

Uncertain Supply Chain Management

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Impact of enterprise resource planning systems on management control systems and firm performance

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ABSTRACT

The aim of this study is to provide empirical evidence of the mediating effect of Supply Chain Management (SCM) on the relationship between enterprise resources planning (ERP) and financial performance. The empirical analysis in this study is based on primary data obtained from a survey of 300 agricultural sector companies with 220 respondents or with a response rate of 73%. This research was conducted with a Structural Equation Modeling (SEM) approach with a test tool using Partial Least Square (PLS). Overall, the findings in this study indicate that Supply Chain Management (SCM) mediates in part the effects of enterprise resources planning (ERP) on financial performance. The results of this study indicate that the implementation of enterprise resources planning (ERP) results in increased financial performance in the long term and Supply Chain Management (SCM) helps companies achieve increased financial performance in the future.

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1. Introduction

Today's business organizations are facing a more complex and competitive environment than ever before (Render & Heizer, 2004). In the high-level competition in the business environment, companies develop their competitiveness by using systems in the company to update customer service, shorten cycle times and reduce costs (Plenert, 2014). A dynamic business environment, characterized by constant technological and organizational changes in high globalization and increasing competition (Russell & Millar, 2014). One way to achieve success in this more complex business environment can be done by integrating the company's information system into a single unit such as Enterprise Resources Planning (ERP) which can integrate financial accounting systems, auditing and supply chain management (SCM) (Simchi-Levi et al., 2008). Enterprise Resources Planning is an enterprise-wide and integrated information system that can be used to manage and coordinate all resources, information and business functions stored in a central database, then let all the information taken from different organizational positions to make each organizational object look more visible (Kotler, 2005). ERP consists of three main modules, namely the operations module, the accounting and finance module and the human resource management module (Macbeth, 2015). In addition, ERP technology can also integrate marketing functions, production functions, logistics functions, financial functions, resource functions and other functions (Robert & Vijay, 2012). Enterprise Resources Planning is often referred to as a back office system which indicates that customers and the public are not involved in this system, and only involve suppliers as supporting systems because ERP is an integrated system that focuses on the company's internal coordination network (Agus, 2015). Before ERP developed, each division in an organization had its own operating information system that was separate from the information systems of other divisions so that access to information was still limited (Simon et al., 2015). Enterprise Resources Planning changes the role of management accounting to provide information for management with easy and fast access to produce relevant and real-time information needed in decision making and management control systems (Stevenson, 2012). Meanwhile, SCM provides visibility, planning, collaboration and control inside and outside the company (Lu, 2011). SCM itself is a coordination network consisting of suppliers,

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manufacturers, distributors, retailers and customers (Birhanu et al., 2018). The network supports careful planning and close coordination within and outside the company in order to improve performance (Fekpe et al., 2015).

According to Leon (2005), the main advantage of ERP implementation includes financial data integration, because all data is stored centrally, company executives get up-to-date data and can better manage company finances, as well as in terms of standardization of operating processes. The success of ERP implementation can be seen by measuring the level of Return on Investment (ROI) and other components, such as: reduced lead-time, increased financial control, decreased inventory, decreased total workforce, increased service levels, increased sales, increased customer satisfaction and loyalty, increased company market share, on-time delivery, better supplier performance, increased flexibility, reduced costs, better use of resources and increased accuracy of information (STPBM, 2013). These benefits go hand in hand with the goal of SCM which provides additional supporting information in decision making both within and outside the boundaries of the organization in terms of pricing, risk assessment and resource evaluation and logistics alternatives, as well as strengthening effective collaboration with vendors and customers (Wijaya & Darudianto, 2009). The use of ERP has been widely applied to large and medium-sized companies in Indonesia. ERP implementation is intended to improve company performance, both financial and non-financial. According to Kallunki et al., (2011) financial performance refers to the ability to generate profits or profitability assessed by financial measures such as the ratio of return on investment and non-financial performance referring to the effectiveness and efficiency of the company. Previous research on ERP implementation in relation to SCM and performance shows that SCM has an effect on improving financial performance (Hong et al., 2012). Su and Yang (2010) state that the operational function of ERP is a factor that has a very important impact on improving performance with SCM in internal and external business processes. Another study conducted by Akyuz & Rehan (2009) states that ERP and SCM can force organizations to streamline the internal functions of company management in an effort to improve performance. Implementing ERP with good control can help achieve goals and lead to increased company performance. Assessing the potential impact of ERP is essential to make a difference in the effect between financial and non-financial performance (Hunton et al., 2003). However, the relationship between increased efficiency, effectiveness and company financial performance is still empirically unclear (Kallunki et al., 2011). Some of the recent empirical evidence regarding the effects of ERP on organizational performance is conflicting; companies that implemented ERP several years ago currently perform better than those that did not implement it or their performance is worse than companies that did not implement ERP (Hunton et al., 2003; Nicolaou, 2008; Nicolaou & Bhattacharya, 2008; Wier et al., 2007; Poston & Grabski, 2001). The differences in research results may be due to the time lag between initial ERP implementation and the desired effect on performance. To explain this, Nicolaou & Bhattacharya (2008) has shown that it takes at least two years before companies that adopt ERP start to achieve positive financial performance. Su and Yang (2010) stated that ERP uptime is an important attribute for improving performance, it usually takes more than three years to have a positive impact on performance. Research that says that ERP does not have a positive impact usually does not see the role of other control systems as well as linkages such as SCM.

