

The Role of ERP in Improving Organization's Intellectual Capital

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Abstract: The purpose of this study was to identify the influence of management control system (MCS) on intellectual capital through the implementation of ERP as intervening variable. Theoretical model is developed that considers two concepts of MCS (the belief system and the boundary system) and the roles they play in enhancing intellectual capital. Data collected via survey from 57 managers of 36 companies in Indonesia that have implemented ERP system. This research used the partial least square to describe relationships between variables.

Results suggest that belief system and boundary system has a positive influence towards intellectual capital through the implementation of ERP as intervening variable on the companies that implement ERP system in Indonesia. When the users experience that ERP is useful and easy to use, the users will use it well. Finding offer the implication for managers to start paying attention to the factors which can help improving the users' work performance. As the users' performance improved the company's intellectual capital will also be improved.

Keywords: Belief System, Boundary System, Technology Acceptance Model, ERP Implementation, Intellectual Capital.

1. Introduction

At the dawn of globalization era, rapid technological development plus numerous and varied changes in customer demand indirectly has made companies around the world encouraged to enhance their company's ability in creating and offering more value so that it can control and maintain the market (Schiuma & Lerro, 2008); therefore, companies nowadays are constantly searching for ways to gain more profit than their competitors (Castaneda & Toulson, 2013). The right management control system could help companies become more efficient and flexible in facing the competition of the business world. The concept of management control system has began to develop now. Management control system is defined as a system that conveys useful information for managers regarding decision-making in the performance management process which is efficient and effective in reaching the organization's goals (Tekavčić, Peljhan, & Teljko, 2008).

Minimizing cost and maximizing profit are necessary in order to improve the competitive advantage (Yang & Su, 2009), therefore companies need business support factors, which are expected to help integrate the information system and capable to assist managements in decision-making. One of the ways to achieve this is by using the Enterprise Resource Planning (ERP) system (Erasmus, 2015). ERP is a business software system which provide an integrated solution for organizations regarding their needs of information processing, while efficiently and effectively manages resources, i.e. materials, human resources, finance (Shih & Huang, 2009). One of the approaches that is used to look at the ease of technology is the Technology Acceptance Model (TAM). Davis (1989) was the first person to introduce TAM and explain the TAM model which has adapted Theory of Reasoned Action (TRA) model. TAM is one of the most-used models to explain behavioral intention and actual usage, which is the intention and behaviour towards the satisfaction of system information (Davis, 1989), and it could help improving the understanding of how the influences on actual usage could help improve the implementation of ERP.

The implementation of enterprise resource planning is the main economic force in many industries, and it is believed to be capable of increasing the effectivity of the organization's operational (Lengnick-Hall, Lengnick-Hall, L., & Abdinnour-Helm, 2004). The implementation of enterprise resource planning helps organizations in developing themselves by making changes, as Markus (2004) noted that the implementation of enterprise resource planning is seen as an innovation in technological aspect which brings changes for the organization, by making it easier for the organization to integrate the organization's data and also helping in the process of decision-making.

In this research, researchers will focus on two factors of management control system, namely belief system and boundary system, and several TAM factors which have been developed by Davis (1989), i.e. perceived ease of use, perceived usefulness, actual use, and intellectual capital which have been developed by Gogan, Artene, Sarca, & Draghici (2016).

2. Literature review

2.1. Resource-Based Theory

According to Rengkung (2015), resource-based theory is a paradigm which views the organization as having a dependency on the resources they have when they are faced with business competition. The resource-based theory approach become a form of organizational strategy, which assumes that organization is a collection of tangible and intangible assets, resources, and competencies.

Anantadjaya (2008) stated that resource-based theory is a theory perspective that shows the company's resources will represent the company's ability. Resource-based theory could be implemented and controlled by the management for the effective and efficient use in the production cycle. Resource-based theory is a theory that is widely discussed and developed by researchers (Pedron, 2009).

2.2. Management Control System (MCS)

Generally, MCS is defined as a system which conveys useful information for managers regarding efficient and effective decision making (in the performance management process) in achieving organization's goal (Tekavčić et al, 2008). Agyemang and Broadbent (2015), argue that MCS works significantly within the organizations, yet it operates in the internal and external context of the organization, and is considered important as it enables organizations to monitor their performance. Simon (1994) stated that MCS components are belief system and boundary system.

