

DOES ENTERPRISE RESOURCE PLANNING LEAD TO THE QUALITY OF THE MANAGEMENT ACCOUNTING INFORMATION SYSTEM?

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Abstract: The objective of this study is to examine the role of enterprise resource planning (ERP) in the quality of management accounting information systems (MAIS). The quality of MAIS is considered by following the three dimensions; reliability, efficiency and flexibility. For this purpose, this study surveyed by using a questionnaire. The survey was carried out among the public-owned enterprises in Indonesia. Respondents of the study were the employees working on MAIS among public-owned enterprises in Indonesia. 180 valid responses were returned and analyzed by using Partial Least Square (PLS). Results of the study highlighted the important role of ERP in the quality of MAIS. It is reported that; ERP has a positive influence on the quality of MAIS. ERP has the potential to promote reliability, efficiency, and flexibility of the quality of MAIS among public-owned enterprises in Indonesia.

Keywords: Accounting information system, enterprise resource planning, reliability, efficiency, flexibility, outcome orientation.

Introduction

Management accounting information (MAIS) is of central importance among organizations (Nuraliati & Sianturi, 2021) because it has a key relationship with the different organizational operations. MAIS is based on financial data which has significant importance to take various decisions by the management influencing organizational performance. Financial data management is important for taking various investment decisions, therefore, this data should have significant quality. Thus, the quality of MAIS is required to maintain by the organizations to get better outcomes in terms of various operations (Nuseeb, Koussa, Matshidze, Umeokafor, & Windapo, 2021).

Along with the other organizations, enterprises working in Indonesia are facing such issues (Puspitawati, 2021). The low quality of MAIS affects the performance of enterprises. Particularly, the public-owned enterprises' Sari and Lubis (2018) are facing more issues related to the MAIS. Low quality of financial data among the public-owned enterprises has a negative role in different financial decisions. Inappropriate financial decisions by the enterprises lead to low profitability, low return on assets and low return on equity. Therefore, it is important to address the issues related to the quality of MAIS.

This study proposed that; the quality of MAIS can be promoted through enterprise resource planning (ERP). ERP has the potential to influence MAIS among organizations as reported in the literature. Literature reported the important elements related to the quality of MAIS which include; reliability, efficiency and flexibility. Improvement in these three elements can enhance the quality of MAIS. Therefore, this study proposed the important contribution of ERP to the reliability, efficiency, and flexibility of MAIS. The resource availability for the enterprises does not work until it is not planned productively. Therefore, planning organizational resources for the MAIS is more important to promote quality (Hartani, Haron, & Tajuddin, 2021). Consequently, the objective of this study is to examine the role of ERP in the quality of MAIS among the public-owned enterprises in Indonesia. Public-owned enterprises are considered in this study because these enterprises have weak MAIS than private-owned organizations. The quality of MAIS among public-owned enterprises is low as compared to the privately-owned enterprises to the issues related to reliability, efficiency, and flexibility. Enterprise cannot get benefits from the ERP until the employees do not work appropriately to achieve the required outcomes.

Thus, this study examined the relationship between ERP, reliability, efficiency, flexibility, and quality of MAIS. By examining this relationship, this study contributed to the literature, several previous studies have considered accounting information systems (Flayyih, Mirdan, & Elkhaldi, 2021), however, these studies have not addressed quality of MAIS along with ERP among the public-owned enterprises in Indonesia. Hence, this contribution of the study in the field of ERP and MAIS lead to several insights for the practitioners to promote the performance of public-owned enterprises (Hamsal, Ichsan, Utomo, Fahira, & Wetik, 2021).

Literature Review

Management Accounting Information system (MAIS)

There are two main components of accounting information systems namely management accounting information system and financial accounting information system. The objective of MAIS is different from financial accounting information systems in terms of its outputs and inputs. **MAIS plays a very important role in helping the workers, executives and managers in generating information that is required for the generation of information required to manage the organization (Napitupulu, 2018).** MAIS is referred to as normative. The user of MAIS will be satisfied in long term as well as short term decision making if the quality of MAIS is good. But if MAIS is not properly understood by the user, its implementation will harm the organization.

MAIS plays a very important role in serving and supporting the corporate strategy. The basic purpose of using MAIS by the manager is to get the specific information regarding organization from informal as well as formal sources. This information is very important for the organization to gain a competitive advantage. The main objective of MAIS is that it is positively linked to the strategy of the organization. It has a major role in the achievement of long-term decisions of the organization. Moreover, the overall performance of the organization is positively affected by the proper integration of MAIS. Scholars have reported several characteristics of MAIS namely flexibility, integrity and reliability (Rahmawati, Rosdiana, & Nurlili, 2017). ***Enterprise Resource Planning systems (ERP)***

In the last decades organizations have adopted new packaged software which was designed for the integration of all of the organizational activities. This system is known as enterprise resource system also known as ERP. Some of the other authors have also termed it as enterprise systems and enterprise-wide systems as well. This system is used to provide the information that is needed by the employees of the organization. There are several different benefits of an ERP system. **These benefits include help in the management of human resource management, accounting, shipping, product planning, customer order management and inventory management (Katuu, 2020).**

Other authors have also reported a few more benefits and significance of the ERP system. The organizations that have used the ERP system have successfully been able to minimize their inventory cost by 30 per cent. Whereas, these organizations have also been able to cut their raw material cost by fifteen percent as well. **Furthermore, the organizations have successfully been able to minimize their production costs, production time and lead time for customers by using ERP systems (Lutfi et al., 2022).**

Hypotheses Development

A public-owned enterprise or simply government-owned enterprise is a business enterprise where the government of the country has major control (Utoyo, Marimin, & Murdanoto, 2019) through full, majority, or significant minority ownership. Due to the higher part of the share, government control over the enterprise for making various decisions for the welfare of shareholders. Currently, approximately more than 100 public-owned companies are working in Indonesia. One of the most important issues these companies are facing is related to the quality of MAIS. The accounting information system is one of the structures that consisted of various techniques, implemented by an enterprise to collect, process, handle, as well as retrieve its financial data to support the management in the various objective decision-making process (Pomberg, Pourjalali, Daniel, & Kimbro, 2012). The low quality of MAIS has a negative influence on the performance of these enterprises. This study proposed ERP as an instrument to enhance the quality of MAIS. Better ERP can enhance the quality of MAIS which is important to

take decisions. Along with the ERP, employees can also play an important role through employee's outcome orientation which is the part of organizational culture. Figure 1 shows the relationship between ERP, and quality of MAIS.