2. Literature review

2.1 Enterprise Resources Planning

Enterprise Resources Planning (ERP) is an information system for identifying and planning the resources a company needs to use, create, send and calculate efficiently and can better respond to customer needs (Monk & Wagner, 2013). ERP is a transaction processing system and a system that can integrate data throughout an organization (Kuo, 2014). ERP is a set of integrated business applications or modules, which can contain business functions, such as ledger accounting, accounts payable, accounts receivable, raw material planning, order management, inventory control and human resource management (Thomas et al., 2012). Company resource planning is an information system model that allows companies to automate and integrate various main business processes (Pudjiarti & Priagung Hutomo, 2020). ERP breaks traditional functional barriers by facilitating the sharing of data among all users in the company. ERP implementation can take the form of a massive takeover, which can take several years. Due to its complexity and size, few companies are willing or able to provide financial resources physically and bear the risk of developing an ERP system internally (Monk & Wagner, 2013). ERP is a software package that involves many software modules that develop especially from the traditional Enterprise Resource Planning system. The purpose of ERP is to integrate key organizational processes such as order entry, manufacturing, purchasing, accounts payable, payroll and human resources (Dhewanto, 2007). In the traditional information system model, each department or function has its own computer system designed to optimize the performance of each department and function. ERP combines all of this into one integrated system that accesses one database, enabling information sharing and improving communication within the company. The Enterprise Resource Planning (ERP) system is an information system that is implemented in companies to help integrate all functions of an ERP implementation company in a company supported by information technology that is designed to be used to handle most businesses of an organization or company in improving company performance (Mastan, 2013). Enterprise Resource Planning is an integrated information system technology used by world-class companies in improving company performance. That way ERP becomes a system both as a planning system and as an information system (Dhewanto, 2007). According to O'Leary in Dhewanto (2007), "ERP systems are computer based systems designed to process an organization's transactions and facilitate integrated and real-time planning, production and customer response. In particular ERP systems will be assumed to have certain characteristics". Enterprise Resource

Planning (ERP) is an integrated system that regulates and describes all existing resources, both in terms of finance, marketing, sales, services and other support to facilitate and support the performance of all related elements in the company as well as as a liaison for all relevant stakeholders (Widjaya, 2012).

2.2 Supply Chain Management

Supply chain management (SCM) is a coordination network consisting of suppliers, manufacturers, distributors, retailers and customers. This network supports careful planning and close coordination within and outside the company (Akkermans & van Helden, 2002). Anatan (2008) defines SCM as a coordinating network for processing raw materials into finished materials that are ready to be distributed to customers. Supply Chain Management is an effort to integrate the parties involved in Supply Chain activities in making a product. Process can be improved, efficient, quality increased and service to customers is good. According to Chopra & Meindl (2007) in a company that implements Supply Chain Management there are 5 main developments, namely product development, procurement, planning, production control and delivery. The principle of implementing Supply Chain Management is to embrace all entities in the supply chain into one unit, encourage integration and synchronization of material flow, cash flow and information flow, and emphasize that each entity in the supply chain can build strategic and partnership relationships in order to reduce total costs and increase customer satisfaction (Lambert & Cooper, 2000). Supply Chain according to Pujawan (2010) is collaboration between companies that interact to deliver products (goods or services) to end customers. Meanwhile, the meaning of the supply chain according to Said et al., (2006) is a group of companies and individuals working collaboratively in a network of interconnected processes. According to Miranda and Tunggal (2002), a supply chain is a network of companies that work together to create and deliver a product into the hands of the end user. The concept of Supply Chain was originally developed in the manufacturing industry but has since been adapted to various sectors including agriculture. The supply system is a network that is interrelated, forming a supply chain (Ballou & Srivastava, 2007). The application of the supply chain system to the agricultural sector has been able to increase efficiency and further ensure product quality. According to Natsir (2012), Manufacturing and agriculture is a process to convert raw materials into finished materials using technology and equipment. Although the basic meaning is the same, the characteristics of the agricultural sector are very different from manufacturing. Agricultural sector supply chain management is an operational and strategic cycle that includes labor, materials, equipment, subcontracting and settlement. These components are connected by technology, security and communication (Chandra & Kumar, 2000).

