

THE IMPACT OF PROJECT MANAGEMENT AND IMPLEMENTING ENTERPRISE RESOURCE PLANNING ON DECISION-MAKING EFFECTIVENESS: THE CASE OF INDONESIAN STATE-OWNED ENTERPRISES

Uswatun Khasanah, Padjadjaran University Bandung

Sri Mulyani, Padjadjaran Universit and Universitas Singaperbangsa Karawang

Bahrullah Akbar, The Audit Board of the Republic of Indonesia (BPK RI),
Muhammad Dahlan, Padjadjaran University

ABSTRACT

Although Enterprise Resource Planning (ERP) systems are the most popular rapidly increasing breakthrough systems used by business actors, this field study on state-owned companies is still very limited to single cases. This study investigates the relationship between project management, ERP implementation, and effective decision-making in Indonesia's state-owned enterprises. This study also explores the moderating role of top management support in the project management - ERP implementation relationship and the mediating role of ERP implementation in the project management - effective decision-making relationship. A total of 88 companies (76 percent of Indonesian state-owned enterprises) participated in this study. Data analyzes for hypothesis testing were conducted using Hayes' PROCESS macro-based hierarchical regression. Results revealed that project management has significant and positive effects on ERP implementation, and this relationship is moderated by top management support. Moreover, the indirect effect of project management on effective decision-making via ERP implementation is also supported. This study provides different insights to point out the importance of top management support as boundary conditions in the relationship between project management to ERP implementation.

Keywords: Project Management, ERP, Stated-Owned Company, Effective Decision-Making

INTRODUCTION

Enterprise Resource Planning (ERP) is considered an essential tool for helping modern companies to achieve and integrate business processes (*i.e.*, entered, processed, monitored, and reported) and improve internal and external coordination (Olson, 2004; Umble et al., 2003). As an integrated system that utilizes advanced information technology, ERP is also stated to increase productivity, customer satisfaction, better decision making, and a company's competitive advantage (Al-Mashari et al., 2003; Umble et al., 2003). Despite the popularity of ERP, the failure rate of ERP implementation remains high (Chen et al., 2009; Liao et al., 2018). Ptak & Schragenheim (2000) reported that 60%–90% of ERP implementation could not meet the target return on investment and 50% fail to meet the adopting organization's expectations (Seymour et al., 2007). Furthermore, although ERP implementation is believed to have many benefits for business organizations, its application in developing countries is still limited, especially in Asia (Alam & Uddin, 2019; Asamoah & Andoh, 2018). The relative contribution of Asian nations is only 7% compared to the global ERP implementation (Santos et al., 2016). This condition shows that the determining factors for the success and impact of the

implementation of this ERP system still require more comprehensive verification in different areas and sectors.

So far, the ERP literature on implementation has been carried out extensively, involving practitioners and academics in the strategic management field. Areas covered include specific methods of ERP requirements analysis (Natarajan, 2017; Vilpola et al., 2007), identification of critical factors for successful ERP implementation (Al-Mashari et al., 2003; Chen et al., 2009; Liao et al., 2018; Umble et al., 2003), and others examining the impact of ERP on various organizational advantages (Behera & Dhal, 2020). Apart from the existing literature is voluminous and complex, it involves technical and non-technical factors such as local or cultural aspects, top management support, project management teams, and communications (Ranjan et al., 2018). However, one of the most challenging and unresolved areas of ERP implementation is identifying and agreeing on the industry-standard implementation model (Ali & Miller, 2017). In other words, there is no common standard that all types of industries can accept because the complexities faced in the planning, implementation, and post-implementation phases will differ from one another. Besides, studies on ERP focus more on private companies, and there is little evidence that discusses the success of ERP in public or government sector companies (Ali & Miller, 2017; Behera & Dhal, 2020; Boros & Fogarassy, 2019).

