



Enterprise Resource Planning (ERP) and Management Controller : A Study of Manufacturing Industries in Banten

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Abstract

The objectives of this study focus on the implementation of ERP and its impact on business and management controllers, and more specifically, it is necessary to present a new wave of information systems and to identify their impact on the relationship of management controllers with the entire management system within the company. The survey results were analyzed using Partial Least Squares - Structural Equation Modeling (PLS-SEM). PLS-SEM provides an estimate of the relationship between variables and constructions (measurement models) and between constructions (structural models). The system quality of the ERP affects the satisfaction of the management controller, then the quality of the ERP information also affects the satisfaction of the management controller. Furthermore, the user utility of the ERP system also directly affects the satisfaction of management controllers. Then, communication does not affect the satisfaction of the management controller because the better the system, the less intense communication will be. In conclusion, ERP convincingly transforms accounting practices within the company, by encouraging the formalization of operations, automation, and securing the recording of operations. ERP makes it possible to apply an event-driven accounting approach to practice. Data collection is ERP's main contribution to management controllers, and leads to harmonization and improvement of budget information.

Keywords: ERP, management controllers, communication and information systems

INTRODUCTION

Information systems and in particular Enterprise Resource Planning are important tools for management controllers. Therefore, each company tries to create an information system that meets its specific needs (Rouissi, 2020). In the field of management controllers, we can distinguish between what is "conceptual equipment" (formal models and tools) and what is under the "organizational device" (structure and behavior). Enterprise resource planning (ERP) systems have

become popular in medium and large enterprises around the world over the past twenty years (Rupcic, 2021). ERP is used to integrate all company information into one central database, they allow information to be retrieved from a variety of different organizational functions and help provide visible objects for organizations (Kallunki *et al.*, 2011). In previous research, ERP implementation in relation to performance and management control systems that have been carried out shows that Enterprise Resources Planning forms dynamics to improve centralization based on homogenization and coordination systems in control practices (Teittinen *et al.*, 2013; Alomari *et al.*, 2018; Nawawi & Yunia, 2021). Management support is needed for the successful implementation of Enterprise Resource Planning implementation (Appelbaum *et al.*, 2017), a reason there is better management control also depends on the length of integration of the management control system into the Enterprise Resource Planning system even though in terms of the economy it requires large costs (Malmi & Brown, 2008; Sbarba & Marelli, 2018). The objectives of this study focus on the implementation of ERP and its impact on the management control business, and more specifically, it is necessary to present a new wave of information systems (Rouissi, 2020), and to identify its impact on the relationship of management controllers with managers. So, an investigation can be carried out: (1) To present ERP as a component of information systems, and to demonstrate the importance of information systems in relation to management controllers. (2) To better understand the contribution of ERP to management controllers.

To collect the necessary data for the study, quantitative confirmation studies will be conducted. With the following systematics: (1) The first part will aim to study the concept of ERP as a component of information systems and to present the various contributions made by this technology. (2) The second part will explain the evolution of the "management control" function and the impact of the introduction and use of ERP on the management controller profession. The model of explanation of its impact is presented with the hypothesis generated and which is devoted to empirically testing the model developed from the previous model carried out by Rouissi (2020).

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The business environment has not stopped undergoing changes and mutations at all levels, whether economic, sociological or technological, in recent years (HasabElnaby *et al.*, 2012), therefore the main interest given by companies to information and communication technologies to be able to face increased competition and thus improve their competitive position (Rouissi, 2020).

To do this, companies need sophisticated, clear, and precise information that allows immediate decision-making to get reaction time on both short-term and long-term horizons (AlMuhayfith & Shaiti, 2020), hence the perception of IT as the most effective way to achieve this goal and therefore information systems as a basis for improving the efficiency of their organization. Therefore the use of ERP which replaces traditional production management and planning systems

and therefore responds to the problem of completeness and synchronization of information in the organization (HasabElnaby *et al.*, 2012). Therefore, the research model development experiment with the following images:

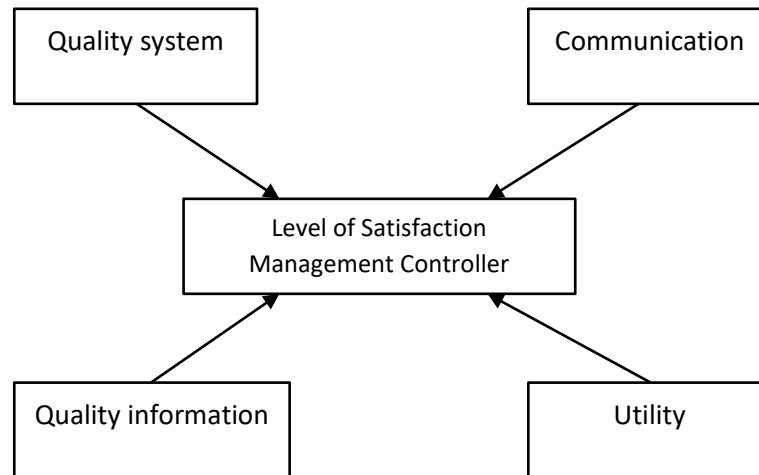


Figure 1. Conceptual model of ERP proxy and management controller satisfaction

2.1 Enterprise Resources Planning

In this section, we will present the various definitions of ERP as well as its history, basic principles, and perimeter.