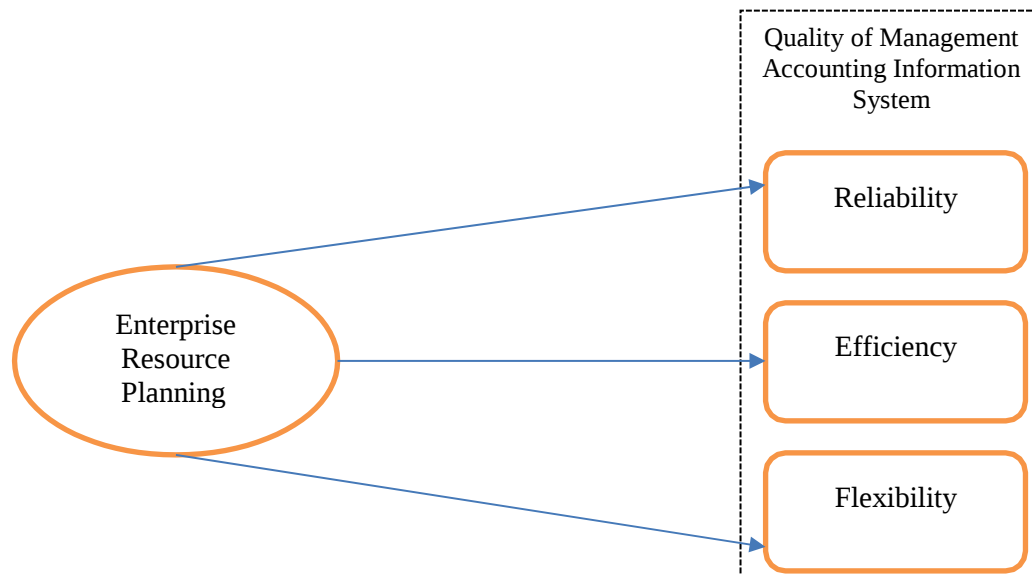


Figure 1: The theoretical framework of the study shows the relationship between ERP, and the quality of MAIS

Reliability: Relationship of ERP and Reliability of MAIS

The MAIS must be reliable as well. Reliability of the MAIS is very important for the measurement of the reliability of MAIS. The focus of reliability of MAIS is towards the level to which it can be assumed by the users that MAIS will be available for the usage of the customers and other users. **This component of the MAIS is important to assure that information being provided by the system is reliable and can be used for the process of decision-making (Al-Dmour, 2019).**

The MAIS must be reliable to do various activities and must have consistency to maintain the quality. This study proposed the element of reliability in two aspects; first, the MAIS should be available for users all the time with all features, and second, the information provided by the MAIS should be reliable and help in the decision-making process. The decision-making based on MAIS data should be reliable and provide better outcomes. To achieve a certain level of reliability, ERP has vital importance. ERP provides various resources in a well-organized manner which may help to enhance the quality of MAIS. The availability of MAIS for users can only be addressed by ensuring resources through ERP. As highlighted in previous studies; ERP has a key influence on MAIS (Faccia, Mosteanu, Fahed, & Capitanio, 2019).

Reliability of MAIS is very important to ensure that the information being provided by the system does not contain any bias and error. Moreover, the information is faithfully represented according to its purpose. The reliable information must be neutral and verifiable. Therefore, reliability is mainly dependent upon faithfulness. In this regard, the ERP system is considered reliable if the decision provided can be used for the decision-making process (Sarkar, 2018). On the other hand, if the information provided by the ERP system is good, it may play a very important role in the success of the organization. Therefore, all of the organizational stakeholders are looking for reliable MAIS. These stakeholders are also looking for ERP systems because it plays a very vital role in the decision-making process.

Efficiency: Relationship of ERP and Efficiency of MAIS

Another key factor for the success of MAIS is its efficiency. Scholars have described efficiency as the linkage process between the output and input among the operations of the organizations. The almost same definition of Efficiency is defined as "Efficiency is a measure of what is produced divided by what is consumed". The efficiency of the program or MAIS is also dependent upon the combination of different processes into a single program so it can process efficiently. Scholars have also mentioned that the

efficiency of the MAIS is the quick and fast time to response, efficient backup, efficient storage of data, streamlined output and efficiently inputting of the data. Organizations try to assess the required time for the completion of each task. Therefore, they create a schedule for the completion of work. Similarly, Sudhaman and Thangavel (2015) also pointed out that efficiency is the level of service in having an efficient information system and can be considered an important factor for the facilitation and improvement of efficiency as well as speed of the system (Teru & Hla, 2015).

Furthermore, efficiency is considered the second important element of MAIS quality which can be attained through ERP. In this study, MAIS efficiency means the system response on time or fast system response time, efficiency in the storage of data such as files should not be big to reduce the use of memory. Efficiency is also based on the data backup features of MAIS. Better data backup features of MAIS are an important element of quality. Finally, efficiency is also considered in terms of the time taken by MAIS to complete a certain job. All these efficient features of MAIS can be managed through better ERP. Resources are the key to getting higher efficiency in MAIS. Availability of resources is not sufficient to achieve MAIS efficiency, the planning of resources in utilization is most important. A study carried out by Napitupulu (2018) also addressed the efficiency of MAIS as the major element of quality which can be achieved through better ERP implementation (Khoma & Vdovychyn, 2021).

Scholars have revealed that the accounting information system is influenced by the ERP system. If the ERP system is improved, it will improve the efficiency of MAIS. Scholars have reported that the main reason for the implementation of ERP systems is to improve organizational efficiency and effectiveness. In literature, efficiency is referred to as goal orientation is mostly measured in terms of the ratio of input and output. Therefore, the main reason for the implementation of an ERP system within an organization is to bring a lot of changes within the organization so the efficiency of the work can be improved (Appelbaum, Kogan, Vasarhelyi, & Yan, 2017). The factor of efficiency becomes more important in the present era of digitalization where efficiency of the business environment is very important for the organizational success that is derived from the ERP system. Therefore, the implementation of an ERP system is vital to developing efficiency as well as effectiveness at each level of the organization. It can also play a critical role at the strategic level of the organization (Indarto & Endah, 2017).

Flexibility: Relationship of ERP and Flexibility of MAIS

For the effectiveness of MAIS, the design of the system is flexible. The design must be useful for all the stakeholders who may need it. Moreover, it should be possible that the programmers of the organization must be able to alter it according to the use and need of customers (Ramazani & Allahyari, 2013).

Scholars have defined flexibility as the ability of the system of customizing, redesign and adapt the application. Therefore, the flexible system is characterized as an application that has the ability of effective and rapid adjustment. It also can incorporate the unplanned requirement without replacing the complete system. It also includes adaptation after its implementation. **Technically, from the perspective of the designer, for the flexibility of the system, there should be modularity, compatibility and connectivity (Arabmazar Yazdi, Nasser, Nekoei Zadeh, & Moradi, 2017).**

Flexibility is considered in terms of changing the MAIS according to the need such as changes according to the changes in the business environment. As the changes are required in the current competitive business environment to compete with rivals along with the introduction of new technology. Therefore, flexibility is important to enhance the level of quality in MAIS. However, to enhance the flexibility in MAIS, ERP is required. Proper allocation of required resources for MAIS such as the software's important to enhance the level of quality. Additionally, better infrastructure is required to develop flexible MAIS which is possible with better allocation of financial and non-financial resources.