This study highlights ERP implementation from the perspective of critical success factors (Al-Mashari et al., 2003; Chen et al., 2009; Liao et al., 2018; Umble et al., 2003) and its impact on effective decision-making (Holsapple & Sena, 2005; Holsapple et al., 2019), particularly with regard to Indonesian state-owned enterprises. As an essential objective, it clarifies the relationship between project management and ERP implementation (Al-Mashari et al., 2003; Chen et al., 2009; Liao et al., 2018; Umble et al., 2003; Zhang et al., 2005; Dey et al., 2010). It also clarifies the moderating effect of top management support (Al-Mashari et al., 2003; Bueno & Gallego, 2017; Dezdar & Ainin, 2011; Liao et al., 2018) as the existing literature suggests, top management support is vital for ERP implementation in various phases of the project (Al-Mashari et al., 2003; Bueno & Gallego, 2017; Dezdar & Ainin, 2011; Liao et al., 2018). However, there is a dearth of theoretical perspectives in prevailing literature regarding the relationship between these constructs in ERP projects, particularly in state-owned enterprises (Ali & Miller, 2017; Behera & Dhal, 2020; Boros & Fogarassy, 2019). Considering that major work on ERP implementation has addressed only private companies (Behera & Dhal, 2020; Boros & Fogarassy, 2019), this study contributes to the literature on ERP implementation in three ways. First, it examines the role of project management in ERP implementation and effective decision-making in state-owned companies, which has been widely neglected in research so far. Most ERP project literature focuses on case studies or a limited industry context, thereby entailing limited theoretical and practical implications of ERP projects. This study advances research by analyzing ERP projects in state-owned companies from various sectors in Indonesia.

Second, it explores the moderating effect of management support, enriching existing knowledge about successful ERP implementation. The moderation effect of top management support on a project's success has been studied intensively (Kanwal et al., 2017; Santos-Vijande et al., 2018; Shee et al., 2019). It is generally believed that the level of leadership support differs in various project management processes across various industries (Kanwal et al., 2017; Pennypacker & Grant, 2003). In general, top management support and project management teams are two main factors that influence successful ERP implementation (Al-Mashari et al., 2003; Ali & Miller, 2017; Behera & Dhal, 2020; Ranjan et al., 2018). Given the progress made in understanding project management as the main factor of successful ERP implementation, there is a need to identify the untested or unexplored potential moderators and investigate whether differences in top management support affect project management and ERP implementation in state-owned companies.

Third, it advances the empirical study on ERP outcomes, especially in terms of the impact on decision-making effectiveness. A meta-analysis (Behera & Dhal, 2020) identified studies on ERP implementation predominantly involving case studies, and critical success

factors, such as organizational impact, trends, and perspective ranked the highest in ERP implementation studies. Decision support is a sub-theme that is rarely discussed. Although there are studies that discuss the relationship between ERP and decision-making effectiveness (Ali & Miller, 2017; Holsapple et al., 2019 ; Mulyani et al., 2019), they are more focused on the technical issues, such as integrating ERP and decision-making systems. This study offers a more comprehensive overview than previous studies (Ali & Miller, 2017; Holsapple et al., 2019) by integrating project management, ERP implementation, and the effectiveness of decision-making in state-owned companies. To summarize, the study's purpose is threefold: To explore the relationships between project management and ERP implementation, as well as the role of top management support in this relationship. Second, we investigate the relationship of ERP implementation to decision-making effectiveness. Third, we investigate the mediating role of ERP implementation in the relationship between project management to decision-making effectiveness.

LITERATURE REVIEW

The ERP system is an integrated computation system used by a company to automate flows of material, information, and finances (Ranjan et al., 2018). It combines various pieces of information such as accounting reports, raw materials, employee data, product data, operational data, and market data, enabling the integration of business functions (Ali & Miller, 2017). A meta-analysis identified ERP studies grouped into five themes: covering ERP implementation, post-implementation, extension, trend and perspective, and education. More than 100 studies during the 2014-2018 period were evaluated. They found that almost 27% of the papers on the theme of ERP implementation. Also, 40% of the total journals published with the topic related to post-implementation, indicates that researchers are more interested in examining the Critical Success Factor (CSFs) of ERP implementation and its impact on organizations (Behera & Dhal, 2020)..Based on this categorization, this study falls into the ERP implementation and post-implementation category.