Supply chain management is defined as strategic management of the flow of information, activities, tasks and processes involving various independent organizational networks and interaction relationships (upstream and downstream) that produce value delivered to owners in the form of project completion (Chow & Chan, 2008). Supply chain is a network of organizations that are involved through upstream and downstream relationships, in different processes and activities that produce value in the form of products and services in the hands of consumers (Widyarto, 2012). As well as providing an explanation that the SCM practice is a multidimensional concept that includes the upstream and downstream sides of the supply chain. Hugos (2018) identifies that long-term relationships, information sharing, vision and mission, risk, profit sharing, cooperation, integration processes and underlying supply chain leadership, also identifies that supplier strategy, customer relationships and information sharing are the keys to SCM practice (Pujawan & Mahendrawathi, 2010).

2.3 Financial Performance

Performance in the organization is the answer to the success or failure of the organizational goals that have been set (Harahap, 2010). Organizational performance is an overall achievement (over-all) in order to obtain an objective performance measure. Previous research such as Agustin & Handayani (2013) produced a performance construct that was defined as the degree of the level of goals achieved in all dimensions, including financial and non-financial aspects. Company performance is a measure of the success of a company which is measured over a specified period of time. This result can be said to be a value of every activity that has been compiled and implemented to be able to identify whether the strategy that has been made and the implementation of the strategy is correct or vice versa (Munawir, 2018). The performance targets set by the company will motivate personnel to achieve these targets. The target set will be a measure of the success or failure of the company and each member of the company in carrying out operational activities. Good performance will have an impact on the company's survival. To achieve good performance, it is necessary to have a performance appraisal (Rico & Rudy, 2003). Performance appraisal is also used to suppress and prevent inappropriate behavior from occurring and to design and enforce behavior that should be desired, through timely feedback on performance results and rewards given, both intrinsic and extrinsic in nature. Sawir (2005) states that company performance can be assessed from the company's financial performance and non-financial performance. Hery (2012) states that company performance can be measured using three indicators, namely financial performance, operational performance and market-based performance. Financial performance is generally measured by measurement based on accounting data, such as the measurement of profitability which includes return on assets, return on investment, return on sales and return on equity. Performance measurement from a non-financial perspective has received more attention for years as the number of companies has grown. Hanafi (2010) states that the main advantage of measuring operational performance compared to financial performance is when the available information is related to opportunities that already exist, but have not been financially realized. Operational performance can generally be measured using measurements such as market share, new product launches, product / service quality, marketing effectiveness and customer satisfaction (Fahmi, 2013). Overall

market-based performance will be affected when the market finds out information about the company's operations that is not included in the company's performance results. The rate of return to shareholders, market value added and annual profits can be used to measure market-based performance (Rudianto, 2013).

2.4 Hypothesis

Fig. 1 below shows the direct effect of ERP implementation on company performance (non-financial and financial) (Chapman & Kihn, 2009), as well as the possible indirect effect through the mediating role of SCM (Akyuz & Rehan, 2009; Su, & Yang, 2010).

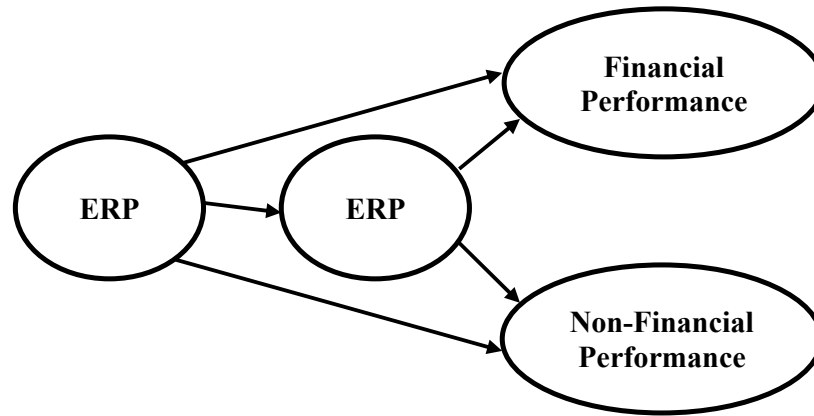


Fig. 1. Framework

Supply chain dynamics have been studied for more than three decades. The literature on SCM relating to strategies and technologies for effectively managing supply chains is quite extensive. Chen and Wu (2011) classify approaches and initiatives within the scope of SCM into four streams, namely strategic purchasing control, supply management control, logistics control and customer network coordination control. In recent years, SCM has received a lot of attention from researchers and practitioners. The main challenge to empirically show that SCM concerns how to measure the supply chain in the company's control process, the supply chain work system must necessarily combine financial and non-financial measures to cover a broader range of steps. Su and Yang (2010) developed a logistical framework based on the research results of Buurman (2002) that use a measurement model that considers supply chain performance to represent five major performance areas: customer service, cost management, quality, productivity and asset management. Meanwhile, the integration of ERP enhances the coordination network that has been formed in SCM control so that it makes it easier for business processes with a high degree of accuracy in planning, production, distribution and reporting.