Simons (1994) defines belief system as a formal organizational system where senior managers communicate formally and systematically to the employees to strengthen the basic values, goals, and direction of the organization. Belief system aims to communicate core values such as vision and mission so as to encourage CEOs to uphold the organization's concerns (Crombie & Geekie, 2010). Further, Simons (1994) defines boundary system as a formal system that is used by top managers to establish rules that must be obeyed. Boundary system is designed to communicate risks that could be occur and must be avoided, so that the organization can avoid any actions that could trigger the occurrences of unwanted risks (Ferreira & Otley, 2009).

2.3. Enterprise Resource Planning (ERP) System

According to Bansal(2015), ERP is a software driven by a business management system which is integrated to all business aspects. ERP is a complex software. Hwang & Min(2015) and also O'Leary(2000) claim that ERP could generate values through several different ways, which are by integrating various business activities into one system, facilitating control in terms of organizational standards, improving access to online and real time informations, improving intra- and inter-organizational communications, and improving the capability of decision-making.

2.4. Technology Acceptance Model (TAM)

TAM is an information system theory designed to explain how individuals are able to use and understand an information technology (Davis, 1989). Rauniar, Rawski, Yang, Johnson (2014) stated that TAM is an information system used in organizational arrangement to improve workers's efficiency. In conclusion, TAM is an important theoretical contribution to the understanding of ERP (Davis, 1989). According to Venkatesh and Davis(2000) who developed a study conducted by Davis(1989) about the ERP's dimension in technology acceptance model are Perceived Usefulness (PU), Perceived Ease of Use (PEU), and Actual System Usage.

Davis(1989) defines PU as a level of someone's trust towards information system that can improve the performance in an organization, where some organizations believe that it brings positive impacts. PU helps design organizational intervention which can improve organization's performance(Venkatesh & Davis, 2000). PU is viewed by Pantano and Di Pietro (2012) and also Teo (2013) as a subjective prospect, that the specific application system would improve work performances within a certain organization. PU is defined as a person's subjective perception of the ability to operate a computer in order to improve work performance when completing a task.

PEU is defines by Davis (1989) as a belief on decision-making process to use an information system in order to make it easier and more effortless. PEU can improve individual performances since the system can provide convenience for its users(Venkatesh & Davis, 2000). Wen & Kwon(2010) observed that PEU has that confidence in providing the ease and is uncomplicated to improve user's skill. Zhu, Linb, and Hsu(2012) add that PEU signifies the degree to which individuals accept that by using a particular technology it would make things become easier and hassle-free. The system's characteristics could help users in terms of providing the ease of technology usage and system usage. In their research, Venkatesh and Davis(2000) claim that PEU is "the individual's perception of how easy the innovation is to learn and to use" which means PEU is someone's view of their willingness to apply innovations or systems when it is easy for them to understand and use.

Davis (1989) argues that the actual system usage is user's satisfaction towards the system for providing the ease in the application of new technologies which reflected as in the actual condition. The individual usage degree of a technology can be predicted from their attitude and behaviour towards the technology, such as the existence of innovation to add supporting features, the motivation to keep using that technology, and to motivate other users(Davis, 1989). Actual system usage is the real condition of system usage, conceptualized in the form of measurement of frequency and duration of technology usage time(Davis, 1989).

2.5. Intellectual Capital

Intellectual capital is an intangible asset, but it can help organizations to reach their goals(Dost, Badir, Ali, and Tariq, 2016). This is supported by the statement from Sällibrant, Hansen, Bontis, Hofman-Bang (2007), that intellectual capital can create the value of organizational factors that are not visible on the balance sheet, but it has important values for the long-term company's profitability. According to Sullivan and Sullivan(2000), intellectual capital can increase the company's profitability. In this case, intellectual capital is recognized as a valuable intangible asset and utilized to influence creativity, innovation, competitive superiority, to create values, and to improve company performance(Khalique, Shaari, Hassan, 2011). Gogan et al. (2016) developed Intellectual Capital based on Bontis et al. (2000) as: human capital, relational capital, and structural capital.