Critical Success Factors (CSFs) are intended to identify success factors for avoiding losses and maximize the company's benefits (Al-Mashari et al., 2003; Liao et al., 2018; Umble et al., 2003). Studies in this theme have produced various models and frameworks to provide ERP practitioners with valuable information through studies on the many cases in ERP implementation around the world. For example, al-Mashari, et al., (2003) developed a taxonomy of realizing and maximizing ERP success and benefits based on three development stages (setting-up, implementation, and evaluation). Each of these stages involves various essential factors, including management and leadership (in the setting-up phase), ERP package selection, training, system integration and others (in the implementation phase), and performance and management evaluation in the final evaluation phase. The taxonomy has also suggested that successful ERP implementation elements depend on leadership and commitment. Accordingly, Umble, et al., (2003) compiled 11 crucial stages for successful ERP implementation in the same vein. They described the top three critical factors causing ERP implementation failures: poor planning or poor management, a change in business goals during the project, and a lack of business management support. Meanwhile, other authors have explained the causes of implementation failure: Scope creep, lack of ownership and transfer of knowledge, change management, communication, and performance measurement; the last is the propensity to isolate IT from business affairs (al-Mashari et al., 2003).

The Relationship between Project Management, Top Management Support and ERP Implementation

Project management provides a framework for types of company resource planning projects that can be estimated, planned, and controlled. The project management concept focuses on what is needed, ensuring that goals must be clear at the beginning of the project to

completion throughout the project cycle (Chofreh et al., 2016). It involves work organization and goal setting (Dahlan et al., 2019). Project management is involved in various project planning activities such as involvement in decisions, determining contribution, sharing roles, and determining objectives (Young, 2006). Furthermore, project management tools contribute to estimating budget, time and related to the quality of accounting information (Ganesh et al., 2014; Hasti et al., 2018; Young, 2006). The effectiveness of project management impacts future projects and allows the team to define a comprehensive ERP system (Chofreh et al., 2016). Management includes, but is not limited to, project schedules, project coverage, project costs and project control. Successful system implementation includes the use of quality software, so that competencies can be optimised (Mulyani & Rachmawati, 2016).

Successful ERP implementation requires excellent project management (Liao et al., 2018). In the early stages of ERP implementation (al-Mashari et al., 2003; Liao et al., 2018), poor project management is a major factor behind the failure of ERP implementation (Umble et al., 2003), lack of communication, inappropriately designed business processes, and lack of clarity about changes (Ali & Miller, 2017; Ranjan et al., 2018). Project management has functioned as "checks and balances" to ensure that decisions made by management are made appropriately (Marchewka, 2015). Similarly, Zhang, et al., (2005) described two central roles of top management support: providing the necessary resources and providing leadership. Dezdar & Ainin (2011) stated that top management must provide full support and commitment to the ERP project. Because ERP implementation involves various changes, which may cause conflicts in different departments, without top management intervention, it is not easy to complete this process]. Thus, the responsibilities of top management in ERP implementation are not only limited to being an initiator, but also a communicator to all members of the organization to explain the strategic objectives taken by the company (Umble et al., 2003), especially its role in influencing the success of the organization in complex information systems projects (Bueno & Gallego, 2017). Based on the above discussion, the following hypotheses were defined:

H1: Project management was positively related to ERP implementation.

H2: Top management support moderates the relationship between project management to decision-making effectiveness.

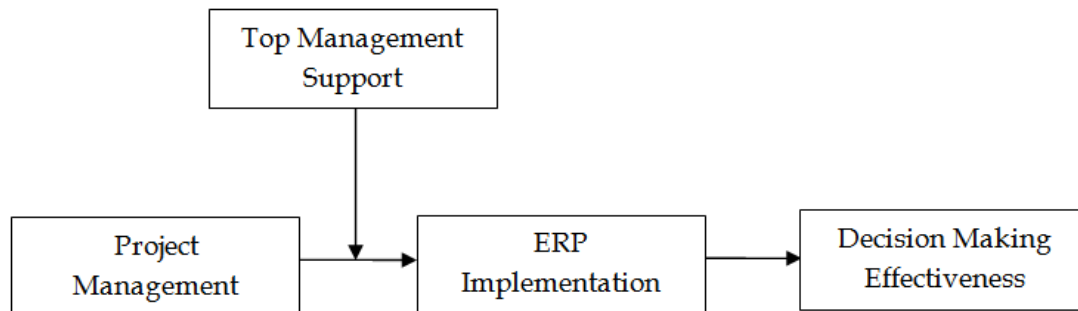
The Relationship between ERP Implementation and Effective Decision-Making