Su and Yang (2010) argue that the core ERP system for operational functions must include applications for forecasting, production production scheduling, planning, inventory control, warehouse management and other supporting factors. Thus, comparing the competence of firms with SCM control with the operational benefits of ERP is not difficult to find some correlation between the two. Based on this, the empirical findings of Su and Yang (2010) suggest the benefits generated by SCM control with increased income, increased productivity, reduced operating costs, lower inventory and reduced order cycle time. Previous research conducted by Wade and Hulland (2004) provides an overview of the literature on the relationship of related resources and their impact on company strategy, SCM and performance which have a significant relationship. Akkermans & van Helden (2002) studied the future impact of ERP systems on management in relation to SCM which has a positive relationship by looking at managerial competences and company system competencies. Therefore, in the company's SCM competency model in the process of operational integration, customers, as well as planning and control integration are driven by the operational benefits of ERP, so that company performance can be improved. Based on the above discussion, it can be suggested that SCM can mediate the implementation of ERP in achieving an increase in organizational performance, both financial and non-financial performance. The following is the research hypothesis:

H1: Supply Chain Management mediates the effect of ERP implementation on the company's non-financial performance.

H2: Supply Chain Management mediates the effect of ERP implementation on the company's financial performance.

3. Research methods

3.1 Samples, Data Collection and Survey Procedures

The sample in this study is an agricultural sector company that has implemented an ERP system (Nicolaou, 2008). Respondents in this study were financial / treasury managers and accounting managers. The selection of respondents to managers who are responsible in terms of corporate finance and accounting is carried out because they occupy positions

where they have knowledge of strategic issues (Widener, 2007). Data collection methods are through mail surveys, e-surveys and self-administered surveys to each accounting manager and company financial manager, in which respondents are sent a questionnaire list via email or Google form. There are 300 questionnaires distributed.

3.2 Construct Measurement

The ERP construct is measured based on the financial system, logistics, inventory management, product and process management, and human resource management developed by Kallunki et al., (2011) with 6 (six) survey questions. By using a Likert scale of 7 (seven) from a value of one if it is not used at all in the company to a value of seven if it is very intensively used in the company. In designing questions for SCM, the variable instrument consists of 4 (four) question items adapted from the research of Akyuz & Rehan (2009). The construct is made based on an internal business perspective, an external business perspective and a customer perspective according to the instrument questions from previous researchers. By using a Likert scale of 7 (seven) from a value of one if very low in supporting business processes to a value of seven if it is very high in supporting business processes. In accordance with the measurement of previous research conducted by Kallunki et al., (2011), financial performance is measured by 5 (five) question items, while non-financial performance is measured by 8 (eight) question items. By using a Likert scale of 7 (seven) from the value of one if it is lower than the previous year to the value of seven if it is higher than the previous year.

3.3 Hypothesis Test

Analysis of structural equation modeling (SEM) with the SmartPLS version 2.0 program was used to test the hypothesis. SEM-PLS was chosen because it is suitable for this research model which uses latent variables. SEM analysis can simultaneously test multiple dependencies as in this research model and component-based SEM (PLS) can estimate a fairly complex model with a small sample size (Ghozali, 2011).

4. Results and discussion

4.1 Response Rate and Sample Characteristics

Of the 300 questionnaires sent, 220 were returned questionnaires, so the questionnaires used in data processing were 220 questionnaires with a response rate of 73%.

Table 1
Response Rate

Information	Amount
Number of questionnaires sent	300
Number of questionnaires returned	220
Response rate (300/220) * 100%	73%

Source: Primary data processed, 2021

4.2 Descriptive Statistics

The descriptive statistics in Table 2 show that the average use of the ERP module is 26.79. This shows the high intensity of the use of the ERP module by the sample because the average value is far above the middle value of the theoretical range of 20.00. Table 2 also shows that the use of supply chain management in supporting business processes is quite high with an average value of 19.81, higher than the theoretical mean value of 16.00. The non-financial performance with an average value of 46.69 is higher than the theoretical mean value of 32.00. The financial performance with an average value of 23.85 is higher than the theoretical mean value of 20.00.

Table 2
Descriptive Statistics

Variable	Theoretical			Truly			Std. Dev
	Range	Mean	Range	Mean	Mean		
ERP	5 → 35	20,00	19 → 35	26,79	3,51		
SCM	4 → 28	16,00	12 → 28	19,81	2,59		
KNK	8 → 56	32,00	38 → 56	46,69	4,52		
KK	5 → 35	20,00	15 → 35	23,85	2,58		

Source: Primary data processed, 2021

4.3 Non-Response Bias Test Results

The non-response bias test in this study is done by comparing the answers for each construct between early respondents and late respondents. In this study, responses that returned answers past the predetermined cut-off time were considered to

represent the answers of respondents who did not answer (non-response). Table 3 shows no significant difference in answers between the two groups. Overall, the results suggest that there was no non-response bias in this study.