Human capital is a concept which claims that the resources and the asset of an organization are their people. Human capital includes the knowledge, experiences, and special skills of individuals working to create the economic value of the company(Cohen & Kaimenakis, 2007). According to Moon & Kym(2006), human capital is the most important part of the intellectual capital. Human capital can be in the form of knowledge, skills, relationships, individual attitude and behaviour(Schiuma, Lerro, Sanitate, 2008). Human capital refers to the company's individual intellectual characteristics and qualities that affect the market changes and customer needs(Gogan et al., 2016).

Relational capital refers to the competency in developing relations with any stakeholders in the market, and is a skill to establish interpersonal relations and to develop the relation based on trust(Gogan et al., 2016). Relational capital is a value that is obtained through relations between organizations and the parties involved, e.g. relation with suppliers, shareholders, and anyone related to the organization; usually comprised of relation between organizations and customers(Grasenick & Low, 2004).

Gogan et al.(2016) defines structural capital as a component of organization which can be described as the infrastructure and the organizational process that is used to acquire products and services. Structural capital is a common system and also serves as the procedure of problem-solving and innovation(Chu, Lin, Hsiung, and Liu, 2006). Structural capital includes all non-human knowledge within the organization. This is related to the infrastructure owned by the organization and supports human capital(Watson & Stanworth, 2006). According to Ordenez de Pablo(2005), structural capital consists of skills and competencies of the individuals who work within an organizational structure.

3. Research Methods

3.1. Research Model

Davis(1989) states that perceived usefulness is a degree of someone's trust towards information system that can improve the performance of an organization. Perceived usefulness is influenced by external variables. External variables could be in the form of belief, attitude, and intention to use(Park, 2009). In the other hand, perceived ease of use is a belief in the decision-making process to utilize an information system(Davis, 1989). In their research, Chomcalao & Naenna(2013) modified and developed the Technology Acceptance Model (TAM) and found the addition of external variables. These external variables are grouped into 2 types of contexts, the system context and the individual context. The system context includes system quality, information quality, and service quality. Meanwhile the individual context are social influence, facilitating condition, self-efficacy and personal innovativeness in IT. Lewis, Agarwal, Sambamurthy(2003) claims that individual characteristics will positively affect the use of technology and establish trust towards new technology by combining information from several channels or mass media and interpersonal relationship. Individuals with good characteristics are expected to develop more positive trusts regarding the technologies. PEU and PU are the constructions of trust which indirectly affected by external variables when it comes to strengthening the trust. Users who use particular system can improve their performances and through their belief that using particular system(i.e. ERP) would enable them to be effortless(Surendran, 2012).

H1: Belief System is positively related with ERP Implementation.

Maas, Fenema, & Soeters(2016) stated in their research that the main goal of ERP system's knowledge development is to make the system more understandable by end-users and managers within an organization, with the implementation

of ERP can reliably improve the organization's performance. By doing so, ERP can reduce the occurrences of risks and improves the organization's performance. The implementation of ERP is expected to open opportunities for changes within the organization's culture and general vision between the company and the customers(Shang & Seddon, 2002). PEU is defined as how far a person believes that by using a particular system they could be free from any efforts and risks while PU is defined as how far a person believes that by using a particular system it would improve their work performances(Davis, 1989).

Chou et al.(2014) assert the importance of knowledge-sharing to facilitate the use of ERP system. The intended knowledge are the users' psychological and sociological characteristics, related to motivation, code of ethics, and social modal(Chou et al., 2014). The company's boundaries appear in a tangible form, as reflected in the organization chart and in the scope of government and authorities. But, behind the tangible boundaries there are more profound boundaries that fall under the cognitive ones. In this sense, the organizational boundaries have been considered to be a composite object. According to Kallunki, Laitinen, Silvola. (2011), the integration of control management can be pursued through ERP system, and this system has become one of the most significant implications from the perspective of control management. The ERP system can be viewed as a platform for managements since it has standardized the operation and by doing so enables them to be centralized towards management. This also explains the meaning of ERP system to management controls, such as its ability to deliver relevantly and in real time which is important in critical decision making (Kallunki et al., 2011).