Presently, ERP software is an important strategic platform that supports business processes at every level of the company. But, few authors have shown reservations regarding the role of ERP systems to develop flexibility within the organization.

A few researchers have revealed that ERP systems play a very crucial role in the development of analysis parameters important for MAIS. The ERP systems being currently used are evolving towards BPM which is vital for the development of flexibility

in the process (Trigo, Belfo, & Estébanez, 2016). The ERP systems can be used to promote flexibility in the MAIS because ERP systems are very important to improving task-oriented activities within the firm (Alhatabat, 2020).

Therefore, it is concluded that; ERP has a positive role to promote the quality of MAIS through reliability, efficiency and flexibility which leads to the following hypotheses;

Hypothesis 1. ERP has a positive effect on reliability.

Hypothesis 2. ERP has a positive effect on efficiency.

Hypothesis 3. ERP has a positive effect on flexibility.

Research Methodology

Research Design

The research design of the study is cross-sectional; therefore, data were collected at one point in time. In a cross-sectional research design, a questionnaire survey is carried out. Thus, this study uses a quantitative research approach in which a questionnaire is used for data collection. Consequently, this study measured the relationship between ERP, reliability, efficiency, flexibility, and quality of MAIS by using a questionnaire survey followed by a cross-sectional research design which is most suitable to measure this study relationship.

Data Collection

Population of the study is the public owned enterprises working in Indonesia. The employees working in these enterprises are the respondents of the study. Therefore, data collection is made from the employees working in Indonesian public owned enterprises. Only those employees were selected which were involved in MAIS activities. 400 questionnaires were distributed among the employees. 195 questionnaires were returned. However, 10 questionnaires were not completed, therefore, excluded from the survey. Finally, 185 valid responses were used in data analysis. Furthermore, collected data statistics are given in Table 1 which shows missing value, mean, median, outlier, and normality of the data.

Table 1. Data Statistics.

Items	No.	Missing	Mean	Median	Min	Max	SD	Kur	Ske
ERP1	3	0	2.189	2	1	5	1.107	0.582	1.087
ERP2	4	0	1.927	2	1	4	0.894	0.144	0.868
ERP3	5	0	2.293	2	1	5	1.205	-0.051	0.898
ERP4	6	0	2.085	2	1	5	1.237	0.033	1.066
ERP5	7	0	2.067	2	1	5	1.265	0.274	1.151
FL1	8	0	1.927	2	1	5	1.074	1.299	1.31
FL2	9	0	2.28	2	1	5	1.113	-0.349	0.712
FL3	10	0	2.476	2	1	5	1.212	-0.688	0.535
EF1	11	0	1.902	2	1	5	1.043	1.759	1.401
EF2	12	0	2.213	2	1	5	1.282	-0.148	0.978
EF3	13	0	2.201	2	1	5	1.127	-0.154	0.807
EF4	14	0	2.201	2	1	5	1.25	0.031	0.973
EF5	15	0	2.482	2	1	5	1.271	-0.604	0.653
RE1	16	0	2.646	3	1	5	1.347	-1.092	0.32
RE2	17	0	2.39	2	1	5	1.262	-0.782	0.572

Note: ERP = Enterprise Resource Planning; RE = Reliability; EF = Efficiency; FL = Flexibility;; MAIS = Management Accounting Information System.

Research Results

The current study employed Partial Least Square (PLS), a most popular data analysis tool which is recommended by the several previous studies (F. Hair Jr, Sarstedt, Hopkins, & G. Kuppelwieser, 2014; J. F. Hair, Ringle, & Sarstedt, 2013). Structural equation modeling (SEM) is used through PLS. The first part of PLS is measurement model which obtained the

information related to the factor loadings, reliability of the data and average variance extracted (AVE). Figure 2 shows the measurement model. Factor loadings are reported in Table 2 which shows that all the items have loadings above 0.6 which is minimum level. Additionally, this study addressed convergent validity through campsite reliability (CR) and AVE. To achieve convergent validity, CR should be above 0.7 and AVE should be above 0.5 (Ali, Azeem, Marri, & Khurram, 2021). Table 2 shows that all the variables have achieved the minimum level for CR and AVE which confirmed the convergent validity.

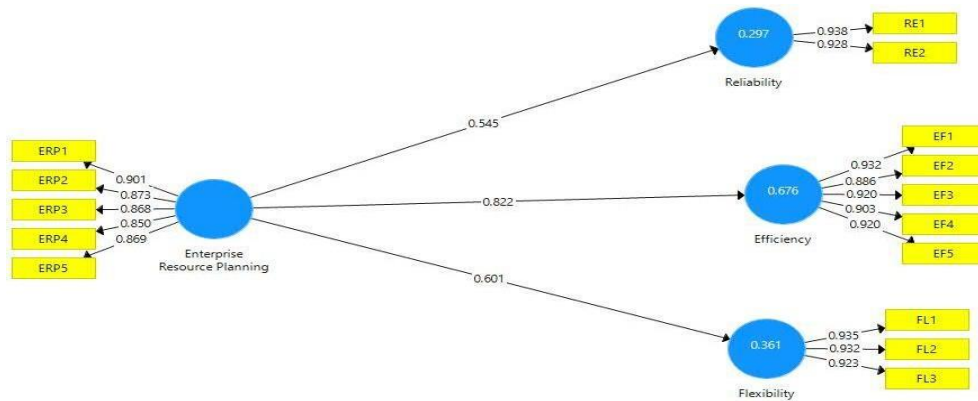


Figure 2: Measurement Model.

Note: ERP = Enterprise Resource Planning; RE = Reliability; EF = Efficiency; FL = Flexibility; MAIS = Management Accounting Information System.

Table 2. Reliability and Convergent Validity.

Variables	Items	Factor Loadings	Alpha	CR	AVE
Efficiency	EF1	0.932	0.950	0.961	0.832
	EF2	0.886			
	EF3	0.920			
	EF4	0.903			
	EF5	0.920			
Enterprise Resource Planning	ERP1	0.901	0.922	0.941	0.761
	ERP2	0.873			
	ERP3	0.868			
	ERP4	0.850			
	ERP5	0.869			
Flexibility	FL1	0.935	0.920	0.951	0.865
	FL2	0.932			
	FL3	0.923			
Reliability	RE1	0.938	0.851	0.931	0.870
	RE2	0.928			

Note: ERP = Enterprise Resource Planning; RE = Reliability; EF = Efficiency; FL = Flexibility; MAIS = Management Accounting Information System

In addition to the convergent validity, it is important to achieve discriminant validity which is reported in in Table 3. To achieve the discriminant validity, three methods are available in the literature, namely, AVE square root, cross-loadings and heterotrait-monotrait ratio of correlations (HTMT). HTMT is the most latest technique which is used in this study. According to HTMT_{0.9}, none of the value should exceed 0.9. Table 3 indicating that all the value are below 0.9.

Table 3. HTMT.