An ERP system can greatly assist decision making (Akbar et al., 2016). It is necessary to achieve organisational success by changing forms and structures, focusing on processes, methods and technology, and improving skills based on science and good performance (Holbeche, 2007). The effectiveness of decision-making is shown in the achievement objectives, using information generated from a system. The ERP system application can help to reduce operating costs, increase production, and improve customer service (Dey et al., 2010). It can be used to generate invoices, purchase orders for goods produced, and other tasks. Activities that were previously conducted manually can now be automated and generated automatically (Ganesh et al., 2014). The successful design of information systems has become an effective decision (Hasti et al., 2019), therefore supporting data for decisions based on the hardware and software of ERP systems. The relationship between ERP implementation and its benefits as decision-making support has been investigated from various perspectives (Alghazali & Ageeli, 2020; Chou & Chang, 2008). For example, Chou & Chang (2008), from the benefit side, and Hong & Kim (2002), from the organizational suitability perspective. More recent studies have examined the benefits of ERP systems, especially as a support for decision making. However, most studies use a technical approach to integrated decision-making systems models in ERP (Alghazali & Ageeli, 2020; Holsapple et al., 2019). This study follows Holsapple, et al., (2005; 2019), who tested ERP systems' relationships based on four decision criteria: Decision support for individuals, participants working jointly, inter-related, and multiple organizations. Moreover,

we propose the role of ERP as a mediator in the relationship between project management and decision-making effectiveness.

H3: ERP implementation is positively related to decision-making effectiveness.

H4: ERP implementation mediates the relationship between project management and decision-making effectiveness.



**FIGURE 1
RESEARCH MODEL**

METHODOLOGY

Participants and Sampling Procedure

The unit of analysis of this study was at the firm level; thus, only key organizational respondents were required to participate, including senior and middle managers in the accounting and finance, operations, and information technology departments. After obtaining permission, the research team sent a packet consisting of a cover letter, a questionnaire, and a closed envelope. Data collection was carried out in two stages. First, respondents were asked to fill in information about project management and ERP implementation. In the second stage, respondents were asked to fill in their perceptions about top management support and decision-making effectiveness.

A total of 115 state-owned companies in Indonesia were contacted, and 76% responded. Approximately 72% of the mailings included only one questionnaire; the rest (28%) of the mailings had two questionnaires. The researcher decided to send more than one questionnaire to minimize bias while also obtaining views from different divisions (*i.e.*, the finance and operations departments). A total of 88 state-owned companies returned the questionnaire. Of these participants, 62% were male and 38% were female. Regarding their educational backgrounds, 87% had a Master's degree. Finally, 75% of the respondents' tenure was above 10 years.

Measurement

This research examines the relationship between project management, the implementation of ERP systems, top management support, and decision-making effectiveness in Indonesia. A questionnaire was utilized to collect empirical data for this study. This study's items were adapted from relevant prior research (Antoniadis et al., 2015; Ifinedo et al., 2008; Krumbholz & Maiden, 2001; Metaxiotis et al., 2005; Project Management Institute., 2017). All measurement scales were rated using five-point Likert-type scales (1=strongly disagree; 5=strongly agree). Three experts from the academic faculty and two practitioners (*i.e.*, ERP consultants and ERP managerial-level users) were involved in providing advice on each item, and their comments helped improve its quality. The questionnaire consisted of two sections. The respondents fill in their demographic information in section 1, such as gender, tenure, level of

education, ERP usage period, and ERP usage frequency. Perceptions of project management, top management support, ERP implementation, and decision-making effectiveness in section 2.

Project management was measured based on 10 project management components adapted from the Project Management Institute (2017). This concept is generally used in project implementation to complete projects, including integration, time, budget, scope, quality, human resources, communication, risk, procurement, and stakeholder management. Top management support was assessed with four items adapted from Krumbholz & Maiden (2001); Ifinedo (2008). ERP implementation was measured by adapting 10 items perceptions of advantages of implementing ERP Systems from Antoniadis (2001); Ifinedo (2008). The effectiveness of decision making was adapted from Holsapple (2019), which classifies four types of decision support provided by ERP: Decision support for individuals, participants working jointly, inter-related decisions, and involving multiple organizations.