H2: Boundary System is positively related with ERP Implementation

Bontis, Sharabati dan Jawad (2010) defines intellectual capital as anything that creates value from human intelligence and thought. Astuti & Sabeni (2005) defines intellectual capital as knowledge, informations, intellectual properties, and experiences which can be utilized to create organizational welfare. The implementation of ERP can affect social capital. This implementation is linked to the relations that are created by the coordination and collaboration among individuals in the organization(Ifinedo, 2006). This is supported by a research which was conducted by Lengnick-Hall et al. (2004), that the implementation of ERP system could improve communication and form a more integrated organization. The system will support individuals to collaborate, to conduct information exchanges, and to create work relationships. The implementation of ERP provides a platform to improve social capital and intellectual capital that supports the organization to have advantages in the competition between companies in the field of economic knowledge (Lengnick-Hall et al., 2004).

H3: ERP Implementation is positively related with Intellectual Capital.

Simons(1994) identifies the beliefs and limits of the system that can be used to articulate and advertised the organization's goal. According to Simons(1994), beliefs and system boundaries have been articulated as a way to utilize

formal control to clarify and communicate values. Like many other organizations, belief system is used to communicate core values to the potential employees during recruitment, and to strengthen these values to the existing employees and the others outside the organization. In their research, Chenhall et al.(2010) found 2 relations between belief system variables and intellectual capital, namely : (1) it could improve the bond and strengthen values by explaining the core values to new employees and existing employees, (2) it could bridge other parties within the network to understand the core values and the corporate goals. Mundy(2010) argues that the belief system can add the highest values when it is used actively and for influencing employees in certain situations. Chenhall et al. (2010) states that the definition of belief system is an organization that utilizes senior managers to communicate and strengthen the organizational values, goals, and direction. Belief system plays an important role in communicating and strengthening social justice values (Chenhall et al, 2010).

H4: Belief System is positively related with Intellectual Capital.

Simons(1994) defines boundary system as a formal system which is used by top managers to establish rules that must be obeyed. Boundary system was designed to keep companies away from any threats that can degrade the companies' values by communicating the possible risks that should be avoided, in order to enable the company to avoid actions that can trigger unwanted risks(Ferreira & Otley, 2009). According to Simons(1994), managers seek to control strategic positions by using the system so that the organization can avoid the identifiable risks.

H5: Boundary System is positively related with Intellectual Capital.

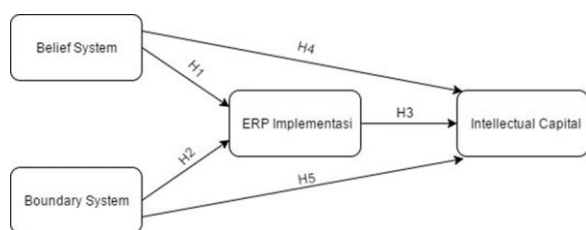


Figure 1. Research model

3.2. Instrumentation

This research uses quantitative data types. The sources of the data used here are primary data which obtained through the distribution of questionnaires to companies in Indonesia which implement the ERP system.

The population of this research are companies in Indonesia that implement ERP system in their company. Meanwhile, the sample of this research are 36 companies in Indonesia that implement the ERP system. The sampling technique used in this research was convenience sampling.

The questionnaire was divided into three parts :

1. Management Control System, statements adopted from Su, Baird and Schoch. (2015).
2. The Implementation of ERP, statements adopted from Davis (1989).

3. Intellectual Capital, statements adopted from Bontis (1998).

This research uses Partial Least Square(PLS) as its data analysis technique, with the calculation process assisted by WarpPLS 5.0 software. Partial Least Square (PLS) is part of Structural Equation Modeling (SEM). The purpose of using WarpPLS is to find out the impact of the independent variable (X) on the dependent variable (Y) and explain the relationship between these variables. This analytical technique is able to provide accurate results and can be used on a small sample scale.