Table 3
Ray non-response testing

Information	N	Descriptive	Construct			
			ERP	SCM	KNK	KK
Before cut off	220	Mean	28,39	19,38	48,12	24,19
		Std. Dev	4,89	3,32	6,47	3,37
After the cut off	210	Mean	27,42	16,92	44,93	22,17
		Std. Dev	3,69	3,78	5,57	5,12
Probability			0.37	0.89	0.87	0.51

Source: SPSS output, 2021

4.4 Results of Construct Validity and Reliability Testing

In accordance with the SEM-PLS testing procedure, the evaluation of the convergent validity of the constructs uses indicators in the form of loading factors and average variance extracted (AVE) (Ghozali, 2011). The results of the outer model with the SmartPLS program in Table 4 show that the criteria for convergent validity have been met, namely the loading factor is greater than 0.70 and AVE is greater than 0.60 (Ghozali, 2011).

Table 4
Data Criteria

Variable	AVE	$\sqrt{\text{AVE}}$	Composite Reliability	Cronbach Alpha	R Square
ERP	0.867	0.935	0.909	0.879	-
SCM	0.793	0.913	0.889	0.849	0.769
KNK	0.845	0.934	0.931	0.901	0.891
KK	0.828	0.914	0.893	0.858	0.848

Source: SmartPLS output, 2021

Table 4 also shows that the criteria for discriminant validity have been met, indicated by the square root of AVE being greater than the correlation coefficient between constructs in each column. Likewise, reliability has been fulfilled with composite reliability and Cronbach alpha greater than 0.70 (Ghozali, 2011).

4.5 Correlation between Constructs

The correlation matrix in Table 5 shows that there is a strong positive relationship between ERP and SCM, indicated by a correlation coefficient of 0.881 and significant. There is a positive relationship between ERP and non-financial performance (KNK) with a correlation coefficient of 0.919 and significant. There is a positive relationship between ERP and financial performance (KK) with a correlation coefficient of 0.902 and significant. There is a positive relationship between SCM and non-financial performance (KNK) with a correlation coefficient of 0.898 and significant. There is a positive relationship between SCM and financial performance (KK) with a correlation coefficient of 0.891 and significant. There is a positive relationship between non-financial performance (NPC) and financial performance (KK) with a correlation coefficient of 0.897 and it is significant. These results indicate an initial indication of support for the mediation hypothesis because the mediation relationship requires a significant correlation between the independent, mediating and dependent variables (Hair et al., 2010).

Table 5
Relation and Square Roots of AVE

Variable	ERP	SCM	KNK	KK
ERP	0.931			
SCM	0.881	0.903		
KNK	0.919	0.898	0.918	
KK	0.902	0.891	0.897	0.906

Source: SmartPLS output, 2021

4.6 Mediation Test Results

The procedure for testing innovation as a mediating variable for the relationship between SCM and performance is as follows (Baron & Kenny, 1986; Hair et al., 2010):

1. Estimating the direct effect of ERP on non-financial performance and financial performance (path c).

2. Estimating the indirect effect simultaneously PLS SEM Model, namely ERP → Non-financial performance and financial performance (Line c''), ERP → SCM (line a), and SCM → Non-financial performance and financial performance (Line b).

The mediation effect requirements that must be met are: (i) the path coefficient c is significant in model (1), and (ii) the path coefficient A and B must be significant in model (2). The conclusions about mediation are as follows:

- a. If the path coefficient c'' from the estimation results of model (2) remains significant and unchanged (c'' = c) then the mediation hypothesis is not supported.
- b. If the path coefficient c'' decreases (c'' < c) but remains significant, the form of mediation is partial mediation.
- c. If the path coefficient c'' decreases (c'' < c) and becomes insignificant, the form of mediation is full mediation.

The results in Fig. 2 show that the requirements for the mediation test have been met, namely the coefficients c, a, and b are significant with the respective values of the c coefficient of 0.589 and 0.561, the coefficient of 0.881, and the b coefficient of 0.381 and 0.389.