	EF	ERP	FL	RE

EF				
ERP	0.877			
FL	0.703	0.647		
RE	0.683	0.614	0.524	

Note: ERP = Enterprise Resource Planning; RE = Reliability; EF = Efficiency; FL = Flexibility; MAIS = Management Accounting Information System

After the careful assessment of measurement model, the structural model is used to examine the relationship between ERP, reliability, efficiency, flexibility, and quality of MAIS, as shown in Figure 3. Structural model is the second part of PLS-SEM in which bootstrapping is used to examine the relationship (J. Hair, Hollingsworth, Randolph, & Chong, 2017). T-value 1.96 is considered as minimum threshold level in the current study. Results of structural model are reported in Table 4 which shows that, ERP has positive effect on quality of MAIS. ERP has significant relationship with reliability (t-value 6.365, $\beta = 0.545$). ERP has significant relationship with efficiency (t-value 16.723, $\beta = 0.822$) and flexibility (t-value 7.289, $\beta = 0.601$). Therefore, hypothesis 1, hypothesis 2 and hypothesis 3 are supported.

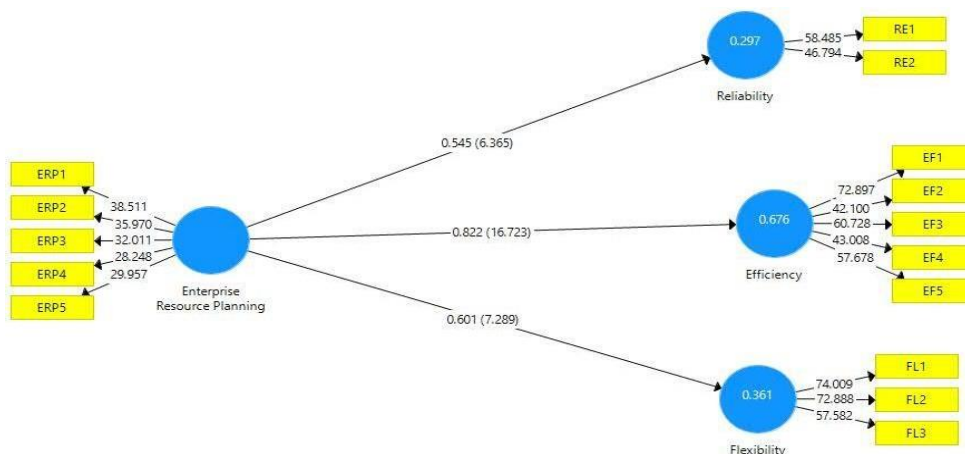


Figure 3. Structural Model.

Note: ERP = Enterprise Resource Planning; RE = Reliability; EF = Efficiency; FL = Flexibility; MAIS = Management Accounting Information System

Finally, Figure 2 shows the r-square (R^2) value, which is 0.277 for reliability, 0.571 for efficiency and 0.760 for flexibility. #

Table 4. Direct Effect Results.

	Beta	SD	T Value	P Values
Enterprise Resource Planning (ERP) -> Efficiency	0.822	0.049	16.723	0.000
Enterprise Resource Planning (ERP) -> Flexibility	0.601	0.082	7.289	0.000
Enterprise Resource Planning (ERP) -> Reliability	0.545	0.086	6.365	0.000

Discussion and Conclusion

The objective of this study was to examine the role of ERP in quality of MAIS. The relationship between ERP, reliability, efficiency, flexibility, and quality of MAIS was examined. Data collection is made through survey questionnaire among the employees working in Indonesian public owned enterprises. Finally, statistical tool is used to approach the findings of the study.

To achieve the study objective, three hypotheses are proposed. Three hypotheses are based on direct effect. Results of the study shows the important role of ERP to enhance the

quality of MAIS. These results are in line with the previous studies, as the previous studies also shows positive contribution of ERP towards accounting information system (Alzoubi, 2011; Antunes & Alves, 2008). This is proved by examining the effect of ERP on MAIS reliability, efficiency, and flexibility. Hypothesis 1 reported the relationship between ERP and reliability. It is proved that; ERP has positive effect on reliability of MAIS. Increase in ERP increases the reliability of MAIS which is the important element to enhance the quality of MAIS. Moreover, hypothesis 2 examined the relationship between ERP and efficiency of MAIS. The findings show the positive effect of ERP on efficiency. While examining the direct effect, hypothesis 3 reported the effect of ERP on flexibility of MAIS system. ERP has significant and positive effect on quality of MAIS by enhancing the flexibility in MAIS. Thus, the improvement in ERP system can improve the quality of MAIS. Therefore, among the public owned enterprises in Indonesia, the role of ERP is most crucial to enhance quality of MAIS which may lead to solve various problems. Finally, it is proved that; issues related to the quality of MAIS among Indonesian public owned enterprises can be resolved by strengthening the ERP and organizational culture.

Implications of the Study

This study examined the relationship between ERP, reliability, efficiency, flexibility, and quality of MAIS which is a unique relationship and not considered by the earlier studies. Therefore, this relationship filled the important literature gap by examining the effect of ERP on quality of MAIS. Although, number of studies available in the literature considering the MAIS, however, previous studies are rarely considered the element of quality in MAIS. Therefore, this study considered the quality of MAIS which is important contribution to the literature. Along with these theoretical implications, this study also has practical implications. The results of this study can facilitate management of public owned enterprises to enhance MAIS. The practitioners should promote ERP and to enhance quality of MAIS.

Limitations and Future Directions

Although this study has considered the important gaps in the field of ERP and MAIS, however, there are various limitations which may be the future directions for the researchers. This study considered three elements of MAIS quality; reliability, efficiency, and flexibility, however, integration is fourth important factor which could be addressed. Therefore, future studies should address integration while examining the quality of MAIS. Furthermore, ERP is considered as a whole, it is more effective to consider various components of ERP and examine the effect on quality of MAIS. Additionally, this study only considered the public owned enterprises in Indonesia. It is better to draw a comparison between public owned enterprises and private owned enterprises.

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DOES ENTERPRISE RESOURCE PLANNING LEAD TO THE QUALITY OF THE MANAGEMENT ACCOUNTING INFORMATION SYSTEM?

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Abstract: The objective of this study is to examine the role of enterprise resource planning (ERP) in the quality of management accounting information systems (MAIS). The quality of MAIS is considered by following the three dimensions; reliability, efficiency and flexibility. For this purpose, this study surveyed by using a questionnaire. The survey was carried out among the public-owned enterprises in Indonesia. Respondents of the study were the employees working on MAIS among public-owned enterprises in Indonesia. 180 valid responses were returned and analyzed by using Partial Least Square (PLS). Results of the study highlighted the important role of ERP in the quality of MAIS. It is reported that; ERP has a positive influence on the quality of MAIS. ERP has the potential to promote reliability, efficiency, and flexibility of the quality of MAIS among public-owned enterprises in Indonesia. [These results have important insights for Indonesian public-owned enterprises to promote the quality of MAIS.](#)

Keywords: Accounting information system, enterprise resource planning, reliability, efficiency, flexibility, outcome orientation.