There are two models of PLS analysis, namely inner model and outer model. The outer model is the specification of relations between variables and its indicators, while inner model is the specification of relations about hidden or latent variables, which is between exogeneous variables and endogeneous variables.

Table 1. Respondent's profile descriptive based on the company's type of industry

Types of Company	Frequency	Percentage
Manufacture	20	35%
Non Manufacture	37	65%
Total	57	100%

Table 1 shows that this study was conducted on the majority of non-manufacture companies(65%).

Based on Table 2, it was known that the outer loading values for each indicators in every variables all has a value of >0.5, so those indicators have already fulfilled the convergent validity.

Table 2. Outer and cross loading value

	BS	BOS	ERP	IC
BS 1	(0.897)	-0.042	-0.046	0.162
BS 2	(0.917)	-0.053	0.001	-0.048
BS 3	(0.895)	0.076	-0.036	-0.062
BS 4	(0.891)	0.020	0.081	-0.051
BOS 1	-0.122	(0.885)	-0.165	0.353
BOS 2	-0.019	(0.927)	-0.040	0.020
BOS 3	-0.089	(0.850)	-0.036	-0.296
BOS 4	0.254	(0.795)	0.267	-0.101
PU	0.104	-0.061	(0.895)	-0.100
PEU	0.656	-0.414	(0.794)	-0.187
USG	-0.790	0.493	(0.776)	0.306
HC	-0.441	0.180	-0.120	(0.841)
SC	-0.110	0.189	0.081	(0.883)
RC	0.531	-0.361	0.034	(0.882)

Based on the cross loading table in table 2 above it can be concluded that each indicator that exists in latent variables has a difference with the indicators in other variables which were signified by higher loading score in its own construct. Thus, the model has already possessed a good discriminant validity.

Table 3. Average variance extracted table

	AVE	AVE's square root
BS	0.810	0.900
BOS	0.749	0.865

ERP Implementation	0.678	0.823
IC	0.755	0.869

Based on table 3, it shows that the AVE value of belief system variable was 0.810, boundary system was 0.749, ERP implementation was 0.678, and intellectual capital was 0.755. The results of these constructs shows that the AVE values of all constructs were >0.5. Based on AVE's criteria, the results met the discriminant validity.

Table 4 Composite reliability value

	Composite Reliability
BS	0.945
BOS	0.923
ERP implementation	0.863
IC	0.902

Table 4 shows that the composite reliability from each variables i.e. belief system was 0.945, boundary system was 0.923, ERP implementation was 0.863, and intellectual capital was 0.902, which were used in this research had already fulfilled the rule of thumb. It can be concluded that each variables has a high reliability where it can be seen from the whole composite reliability value which was greater than >0.7. This result shows that the model in this research was already reliable.

Table 5. R square value

	R Square
BS	-
BOS	-
ERP implementation	0.219
IC	0.715

Table 5 shows that the R-square value for ERP implementation variable was 0.219 which means that the percentage of the influence of belief system and boundary system on ERP implementation is 21,9% while the rest of it(78%) were explained by other variables.

The value of R-square for intellectual capital was 0.715 which means that the percentage of the influence of belief system, boundary system, and ERP implementation on intellectual capital were 71.5% while the rest of it(28.5%) were explained by other variables.

$$Q^2 = 1 - ((1 - 0.219) \times (1 - 0.715)) = 0.777415 = 77.74\% \quad (1)$$

Therefore the model used in this research could explain the information contained in the data of 77.74% and the rest could be explained by other variables outside the model.

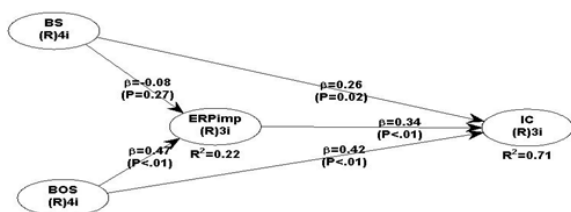


Figure 2. Result model

Table 6. Hypothesis testing

Hypothesis	Influence	Path Coefficient	P values	Remarks
H1	Belief System → ERP Implementation	-0.078	0.272	Rejected
H2	Boundary System → ERP Implementation	0.475	<0.001	Accepted
H3	ERP Implementation → Intellectual Capital	0.341	0.003	Accepted
H4	Belief System → Intellectual Capital	0.261	0.017	Accepted
H5	Boundary System → Intellectual Capital	0.419	<0.001	Accepted