Data Analysis

This study used CFA to examine the measurements' construct validity, including the convergent and discriminant validity. Regarding the four proposed hypotheses of this study, several regression analyzes were executed using PROCESS (version 3.5), a macro developed by Hayes (2017). A moderated mediation model 7 of the PROCESS macro was used to test all of the proposed hypotheses.

RESULTS AND DISCUSSION

Results

As shown in Table 1, all of the variables' factor loadings were greater than 0.5 for all the items; these results suggest that convergent validity was established. Internal consistency was evaluated by Cronbach's Alpha (CA), indicating that all variables had met a cut-off value of 0.7. In sequence, the CA values were 0.72 (project management), 0.74 (top management support), 0.79 (ERP implementation) and 0.76 (effectiveness of decision making). Furthermore, the Average Variances Extracted (AVEs) of all the variables were above 0.5 (ranging from 0.61 to 0.74), indicating a satisfactory convergent validity. The discriminant validity was evaluated by comparing the root square values of the AVEs with all of the correlations between the variables. Table 2 shows that all of the values of the root squares of the AVEs (diagonal bold italic) are greater than the correlations between the variables, which indicates that the discriminant validity threshold was met.

	Number of Item	CA	Loading Factor	CR	AVE
Project management	10	0.72	0.66–0.87	0.95	0.68
Top management support	4	0.74	0.63–0.86	0.90	0.70
ERP implementation	10	0.79	0.56–0.88	0.93	0.61
Decision making	4	0.76	0.76–0.82	0.92	0.74
Notes: CA=Cronbach's alpha; CR= Construct reliability; AVE= Average variance estimate; ERP=Enterprise resource planning.					

Table 2 presents the means, standard deviations, and correlations of the data. As Table 2 shows, the presence of project management was significantly positively related to ERP implementation ($r=0.54$, $p<0.01$) and decision-making effectiveness ($r=0.52$, $p<0.01$). ERP implementation was positively related to decision-making effectiveness ($r=0.56$, $p<0.01$) and was also significantly related to management support ($r=0.43$, $p<0.01$). This result provides

some initial support for the proposed relationships between project management, management support, ERP implementation, and decision-making effectiveness.

No.	Variables	M	SD	1	2	3	4
1	Project management	3.90	0.44	0.82			
2	Management support	3.68	0.67	0.43**	0.83		
3	ERP implementation	3.91	0.46	0.54**	0.43**	0.78	
4	Decision making	3.86	0.40	0.52**	0.52**	0.56**	0.86

Notes: M, mean; SD, standard deviation. Square root of the average variances extracted (AVEs) are shown on diagonal.**Correlations are significant at Table 2. Correlation and discriminant validity.0.01. The correlations are based on N=88.

Step 1 of Table 3 shows that project management was positively related to ERP Implementation ($\beta=0.51$, $p<0.01$), supporting H1. We also found a significant interaction between project management and management support for ERP in predicting successful ERP implementation ($\beta=0.25$, $p<0.01$).

Variable	coeff.	SE	p	Bootstrap (95%)	
				LL	UL
Outcome: ERP implementation					
Constant	3.88	0.04	0.00	3.79	3.96
Project management	0.51	0.11	0.00	0.30	0.72
Top management support	0.14	0.07	0.04	0.01	0.28
Interaction	0.25	0.12	0.04	0.01	0.48
R ²	0.37				
F-statistic	16.43				
Outcome: Decision-making effectiveness					
Constant	2.52	0.34	0.00	1.84	3.19
Project management	0.27	0.09	0.00	0.09	0.45
ERP implementation	0.35	0.09	0.00	0.17	0.52
R ²	0.38				
F-statistic	26.46				

Notes: coeff., coefficient; SE, standard error; p, p-value; LL, lower limit; UL, upper limit; CI, confidence interval. Bootstrapping sample size=5000.

Table 4 shows that ERP implementation would strengthen the positive relationship between project management and ERP Implementation. The results of the analysis show that the effect of project management in EPR implementation is stronger (effect=0.68, Standard Error (SE)=0.15, $t=4.58$, $p<0.01$, 95% Confidence Interval (CI) [0.38, 0.66]) when top management is at a high level than when it is low (effect=0.35, SE=0.11, $t=3.09$, $p<0.01$, 95% CI [0.12, 0.57]), supporting H2.