Introduction

Management accounting information (MAIS) is of central importance among organizations (Nuraliati & Sianturi, 2021) because it has a key relationship with the different organizational operations. MAIS is based on financial data which has significant importance to take various decisions by the management influencing organizational performance. Financial data management is important for taking various investment decisions, therefore, this data should have significant quality. Thus, the quality of MAIS is required to maintain by the organizations to get better outcomes in terms of various operations (Nuseeb, Koussa, Matshidze, Umeokafor, & Windapo, 2021).

[However, various enterprises are facing issues related to the quality of MAIS which affects the overall enterprise performance. The low quality of MAIS affects adversely the management decisions towards investment, expenditures, working capital etc. Inappropriate decisions may lead to long-term losses for the enterprises.](#) Along with the other organizations, enterprises working in Indonesia are facing such issues (Puspitawati, 2021). The low quality of MAIS affects the performance of enterprises. Particularly, the public-owned enterprises' Sari and Lubis (2018) are facing more issues related to the MAIS. Low quality of financial data among the public-owned enterprises has a negative role in different financial decisions. Inappropriate financial decisions by the enterprises lead to low profitability, low return on assets and low return on equity. Therefore, it is important to address the issues related to the quality of MAIS.

This study proposed that; the quality of MAIS can be promoted through enterprise resource planning (ERP). ERP has the potential to influence MAIS among organizations as reported in the literature. Literature reported the important elements related to the quality of MAIS which include; reliability, efficiency and flexibility. Improvement in these three elements can enhance the quality of MAIS. Therefore, this study proposed the important contribution of ERP to the reliability, efficiency, and flexibility of MAIS. The resource availability for the enterprises does not work until it is not planned productively. Therefore, planning organizational resources for the MAIS is more important to promote quality (Hartani, Haron, & Tajuddin, 2021). Consequently, the objective of this study is to

examine the role of ERP in the quality of MAIS among the public-owned enterprises in Indonesia. Public-owned enterprises are considered in this study because these enterprises have weak MAIS than private-owned organizations. The quality of MAIS among public-owned enterprises is low as compared to the privately-owned enterprises to the issues related to reliability, efficiency, and flexibility. Enterprise cannot get benefits from the ERP until the employees do not work appropriately to achieve the required outcomes. Thus, this study examined the relationship between ERP, reliability, efficiency, flexibility, and quality of MAIS. By examining this relationship, this study contributed to the literature, several previous studies have considered accounting information systems (Flayyih, Mirdan, & Elkhaldi, 2021), however, these studies have not addressed quality of MAIS along with ERP among the public-owned enterprises in Indonesia. Hence, this contribution of the study in the field of ERP and MAIS lead to several insights for the practitioners to promote the performance of public-owned enterprises (Hamsal, Ichsan, Utomo, Fahira, & Wetik, 2021).

Literature Review

Management Accounting Information system (MAIS)

There are two main components of accounting information systems namely management accounting information system and financial accounting information system. The objective of MAIS is different from financial accounting information systems in terms of its outputs and inputs. **MAIS plays a very important role in helping the workers, executives and managers in generating information that is required for the generation of information required to manage the organization (Napitupulu, 2018).** MAIS is referred to as normative. The user of MAIS will be satisfied in long term as well as short term decision making if the quality of MAIS is good. But if MAIS is not properly understood by the user, its implementation will harm the organization.

MAIS plays a very important role in serving and supporting the corporate strategy. The basic purpose of using MAIS by the manager is to get the specific information regarding organization from informal as well as formal sources. This information is very important for the organization to gain a competitive advantage. The main objective of MAIS is that it is positively linked to the strategy of the organization. It has a major role in the achievement of long-term decisions of the organization. Moreover, the overall performance of the organization is positively affected by the proper integration of MAIS. Scholars have reported several characteristics of MAIS namely flexibility, integrity and reliability (Rahmawati, Rosdiana, & Nurtleli, 2017). ***Enterprise Resource Planning systems (ERP)***

In the last decades organizations have adopted new packaged software which was designed for the integration of all of the organizational activities. This system is known as enterprise resource system also known as ERP. Some of the other authors have also termed it as enterprise systems and enterprise-wide systems as well. This system is used to provide the information that is needed by the employees of the organization. There are several different benefits of an ERP system. **These benefits include help in the management of human resource management, accounting, shipping, product planning, customer order management and inventory management (Katuu, 2020).**

Other authors have also reported a few more benefits and significance of the ERP system. The organizations that have used the ERP system have successfully been able to minimize their inventory cost by 30 per cent. Whereas, these organizations have also been able to cut their raw material cost by fifteen percent as well. **Furthermore, the organizations have successfully been able to minimize their production costs, production time and lead time for customers by using ERP systems (Lutfi et al., 2022).**

Hypotheses Development

A public-owned enterprise or simply government-owned enterprise is a business enterprise where the government of the country has major control (Utoyo, Marimin, & Murdanoto, 2019) through full, majority, or significant minority ownership. Due to the higher part of the share, government control over the enterprise for making various decisions for the welfare of shareholders. Currently, approximately more than 100 public-owned companies are working in Indonesia. One of the most important issues these companies are facing is related to the quality of MAIS. The accounting information

system is one of the structures that consisted of various techniques, implemented by an enterprise to collect, process, handle, as well as retrieve its financial data to support the management in the various objective decision-making process (Pomberg, Pourjalali, Daniel, & Kimbro, 2012). The low quality of MAIS has a negative influence on the performance of these enterprises. This study proposed ERP as an instrument to enhance the quality of MAIS. Better ERP can enhance the quality of MAIS which is important to take decisions. Along with the ERP, employees can also play an important role through employee's outcome orientation which is the part of organizational culture. Figure 1 shows the relationship between ERP, and quality of MAIS.

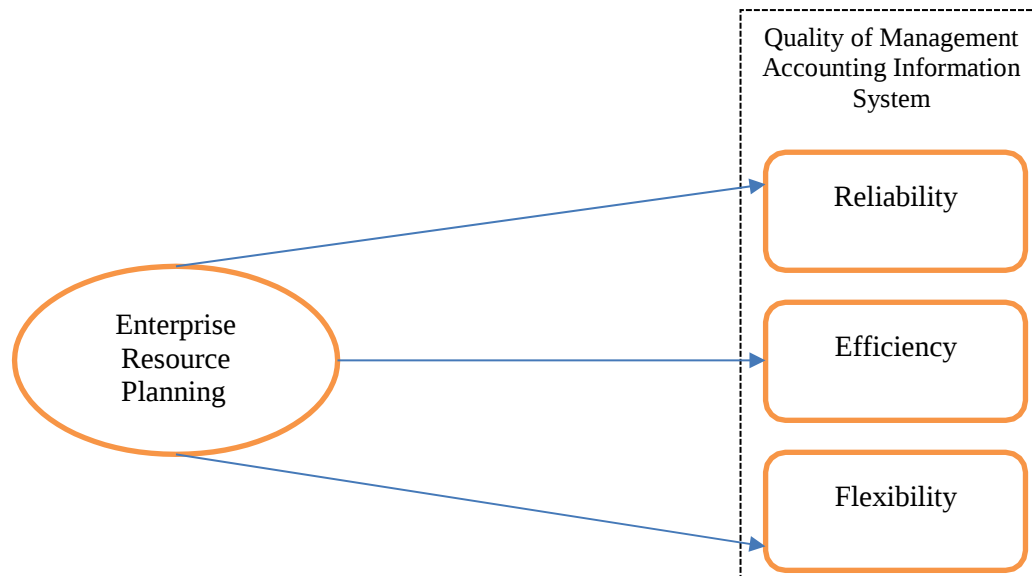


Figure 1: The theoretical framework of the study shows the relationship between ERP, and the quality of MAIS

