-Monotrait Ratio (HTMT)

Structural Model R-Square

After confirming that the research model does not meet the measurement model, we continue to carry out a structural model by analyzing the R-square (R^2) related to the model's prediction accuracy and looking at the variance in endogenous variables explained by exogenous variables.

	R Square	R Square Adjusted
Organizational performance	0,261	0,254
SCM	0,373	0,366

Table 5.
Coefficient of Determination (R^2) and Adjusted R^2

Table 4 shows the R^2 value of 0.261, which means that SCM accounts for about 26.1% of the total variance in organizational performance. Meanwhile, ERP accounts for about 37.3% of the total variance in SCM. The estimation results of PLS (direct and mediating effects) are shown in Figure 1. In addition, this study applies the bootstrap method to determine the path significance.

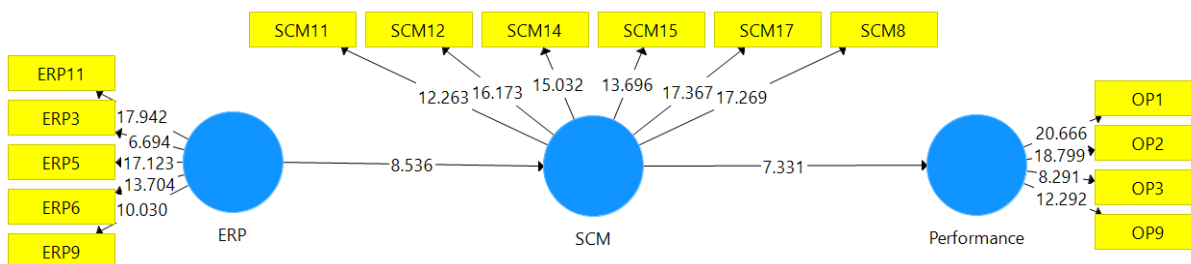


Figure 1.
Structural Model

Direct Effect

The bootstrap procedure was carried out to see the direct effect and the level of significance. The direct influence of research variables can be seen in the path coefficient values.

Hypotheses	Path	Original Sample (O)	T Statistic	P Values	Supported?
H1	ERP -> SCM	0,610	8,536	0,000	Yes
H2	SCM -> Organizational performance	0,511	7,331	0,000	Yes

Table 6.
Path Coefficient and Result of Hypotheses Testing

Regarding the hypothetical relationship shown in table 5, the results show that ERP has a significant positive impact on SCM ($\beta=0.620$, $t = 8.536$, $p\text{-value} = 0.000$), thus supporting H1. These results follow those presented by (Tahrini et al., 2015), and (Putra & Fioltya, 2018), where stated that ERP implementation would improve SCM performance. The results of this study can be interpreted that the benefits of ERP implementation can reduce cycle time and improve quality management and control. ERP implementation can meet customer needs proactively and more efficiently so that the performance of SCM in the internal business processes of PT. Semen Padang will experience an increase.

The results also indicate that SCM has a positive and significant effect on company performance ($\beta=0.511$, $t = 7.331$, $p\text{-value} = 0.000$), thus supporting H2. The results of this study are in line with research conducted by (Truong et al., 2017), (Gandhi et al., 2017), and (Green et al., 2006), where the results of their research show that SCM has a significant effect on organizational performance.

This study indicates that companies can improve their organizational performance if they apply SCM practices. The better the company's SCM practices, the better the company's organizational performance will be.

Mediation Effect

Further research was conducted to determine whether SCM is mediating between ERP implementation and organizational performance. The results are presented in Table 6. The results show that SCM plays a mediating role between ERP and organizational performance ($\beta = 0.312$, $t = 4.925$, $p\text{-value} = 0.000$), so H3 is supported in this study; namely, ERP has a significant effect on organizational performance mediated by SCM.

Table 7.
Indirect Effect

Hypotheses	Path	Original Sample (O)	T Statistic	P Values	Supported?
H1	ERP -> SCM -> Organizational Performance	0,312	4,925	0,000	Yes

Based on the research results shown in table 5 and table 6, it can be concluded that SCM has a partial mediation between ERP and organizational performance because ERP can also directly affect organizational performance.

CONCLUSION

This study was conducted to examine the relationship between ERP, SCM, and organizational performance and advance the mediation approach. The results show that ERP directly has a positive and significant effect on SCM, and SCM directly also has a positive and significant impact on organizational performance. In addition, it was also found that SCM plays a mediating role between ERP and organizational performance. The mediating role played by SCM is partial mediation. Based on the study results, we conclude that ERP and SCM can affect organizational performance. This finding is valuable for the company's stakeholders to improve ERP implementation in every company's business processes and carry out SCM practices in maintaining the relationship between suppliers and customers.

The limitations of this study are that it only focuses on one company, so it cannot be generalized to other companies, and the data are cross-sectional because they are only taken at one time. Therefore, based on the study's limitations, further research can try to validate and use the same conceptual model with a large sample of the company population that is expanded into manufacturing companies, and data collection is carried out longitudinally. Researchers also suggest that research can be carried out in the future on small and medium enterprises, not only on large-scale companies.

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