Dependent variable	Conditional direct effect					
	Effect	SE	t	p	95% CI	
ERP implementation					LL	UL
Top management support (low)	0.35	0.11	3.09	0.00	0.12	0.57
Top management support (high)	0.68	0.15	4.58	0.00	0.38	0.99

Notes: SE, standard error; t, t-value; p, p-value; LL, lower limit; UL, upper limit; CI, confidence interval.
Bootstrapping sample size=5000.

H3 stated that ERP implementation is positively related to decision-making effectiveness, and Table 3 shows that the results supporting H3 are statistically significant ($\beta=0.35$, $p<0.01$). Consistent with H1, H2, and H3, the results show that ERP implementation mediates the relationship between project management and decision-making effectiveness (see Table 5). Additionally, the bootstrapping estimation of the indirect effect of project management on decision-making effectiveness was positive and significant (the CI using a 5000-bootstrap sample does not include 0; CI=0.06, CL=0.23). Therefore, H4 was supported.

Conditional indirect effect				
TPM - ERP - EDM	Effect	BootSE	BootLLCI	BootULCI
Top management support (low)	0.12	0.05	0.02	0.22
Top Management Support (Mean)	0.18	0.06	0.06	0.29
Top management support (high)	0.23	0.08	0.08	0.40
Notes: SE: Standard Error; LL: Lower Limit; UL: Upper Limit; CI: Confidence Interval. Bootstrapping sample size=5000.				

DISCUSSION

The main research goal was to explore how and when project management fosters ERP implementation in state-owned companies, especially in Indonesia. This study included 76% of the state-owned companies that make a broad contribution to the use of ERP, specifically in Indonesia and developing countries in general. Few studies have explored project management's influence on the successful implementation of ERP using an inferential statistical approach. Thus, the current findings help expand the understanding of the direct effect of project management on ERP implementation and examine the moderating role of top management support in this relationship. The indirect effect of project management on decision-making effectiveness was also explored *via* ERP implementation as a mediator. The theoretical and practical implications that follow are described below.

State-owned enterprises have a unique position in the system of public tasks: they are directly or indirectly owned by the state through ownership of shares from public funds and are generally expected to contribute to the performance of a public task (Boros & Fogarassy, 2019). The main problems in state-owned enterprises are usually not managed logically and consistently; therefore, various programs might be hindered due to economic problems (Boros & Fogarassy, 2019) or changes in political leadership. In Indonesia, an increasing number of state-owned companies have implemented ERP systems (Mulyani & Marjulin, 2017), in the last five years, but many do not realize the benefits. Data from 2020 state that only a small proportion of state-owned companies in Indonesia recorded business profits. Of the total 142 state-owned companies in 2019 (some merged in 2020), only 15 companies contributed to state revenue. Therefore, this study offers a broader generalization of ERP implementation by including a large sample covering 76 percent of state-owned companies across various sectors in Indonesia.

THEORETICAL AND PRACTICAL IMPLICATIONS

This study extends the literature on ERP and makes several theoretical contributions. First, it enhances our understanding of the role of project management by broadening the range of its consequences in the initial and processing stages of ERP implementation. Existing studies have established a framework to identify critical success factors for ERP implementation (e.g.,

Al-Mashari et al., 2003; Liao et al., 2018; Umble et al., 2003). Furthermore, this study confirms that successful ERP implementation requires excellent project management (Liao et al., 2018; Metaxiotis et al., 2005). Since major work on ERP implementation addresses private companies (Ali & Miller, 2017; Boros & Fogarassy, 2019; Liao et al., 2018), this study expands the field by analyzing ERP projects in state-owned enterprises from various sectors in Indonesia.

Second, this study uses top management support as an essential boundary condition regarding the impact of project management on ERP implementation. It indicates that top project management leads to higher positive outcomes under higher top management support perceptions (see Figure 2). In general, top management support and project management teams are two main factors that lead to successful ERP implementation (Al-Mashari et al., 2003; Behera & Dhal, 2020). This study advances the understanding about project management as the main factor behind successful ERP implementation. It also examines whether differences in top management support affect project management and ERP implementation in state-owned companies. The contingent nature of top management support is based on the assumption that leadership in state-owned companies is closely related to the political situation wherein policies change with changes in national politics.