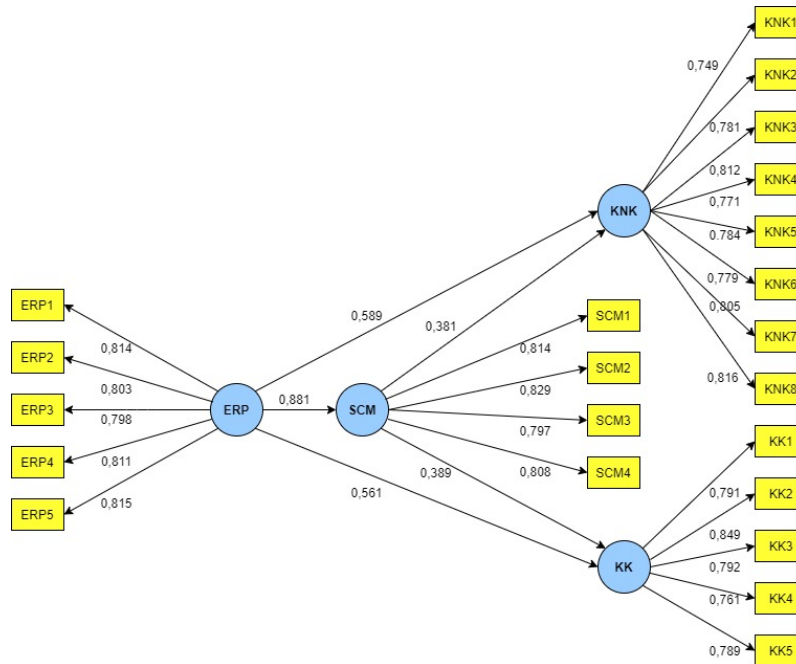


Fig. 2. Structural Path Test Results

The test results in Table 6 show that the ERP direct effect coefficient on non-financial performance (c) in model (1) is 0.919 and significant, the ERP direct effect coefficient on financial performance (c) in the model is 0.911 and significant. The estimation result of model (2) shows the indirect effect coefficient of ERP on non-financial performance (c'') decreases to 0.589 and remains significant, the coefficient of the indirect effect of ERP on financial performance (c'') drops to 0.561 and remains significant. This shows the form of partial mediation or in other words, SCM partially mediates the effect of ERP on performance (non-financial and financial).

Table 6
Results of Hypothesis 1 and 2 Test (Mediation)

Variable	Direct effect		Indirect effect	
	Coefficient	P value	Coefficient	P value
ERP → SCM			0.881	0.031
SCM → KNK			0.381	0.021
ERP → KNK	0.919	0.008	0.589	0.013
SCM → KK			0.389	0.019
ERP → KK	0.911	0.003	0.561	0.015

Source: SmartPLS output, 2021

This partial mediation form shows that SCM is not the only mediator of the relationship between ERP and performance, but there are other mediating factors (Hair et al., 2010). The test results show support for hypothesis 1 and hypothesis 2, namely ERP has an indirect effect on performance (non-financial and financial). SCM acts as a partial mediator of the effect

of ERP on performance (non-financial and financial). This result is also supported by the single test results that the p-value of ERP → SCM → KNK is less than 0.05, and the p-value of ERP → SCM → KK is less than 0.05 (Table 6).

The SEM-PLS test results show empirical support for the mediation model. These findings are consistent with the results of research by Akkermans & van Helden (2002) who argue that ERP implementation has a positive effect on improving SCM performance and influences other business functions that encourage overall company performance improvement. These results are also supported by the results of research conducted by Akyuz & Rehan (2009) which found that ERP and SCM can force organizations to streamline the internal functions of company management in an effort to improve performance. The results of other studies also corroborate the findings of this study, Su and Yang (2010) state that the operational function of ERP is a factor that has a very important impact in improving performance with SCM in internal and external business processes. The core of the ERP system for operational functions must include applications for forecasting, production production scheduling, materials planning, inventory control, warehouse management and others. Thus, comparing the competence of SCM companies with the operational benefits of ERP, it is not difficult to find several correlations between the operational benefits of ERP and company competencies. Overall, these results indicate that the SCM hypothesis as a mediator of the relationship between ERP and firm performance (non-financial and financial) is supported and significant.

5. Conclusion

Overall, the results of this study indicate that supply chain management (SCM) mediates the relationship between the use of enterprise resources planning (ERP) and company performance. In addition, the results encouraged that at least 2 years of ERP implementation is required in a company to produce positive company performance. Some limitations in this study are the relatively small sample size consisting of 220 respondents, this is because many companies have not allowed the role of ERP in their companies to be published. Thus the generalization of the role of ERP is still limited. In addition, although some respondents are middle executives in the company, they are not familiar with all the detailed information needed when responding to several question items. This study uses only one sector, namely agriculture. Given the limitations of this study, the suggestion for future research is to increase the number of samples and respondents so that the findings of this study can be more generalized in other contexts. In addition, it also improved the items of the survey questions to make them easier for respondents to understand. Furthermore, future research is expected to add objects of research not only to the agricultural sector.