Table 6 presented the direct relation between belief system with ERP implementation. That relation resulted in the 0.272 p-values which means hypothesis(H-1) has negative influence inter-variable, since the resulting p-values was >0.05. The -0.078 path coefficients indicates that belief system negatively affects the ERP implementation. Thus, the belief system variable does not affect the ERP implementation variable, so it can be concluded that hypothesis(H1) is rejected.

In the direct relation between the boundary system to the ERP implementation there's a <0.001 p-values, so it can be assumed that the relation between boundary system variable towards the ERP implementation is significant. Beside that, this relation has a 0.475 path coefficient which means there is a positive relationship between the boundary system and the ERP implementation. This is supported by an explanation in the previous chapter which explains about the positive relationship between the boundary system towards the ERP implementation. So it can be concluded that hypothesis(H2) is accepted.

Direct relation between ERP implementation with intellectual capital has 0.003 p-values and 0.341 path coefficients which means the ERP implementation has a significant and positive relationship towards intellectual capital. Thus it can be concluded that hypothesis(H3) is accepted.

Direct relation between belief system and intellectual capital has a 0.017 p-values so it can be said that it has a significant relationship. Besides, the 0.261 path coefficient value indicates that there's a positive relationship between belief system and intellectual capital. Therefore the improvement in belief system would also improve the

intellectual capital. So it can be concluded that hypothesis(H4) is accepted.

The direct relation between boundary system and intellectual capital results in a <0.001 p-values which indicates its significance. In the other hand, the path coefficient has a 0.419 value, so it can be assumed that the boundary system positively affects the intellectual capital. So it can be concluded that hypothesis(H5) is accepted.

4. Discussion and Managerial Implication

In this research, by researching the variables of belief system, boundary system, ERP implementation, and intellectual capital, researchers obtained goodness of fit(GOF) of 77.74%, which means the total competency of all variables to explain the dependent variables(intellectual capital) has competency level of 77.74%. In other words there's still a chance of 22.26% for other variables outside this research model which can explain the intellectual capital further than this research. So it is expected for academics, that this research can enriches references or it can be utilized as the comparison for the next researches.

Suggestions for company managements who implement ERP system in Indonesia is to start paying attention to the factors which can help improving the users' work performance, both for down managers and top managers. As exemplified in this study, the boundary system variable can improve users' work performance on ERP implementation which leads to the improvement of intellectual capital within the company which helps the company to improve its value. With the implementation of the rules, code of ethics, and communication about the risks that should be avoided and the risks in company's decision-making, it can encourages users within the company to improve their performances and implement ERP in their work. When the users felt ERP is useful and easy to use, the users will use it well. Undirectly, when users' performance improved, the company's intellectual capital will also be improved.

5. Conclusion

The aim of this research is to identify whether or not there are any influence between transformational leadership and ERP system self-efficacy towards ERP system usage. The company sample that were used were came from 36 companies in Indonesia which have been implemented the ERP system.

Based on the calculation and examination of the hypothesis in the previous chapter, it can be concluded that :

1. There is a negative and insignificant influence between belief system variable towards ERP implementation from ERP system's users in companies in Indonesia. Therefore, it can be assumed that there is no connection between belief system and ERP implementation.
2. There is a positive and significant influence between boundary system towards ERP implementation. By implementing boundary system within the company, automatically it will improve the implementation of ERP within the company.
3. There is a positive and significant influence between ERP implementation towards intellectual capital in a company. By implementing ERP within the company,

automatically it will improve a company's intellectual capital.

4. There is a positive and significant influence between belief sytem towards intellectual capital. By implementing belief system within the company, it would improve the company's intellectual capital.
5. There is a positive and significant influence between boundary system towards intellectual capital from ERP system's users in companies in Indonesia. By implementing boundary system on intellectual capital within a company, it would improves intangible asset's value within the company.

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