Reliability: Relationship of ERP and Reliability of MAIS

The MAIS must be reliable as well. Reliability of the MAIS is very important for the measurement of the reliability of MAIS. The focus of reliability of MAIS is towards the level to which it can be assumed by the users that MAIS will be available for the usage of the customers and other users. **This component of the MAIS is important to assure that information being provided by the system is reliable and can be used for the process of decision-making (Al-Dmour, 2019).**

The MAIS must be reliable to do various activities and must have consistency to maintain the quality. This study proposed the element of reliability in two aspects; first, the MAIS should be available for users all the time with all features, and second, the information provided by the MAIS should be reliable and help in the decision-making process. The decision-making based on MAIS data should be reliable and provide better outcomes. **The measurement of MAIS quality through these two aspects is also considered by Napitupulu (2018).** To achieve a certain level of reliability, ERP has vital importance. ERP provides various resources in a well-organized manner which may help to enhance the quality of MAIS. The availability of MAIS for users can only be addressed by ensuring resources through ERP. As highlighted in previous studies; ERP has a key influence on MAIS (Faccia, Mosteanu, Fahed, & Capitanio, 2019).

Reliability of MAIS is very important to ensure that the information being provided by the system does not contain any bias and error. Moreover, the information is faithfully represented according to its purpose. The reliable information must be neutral and verifiable. Therefore, reliability is mainly dependent upon faithfulness. In this regard, the ERP system is considered reliable if the decision provided can be used for the decision-making process (Sarkar, 2018). On the other hand, if the information provided by the ERP system is good, it may play a very important role in the success of the organization. Therefore, all of the organizational stakeholders are looking for reliable MAIS. These stakeholders are also looking for ERP systems because it plays a very vital role in the decision-making process. **If the ERP system is properly implemented it will create**

reliability among the stakeholders because this reliability will help them in the process of decision-making (Faccia et al., 2019). Likewise, the implementation of the ERP system is key to increasing the relevancy of information in terms of feedback value and predictive value (Sarkar, 2018).

Efficiency: Relationship of ERP and Efficiency of MAIS

Another key factor for the success of MAIS is its efficiency. Scholars have described efficiency as the linkage process between the output and input among the operations of the organizations. The almost same definition of Efficiency is defined as "Efficiency is a measure of what is produced divided by what is consumed". The efficiency of the program or MAIS is also dependent upon the combination of different processes into a single program so it can process efficiently. Scholars have also mentioned that the efficiency of the MAIS is the quick and fast time to response, efficient backup, efficient storage of data, streamlined output and efficiently inputting of the data. Organizations try to assess the required time for the completion of each task. Therefore, they create a schedule for the completion of work. Similarly, Sudhaman and Thangavel (2015) also pointed out that efficiency is the level of service in having an efficient information system and can be considered an important factor for the facilitation and improvement of efficiency as well as speed of the system (Teru & Hla, 2015).

Furthermore, efficiency is considered the second important element of MAIS quality which can be attained through ERP. In this study, MAIS efficiency means the system response on time or fast system response time, efficiency in the storage of data such as files should not be big to reduce the use of memory. Efficiency is also based on the data backup features of MAIS. Better data backup features of MAIS are an important element of quality. Finally, efficiency is also considered in terms of the time taken by MAIS to complete a certain job. All these efficient features of MAIS can be managed through better ERP. Resources are the key to getting higher efficiency in MAIS. Availability of resources is not sufficient to achieve MAIS efficiency, the planning of resources in utilization is most important. A study carried out by Napitupulu (2018) also addressed the efficiency of MAIS as the major element of quality which can be achieved through better ERP implementation (Khoma & Vdovychyn, 2021).

Scholars have revealed that the accounting information system is influenced by the ERP system. If the ERP system is improved, it will improve the efficiency of MAIS. Scholars have reported that the main reason for the implementation of ERP systems is to improve organizational efficiency and effectiveness. In literature, efficiency is referred to as goal orientation is mostly measured in terms of the ratio of input and output. Therefore, the main reason for the implementation of an ERP system within an organization is to bring a lot of changes within the organization so the efficiency of the work can be improved (Appelbaum, Kogan, Vasarhelyi, & Yan, 2017). The factor of efficiency becomes more important in the present era of digitalization where efficiency of the business environment is very important for the organizational success that is derived from the ERP system. Therefore, the implementation of an ERP system is vital to developing efficiency as well as effectiveness at each level of the organization. It can also play a critical role at the strategic level of the organization (Indarto & Endah, 2017).

Flexibility: Relationship of ERP and Flexibility of MAIS

For the effectiveness of MAIS, the design of the system is flexible. The design must be useful for all the stakeholders who may need it. Moreover, it should be possible that the programmers of the organization must be able to alter it according to the use and need of customers (Ramazani & Allahyari, 2013).

Scholars have defined flexibility as the ability of the system of customizing, redesign and adapt the application. Therefore, the flexible system is characterized as an application that has the ability of effective and rapid adjustment. It also can incorporate the unplanned requirement without replacing the complete system. It also includes adaptation after its implementation. **Technically, from the perspective of the designer, for the flexibility of the system, there should be modularity, compatibility and connectivity (Arabmazar Yazdi, Nasser, Nekoe Zadeh, & Moradi, 2017).**

Flexibility is considered in terms of changing the MAIS according to the need such as changes according to the changes in the business environment. As the changes are required in the current competitive business environment to compete with rivals along with the

introduction of new technology. Therefore, flexibility is important to enhance the level of quality in MAIS. However, to enhance the flexibility in MAIS, ERP is required. Proper allocation of required resources for MAIS such as the software's important to enhance the level of quality. Additionally, better infrastructure is required to develop flexible MAIS which is possible with better allocation of financial and non-financial resources.

Presently, ERP software is an important strategic platform that supports business processes at every level of the company. But, few authors have shown reservations regarding the role of ERP systems to develop flexibility within the organization. *If there is no flexibility, it can be a big risk for the organization because the MAIS system provides a structured and centralized approach toward the function as well as the process of an organization (Karamatova, 2017).*

A few researchers have revealed that ERP systems play a very crucial role in the development of analysis parameters important for MAIS. The ERP systems being currently used are evolving towards BPM which is vital for the development of flexibility in the process (Trigo, Belfo, & Estébanez, 2016). The ERP systems can be used to promote flexibility in the MAIS because ERP systems are very important to improving task-oriented activities within the firm (Alhatabat, 2020).