References

- Agus, A. (2015). Supply chain management: the influence of SCM on production performance and product quality. *Organization*, 12(17), 18.
- Agustin, A. L., & Handayani, S. R. (2013). Analisis rasio keuangan untuk menilai kinerja keuangan perusahaan. *Jurnal Administrasi Bisnis*, 2(1), 12-20.
- Akkermans, H., & van Helden, K. (2002). Vicious and virtuous cycles in ERP implementation: a case study of interrelations between critical success factors. *European Journal of Information Systems*, 11(1), 35-46.
- Akyuz, G. A., & Rehan, M. (2009). Requirements for forming an 'e-supply chain'. *International Journal of Production Research*, 47(12), 3265-3287.
- Anatan, L. (2008). Supply Chain Management; Teori dan Aplikasi.
- Ballou, R. H., & Srivastava, S. K. (2007). *Business logistics/supply chain management: planning, organizing, and controlling the supply chain*. Pearson Education India.
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173.
- Birhanu, D., Krishnanand, L., & Rao, A. N. (2018). Supply chain strategies of manufacturers in Ethiopia. *International Journal of Productivity and Performance Management*, 67(2), 318-340.
- Buurman, J. (2002). *Supply chain logistics management*. McGraw-Hill.
- Chandra, C., & Kumar, S. (2000). Supply chain management in theory and practice: a passing fad or a fundamental change?. *Industrial Management & Data Systems*, 100(3), 100-114.
- Chapman, C. S., & Kihn, L. A. (2009). Information system integration, enabling control and performance. *Accounting, Organizations and Society*, 34(2), 151-169.
- Chen, K. Y., & Wu, W. T. (2011). Applying analytic network process in Logistics service provider selection-A case study of the Industry Investing in Southeast Asia. *International Journal of Electronic Business Management*, 9(1), 24.
- Chopra, S., & Meindl, P. (2007). Supply chain management. Strategy, planning & operation. In *Das summa summarum des management* (pp. 265-275). Gabler.
- Chow, W. S., & Chan, L. S. (2008). Social network, social trust and shared goals in organizational knowledge sharing. *Information & Management*, 45(7), 458-465.
- Dhewanto, W. (2007). Falahah. ERP (Enterprise Resource Planning): Menyelaraskan Teknologi Informasi dengan Strategi Bisnis. *Informatika Bandung, Bandung*.
- Fahmi, I. (2013). Analisis Laporan Keuangan: Alfabeta.