Third, it advances the literature on ERP outcomes, especially the Decision Support System (DSS). It uses ERP implementation as an underlying mechanism linking project management and decision support effectiveness. This study bridges the gap between ERP implementation and decision-making (Holsapple et al., 2019). Most previous studies focused on the technical issues of ERP software and their effects on organizational business performance (*i.e.*, Holsapple et al., 2005; 2019), with few mentions of decision support aspects. However, exploring ERP implementation mediation helps enrich studies concerning ERP and DSSs from a project management perspective. While project management is positively related to ERP implementation, it reinforces the contagious nature of ERP benefits as decision-making support for management. This study offers a more comprehensive overview than previous studies by integrating project management, ERP implementation, and the effectiveness of decision-making in state-owned enterprises. Finally, we provide preliminary evidence that project management's indirect effect on decision-making effectiveness via ERP implementation is a new insight into research in this field.

The practical contributions of this study include the following. First, project management is positively related to the success of ERP implementation, and this implies that successful ERP implementation requires good project management, especially to ensure compatibility between integration, time, budget, scope, quality, human resources, communication, risk, procurement, and stakeholder management in the four stages of development (definition, planning, execution, and delivery). In the context of ERP implementation in state-owned companies, project governance still requires "checks and balances" to ensure that the decisions made during the previous leadership were the right decisions and were indeed beneficial for the organization. In the context of management evaluation, it is necessary to consider the use of the Goal-Directed Project Management (GDPM) framework developed by Metaxiotis, et al., (2005) to ensure the Optimal Adaptation (IOA) of ERP systems in each company.

Second, top management support plays a vital role in increasing the impact of project management on the successful implementation of ERP. Top management must take an active role in leading an ERP implementation project to ensure the process runs well. In the context of state-owned enterprises in Indonesia the minister is the key person to be involved in every step of the ERP implementation, monitoring, and being committed with previous management to ensure the sustainability of the project. In addition, top management must be willing to allocate valuable resources to the implementation of this effort. Further, the Ministry of state-owned company as the coordinator of all state-owned enterprises in Indonesia, can provide training to leaders in each company to help them identify their own ERP implementation problems, and to see the obstacles that occur in the field as starting points; then, they coordinate with the developer for technical solutions.

Third, ERP implementation is positively related to decision-making effectiveness (*i.e.*, decision support for individuals, participants working jointly, inter-related decisions, and involving multiple organizations). This result may indicate that ERP for decision support is already working for most companies. This exploratory study establishes decision support markers in various decision needs in the territory of ERP. The follow-up action of these findings is that management needs to consider the role of integrating ERP systems with decision support applications.

CONCLUSIONS

This study attempts to rectify the lack of research on the critical factors success for ERP implementation in state-owned enterprises, especially in Indonesia. The hierarchical regression model was used to demonstrate the impact of project management on ERP implementation and the moderator effect of top management support in this relationship. This study also found a positive and significant effect of ERP on effective decision making and its role as a mediator in the relationship between project management and effective decision making. Based on the findings, certain conclusions can be drawn. This study found that project management plays an essential role in the successful implementation of an ERP system. Top management support in the context of programs in government agencies takes a strategic position as the person who takes the policy to continue or stop the program. This study also found that ERP implementation is positively related to decision-making effectiveness, which indicates that this system has a role in management activities in decision-making, even though on a limited scale. Finally, the indirect relationship between project management and decision-making effectiveness through ERP implementation can enrich research models in this field.

This study has several limitations. First, we only emphasized project management as a determinant of ERP implementation. Although these factors play a critical role in ERP implementation, other factors such as change management, ERP consultant quality, insufficient training and communication, and lack of financial support may influence the ERP implementation. Second, this study emphasized top management support as the moderator on the project management ERP implementation relationship and state-owned companies, so its generalization to private companies needs to be carried out carefully. Finally, the usual limitations of studies using cross-sectional surveys have the drawback of claiming causality. Thus, a longitudinal study needs to be considered by future researchers to enrich the understanding of the causal relationships between the constructs and may help reduce common method bias (Podsakoff et al., 2012).

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