Therefore, it is concluded that; ERP has a positive role to promote the quality of MAIS through reliability, efficiency and flexibility which leads to the following hypotheses;

Hypothesis 1. ERP has a positive effect on reliability.

Hypothesis 2. ERP has a positive effect on efficiency.

Hypothesis 3. ERP has a positive effect on flexibility.

Research Methodology

Research Design

The research design of the study is cross-sectional; therefore, data were collected at one point in time. In a cross-sectional research design, a questionnaire survey is carried out. Thus, this study uses a quantitative research approach in which a questionnaire is used for data collection. Consequently, this study measured the relationship between ERP, reliability, efficiency, flexibility, and quality of MAIS by using a questionnaire survey followed by a cross-sectional research design which is most suitable to measure this study relationship.

Questionnaire Development

The questionnaire is designed by following previous studies on ERP, MAIS and employee outcome orientation. MAIS is measured by using the reliability of MAIS, the efficiency of MAIS and the flexibility of MAIS. Reliability is measured by using two scale items; RE1: "an effective system is available for users to use, and RE2: system provides reliable information for decision-making." Flexibility is measured by using three scale items; "FL1: useful for all people who will need it as a result of business development, FL2: system has input options, and FL3: system has output options." Efficiency is measured by using five scale items; "EF1: number of inputs produces varying outputs, EF2: fast system-response time, EF3: efficient data storage (files are not too big, so they do not spend a lot of memory), EF4: efficient data backup, and EF5: to determine the amount of time needed to complete the job." ERP is measured by using five scale items; "ERP1: ERP improves the controls of breaking through or trespassing the system, ERP2: ERP regulates the access of professionals to the system according to their level of authorization, ERP3: ERP contributes in separating the discrepant tasks among the organization employees, ERP4: ERP improves the execution of all works of the organization in smooth and effective way and ERP5: ERP enables the linkage of all in and out terminals of the organization properly and appropriately." These scale items are adapted from Alzoubi (2011).

Data Collection

Population of the study is the public owned enterprises working in Indonesia. The employees working in these enterprises are the respondents of the study. Therefore, data collection is made from the employees working in Indonesian public owned enterprises. Only those employees were selected which were involved in MAIS activities. 400 questionnaires were distributed among the employees. 195 questionnaires were returned. However, 10 questionnaires were not completed, therefore, excluded from the survey.

Finally, 185 valid responses were used in data analysis. Furthermore, collected data statistics are given in Table 1 which shows missing value, mean, median, outlier, and normality of the data.

Table 1. Data Statistics.

Items	No.	Missing	Mean	Median	Min	Max	SD	Kur	Ske
ERP1	3	0	2.189	2	1	5	1.107	0.582	1.087
ERP2	4	0	1.927	2	1	4	0.894	0.144	0.868
ERP3	5	0	2.293	2	1	5	1.205	-0.051	0.898
ERP4	6	0	2.085	2	1	5	1.237	0.033	1.066
ERP5	7	0	2.067	2	1	5	1.265	0.274	1.151
FL1	8	0	1.927	2	1	5	1.074	1.299	1.31
FL2	9	0	2.28	2	1	5	1.113	-0.349	0.712
FL3	10	0	2.476	2	1	5	1.212	-0.688	0.535
EF1	11	0	1.902	2	1	5	1.043	1.759	1.401
EF2	12	0	2.213	2	1	5	1.282	-0.148	0.978
EF3	13	0	2.201	2	1	5	1.127	-0.154	0.807
EF4	14	0	2.201	2	1	5	1.25	0.031	0.973
EF5	15	0	2.482	2	1	5	1.271	-0.604	0.653
RE1	16	0	2.646	3	1	5	1.347	-1.092	0.32
RE2	17	0	2.39	2	1	5	1.262	-0.782	0.572

Note: ERP = Enterprise Resource Planning; RE = Reliability; EF = Efficiency; FL = Flexibility;; MAIS = Management Accounting Information System.

Research Results

The current study employed Partial Least Square (PLS), a most popular data analysis tool which is recommended by the several previous studies (F. Hair Jr, Sarstedt, Hopkins, & G. Kuppelwieser, 2014; J. F. Hair, Ringle, & Sarstedt, 2013). Structural equation modeling (SEM) is used through PLS. The first part of PLS is measurement model which obtained the information related to the factor loadings, reliability of the data and average variance extracted (AVE). Figure 2 shows the measurement model. Factor loadings are reported in Table 2 which shows that all the items have loadings above 0.6 which is minimum level. Additionally, this study addressed convergent validity through composite reliability (CR) and AVE. To achieve convergent validity, CR should be above 0.7 and AVE should be above 0.5 (Ali, Azeem, Marri, & Khurram, 2021). Table 2 shows that all the variables have achieved the minimum level for CR and AVE which confirmed the convergent validity.

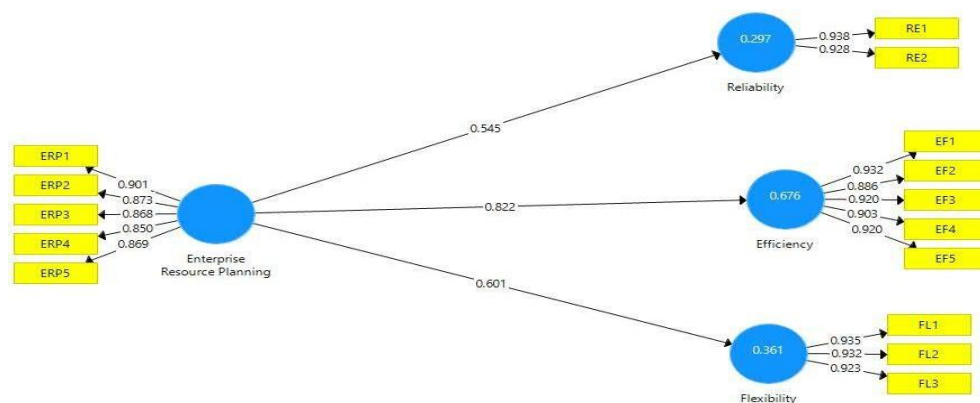


Figure 2: Measurement Model.

Note: ERP = Enterprise Resource Planning; RE = Reliability; EF = Efficiency; FL = Flexibility;; MAIS = Management Accounting Information System.

Table 2. Reliability and Convergent Validity.