- Fekpe, E. S., Osei, V., & Twumasi, J. (2015). Performance measurement of supply chains: a review. In *Proceedings of Academy of Business and Emerginh Markets (ABEM) Conference, Windhoek*, pp. 77-83
- Ghozali, I. (2011). Aplikasi Analisis Multivariate Dengan Program IBM dan SPSS. *Semarang: BP Universitas Diponegoro*.
- Hair, J. F., Anderson, R. E., Babin, B. J., & Black, W. C. (2010). *Multivariate data analysis: A global perspective* (Vol. 7).
- Hanafi, M. M. (2010). *Manajemen Keuangan-Cetakan ke lima*. Yogyakarta: BPFPE.
- Harahap, S. S. (2010). Analisis kritis laporan keuangan. *Jakarta: Rajawali Pers*.
- Hery, S. E., & Si, M. (2012). Analisis Laporan Keuangan. *Jakarta: PT. Bumi Aksara*.
- Hong, P., Dobrzykowski, D., Park, Y. W., HassabElnaby, H. R., Hwang, W., & Vonderembse, M. A. (2012). The impact of ERP implementation on organizational capabilities and firm performance. *Benchmarking: An International Journal*.
- Hugos, M. H. (2018). *Essentials of supply chain management*. John Wiley & Sons.
- Hunton, J. E., Lippincott, B., & Reck, J. L. (2003). Enterprise resource planning systems: comparing firm performance of adopters and nonadopters. *International Journal of Accounting Information Systems*, 4(3), 165-184.
- Kallunki, J. P., Laitinen, E. K., & Silvola, H. (2011). Impact of enterprise resource planning systems on management control systems and firm performance. *International Journal of Accounting Information Systems*, 12(1), 20-39.
- KINI, S. T. P. B. M. (2013). Enterprise Resource Planning (ERP) Sebagai Tulang Punggung Bisnis Masa Kini. *Jurnal Aplikasi Bisnis*, 3(2).
- Kotler, P. (2005). *Manajemen Pemasaran*, Edisi 11 jilid 1 dan 2 Pemasaran. *Jakarta: PT. Indeks*.
- Kuo, C. (2014). Effect of enterprise resource planning information system on business performance: An empirical case of Taiwan. *Journal of Applied Finance and Banking*, 4(2), 1.
- Lambert, D. M., & Cooper, M. C. (2000). Issues in supply chain management. *Industrial marketing management*, 29(1), 65-83.
- Leon, A. (2005). *Enterprise Resources Planning*. McGraw-Hill
- Lu, D. (2011). *Fundamentals of supply chain management*. Bookboon.
- Macbeth, D. K. (2015). *Strategic Analysis of Supply Chain Design-eBooks and textbooks from bookboon. com*.
- Mastan, S.A. (2013). Implementasi Sistem Enterprise Resource Planning: Studi Fenomenologi di PT Platinum Ceramics Industry. *Jurnal Ilmu dan Riset Akuntansi*, 2(1).
- Miranda, S. T., & Tunggal, A. W. (2002). *Management Logistic and Supply Chain Management*. *Jakarta: Harvarindo*.
- Monk, E. F., & Wagner, B. J. (2013). Concepts in enterprise resource planning, internat. ed. ed. *Course Technology Cengage Learning, Boston [ua]*.
- Munawir, S. (2018). *Analisa laporan keuangan*. Liberty.
- Natsir, M. (2012). Sistem rantai pasok material dan peralatan konstruksi untuk mendukung investasi infrastruktur. *Kepala Pusat Pembinaan Sumber Daya Investasi. Badan Pembinaan Konstruksi. Kementerian Pekerjaan Umum*, 18.
- Nicolaou, A. I. (2008). Research issues on the use of ERPS in interorganizational relationships. *International Journal of Accounting Information Systems*, 9(4), 216-226.
- Nicolaou, A., & Bhattacharya, S. (2008). Sustainability of ERPS performance outcomes: The role of post-implementation review quality. *International Journal of Accounting Information Systems*, 9(1), 43-60.
- Plenert, G. J. (2014). *Supply chain optimization through segmentation and analytics*. Crc Press.
- Poston, R., & Grabski, S. (2001). Financial impacts of enterprise resource planning implementations. *International Journal of Accounting Information Systems*, 2(4), 271-294.
- Pudjiarti, E.S., & Priagung Hutomo, P.T. (2020). The critical role of effective organizational learning to improve firm's innovation and performance in a market turbulence condition. *International Journal of Innovation Science*, 12(3), 237-254.
- Pujawan IN, E. R. M. (2010). *Supply Chain Management*. Surabaya: Penerbit Guna Widya.
- Pujawan, I. N. & Mahendrawathi ER. (2010). *Supply Chain Management*.
- Render, B., & Heizer, J. (2004). *Operations Management, International Edition*.
- Rico, L., & Rudy, S. (2003). *Financial Performance Analyzing*. PT. Elex Media Komputindo, Yakarta.
- Robert, A. N., & Vijay, G. (2012). *Management Control System (Sistem Pengendalian Manajemen)*. Salemba Empat, Jakarta.
- Rudianto, E. (2013). *Akuntansi Manajemen Informasi Untuk Pengambilan Keputusan Strategis*. Jakarta: Erlangga.
- Russell, S. N., & Millar, H. H. (2014). Exploring the relationships among sustainable manufacturing practices, business performance and competitive advantage: Perspectives from a developing economy. *J. Mgmt. & Sustainability*, 4, 37.
- Said, A. I., Bayu, A. S., Clara, L. B., Hoetomo, L., Riri, S., Soerjo, W., & Zaldi, I. M. (2006). *Produktivitas dan Efisiensi dengan Supply Chain Management*. Jakarta: Penerbit PPM.
- Sawir, A. (2005). *Analisis kinerja keuangan dan perencanaan keuangan perusahaan*.
- Simchi-Levi, D., Kaminsky, P., Simchi-Levi, E., & Shankar, R. (2008). *Designing and managing the supply chain: concepts, strategies and case studies*. Tata McGraw-Hill Education.
- Simon, A. T., Serio, L. C. D., Pires, S. R. I., & Martins, G. S. (2015). Evaluating supply chain management: A methodology based on a theoretical model. *Revista de Administração Contemporânea*, 19(1), 26-44.
- Stevenson, W. J. (2012). *Operations management*. McGraw-Hill/Irwin.
- Su, Y. F., & Yang, C. (2010). A structural equation model for analyzing the impact of ERP on SCM. *Expert Systems with Applications*, 37(1), 456-469.

- Thomas, W. S., Babb, D., & Spillan, J. E. (2012). The importance of culture change and change management in successful implementation of SAP enterprise resource planning systems. *Mountain Plains Journal of Business and Technology*, 13(1), 2.
- Wade, M., & Hulland, J. (2004). The resource-based view and information systems research: Review, extension, and suggestions for future research. *MIS quarterly*, 107-142.
- Widener, S. K. (2007). An empirical analysis of the levers of control framework. *Accounting, organizations and society*, 32(7-8), 757-788.
- Widjaya, I. K. (2012). Enterprise resource planning. *Yogyakarta: Graha ilmu*.
- Widyarto, A. (2012). Peran supply chain management dalam sistem produksi dan operasi perusahaan.
- Wier, B., Hunton, J., & HassabElnaby, H. R. (2007). RETRACTED: Enterprise resource planning systems and non-financial performance incentives: The joint impact on corporate performance.
- Wijaya, S. F., & Darudiato, S. (2009). ERP (Enterprise Resource Planning) & Solusi Bisnis. *Yogyakarta, Graha Ilmu*.



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