Variables	Items	Factor Loadings	Alpha	CR	AVE
Efficiency	EF1	0.932	0.950	0.961	0.832
	EF2	0.886			
	EF3	0.920			
	EF4	0.903			
	EF5	0.920			
Enterprise Resource Planning	ERP1	0.901	0.922	0.941	0.761
	ERP2	0.873			
	ERP3	0.868			
	ERP4	0.850			
	ERP5	0.869			
Flexibility	FL1	0.935	0.920	0.951	0.865
	FL2	0.932			
	FL3	0.923			
Reliability	RE1	0.938	0.851	0.931	0.870
	RE2	0.928			

Note: ERP = Enterprise Resource Planning; RE = Reliability; EF = Efficiency; FL = Flexibility; MAIS = Management Accounting Information System

In addition to the convergent validity, it is important to achieve discriminant validity which is reported in in Table 3. To achieve the discriminant validity, three methods are available in the literature, namely, AVE square root, cross-loadings and heterotrait-monotrait ratio of correlations (HTMT). HTMT is the most latest technique which is used in this study. According to HTMT_{0.9}, none of the value should exceed 0.9. Table 3 indicating that all the value are below 0.9.

Table 3. HTMT.

	EF	ERP	FL	RE
EF				
ERP	0.877			
FL	0.703	0.647		
RE	0.683	0.614	0.524	

Note: ERP = Enterprise Resource Planning; RE = Reliability; EF = Efficiency; FL = Flexibility; MAIS = Management Accounting Information System

After the careful assessment of measurement model, the structural model is used to examine the relationship between ERP, reliability, efficiency, flexibility, and quality of MAIS, as shown in Figure 3. Structural model is the second part of PLS-SEM in which bootstrapping is used to examine the relationship (J. Hair, Hollingsworth, Randolph, & Chong, 2017). T-value 1.96 is considered as minimum threshold level in the current study. Results of structural model are reported in Table 4 which shows that, ERP has positive effect on quality of MAIS. ERP has significant relationship with reliability (t-value 6.365, $\beta = 0.545$). ERP has significant relationship with efficiency (t-value 16.723, $\beta = 0.822$) and flexibility (t-value 7.289, $\beta = 0.601$). Therefore, hypothesis 1, hypothesis 2 and hypothesis 3 are supported.

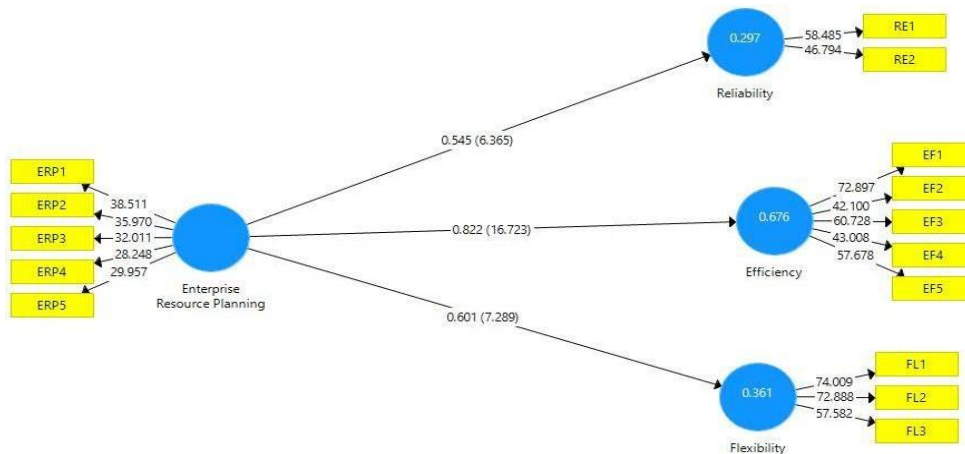


Figure 3. Structural Model.

Note: ERP = Enterprise Resource Planning; RE = Reliability; EF = Efficiency; FL = Flexibility; MAIS = Management Accounting Information System

Finally, Figure 2 shows the r-square (R^2) value, which is 0.277 for reliability, 0.571 for efficiency and 0.760 for flexibility. #

Table 4. Direct Effect Results.

	Beta	SD	T Value	P Values
Enterprise Resource Planning (ERP) -> Efficiency	0.822	0.049	16.723	0.000
Enterprise Resource Planning (ERP) -> Flexibility	0.601	0.082	7.289	0.000
Enterprise Resource Planning (ERP) -> Reliability	0.545	0.086	6.365	0.000

Discussion and Conclusion

The objective of this study was to examine the role of ERP in quality of MAIS. The relationship between ERP, reliability, efficiency, flexibility, and quality of MAIS was examined. Data collection is made through survey questionnaire among the employees working in Indonesian public owned enterprises. Finally, statistical tool is used to approach the findings of the study.

To achieve the study objective, three hypotheses are proposed. Three hypotheses are based on direct effect. Results of the study shows the important role of ERP to enhance the quality of MAIS. These results are in line with the previous studies, as the previous studies also shows positive contribution of ERP towards accounting information system (Alzoubi, 2011; Antunes & Alves, 2008). This is proved by examining the effect of ERP on MAIS reliability, efficiency, and flexibility. Hypothesis 1 reported the relationship between ERP and reliability. It is proved that; ERP has positive effect on reliability of MAIS. Increase in ERP increases the reliability of MAIS which is the important element to enhance the quality of MAIS. Moreover, hypothesis 2 examined the relationship between ERP and efficiency of MAIS. The findings show the positive effect of ERP on efficiency. While examining the direct effect, hypothesis 3 reported the effect of ERP on flexibility of MAIS system. ERP has significant and positive effect on quality of MAIS by enhancing the flexibility in MAIS. Thus, the improvement in ERP system can improve the quality of MAIS. Therefore, among the public owned enterprises in Indonesia, the role of ERP is most crucial to enhance quality of MAIS which may lead to solve various problems. Finally, it is proved that; issues related to the quality of MAIS among Indonesian public owned enterprises can be resolved by strengthening the ERP and organizational culture.

Implications of the Study

This study examined the relationship between ERP, reliability, efficiency, flexibility, and quality of MAIS which is a unique relationship and not considered by the earlier studies. Therefore, this relationship filled the important literature gap by examining the effect of ERP on quality of MAIS. Although, number of studies available in the literature

considering the MAIS, however, previous studies are rarely considered the element of quality in MAIS. Therefore, this study considered the quality of MAIS which is important contribution to the literature. Along with these theoretical implications, this study also has practical implications. The results of this study can facilitate management of public owned enterprises to enhance MAIS. The practitioners should promote ERP and to enhance quality of MAIS.

Limitations and Future Directions

Although this study has considered the important gaps in the field of ERP and MAIS, however, there are various limitations which may be the future directions for the researchers. This study considered three elements of MAIS quality; reliability, efficiency, and flexibility, however, integration is fourth important factor which could be addressed. Therefore, future studies should address integration while examining the quality of MAIS. Furthermore, ERP is considered as a whole, it is more effective to consider various components of ERP and examine the effect on quality of MAIS. Additionally, this study only considered the public owned enterprises in Indonesia. It is better to draw a comparison between public owned enterprises and private owned enterprises.

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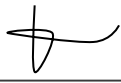
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Dear Author (s)

Widia Astuty; Ikbar Pratama, Indra Basir, Junita Putri Rajana Harahap

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