A. Definition of ERP

ERP is an integrated set of business applications or modules, which can contain business functions, such as ledger accounting, debt, receivables, raw material planning, order management, inventory control, and human resource management (Chapman & Kihn, 2009). Then, Estébanez (2021) defines ERP as "Configurable, modular, and integrated IT applications, which aim to combine and optimize business management processes by proposing unique repositories and using standard management rules".

To summarize, this somewhat different definition emphasizes the concept of integration of information systems that work in a coordinated and coherent manner. So, we are talking about ERP when we are in the presence of an information system consisting of several applications that share the same database, through a system that is automatically predefined, and may be configurable as a workflow engine (Rouissi, 2020). In addition, ERP is applied in enterprises to coordinate all the activities of the company by so-called vertical activities such as production, supply or horizontal such as marketing, salesforce, human resource management, and others around the same information system (Shatat & Shatat, 2021).

B. History and Scope of ERP

In the late 1970s, accounting and order entry functions were integrated into the Computer Assisted Production Management (CAPM) system to give birth to Manufacturing Resource Planning (MRP) which included production master plan maintenance, tool management, stock management, inventory, logistics. During the 1980s, the needs of enterprises became increasingly complex, we tried to make the connection between accounting and electronic exchanges. A new generation system later appeared, DRP (Distribution Resource Planning), which made it possible to coordinate the management of warehouses, distribution centers, and supply chains (Rouissi, 2020).

The term ERP is to standardize the company's information system with a unique tool capable of covering a large management perimeter, including purchasing management, sales management, accounting management (customer accounting, suppliers, fixed assets, personnel), management control, production management (planning), inventory management (logistics) (Trigo *et al.*, 2014).

ERP consists of functional modules, each of which covers the scope of business management. For example, entering sales automatically generates a double entry accounting entry in the sales journal with an automatic calculation of the value added tax collected (Rouissi, 2020). This software package generally consists of three main structural areas, namely: (1) Finance: accounting and financial applications, (2) Logistics: supply management, (3) Human resources: everything related to personnel management. However, ERP implementation has an impact on the company, both at the strategic and structural levels (Kallunki *et al.*, 2011).

C. ERP Implementation

ERP is a real project characterized by the total integration of software tools in an organization. Its implementation in the enterprise leads to a significant change in the work habits of most employees (Chatzoglou *et al.*, 2017). Before establishing ERP, each department had its own information system. To create relationships between these different systems, the following situations once occurred:

- Double or even triple entry of the same information in a separate information system.
- Companies have different IT system interfaces between divisions even within one company.

Dangerous consequences can be reflected in terms of double entry: there are a large number of inconsistency errors between different IS. In the event of an interface between different IS, the update is not performed in real time (Phaphoom *et al.*, 2018). Data loss sometimes occurs due to computer problems during data transfer. Human error also occurs regularly (incorrect file transfers, duplication due to two consecutive failed transfers, and others.). In some large companies, management controllers are specifically hired to analyze and correct inconsistencies between these information systems (Rouissi, 2020).

Su & Yang (2009) focusing their attention on the ERP implementation approach while trying to show that an incremental, evolutionary, approach based on continuous improvement is a key factor in the successful implementation of an ERP project. Verma & Kumar (2016) defines

'implementation as preparing a business to receive an information system to use it effectively'. The result of the implementation extends to changes in tasks, structure and staff.

Rouissi (2020) offers a 5-step method aimed at better planning. (1) Choice of ERP solution: The company determines the needs that its information system must meet and analyzes the solutions offered in the market. (2) Management process analysis: this phase involves a double analysis: First, Understand how organizational processes work and identify problems in lost time. Second, Setting up an information system. (3) Reengineering: the choices made during this phase have an impact on the organization and its staff. (4) ERP particularization: particularization is determined by strategic and structural choices. (5) Implementation: adaptation to the new system is through staff training and smooth communication between different players is called upon to learn the logic of integration. ERP systems are effective on an individual level and therefore the expected success is achieved when their users are satisfied with them. This level of satisfaction is determined by the good quality of the information provided (Caserio & Trucco, 2020). On this basis, the following hypothesis is put forward:

H₁: The better the quality of information provided by the ERP system, the higher the satisfaction level of the management controller

H₂: The better the quality of the ERP system, the higher the satisfaction level of the management controller

2.2 Basis of Management Control

Information systems are an important organ of strategy and monitoring of their effectiveness and are responsible for efficient modeling of information management. It plays an important key role in directing increasingly complex organizations. In this section, we'll deploy the definition of management control and the role of management controller.

A. Management Control

The definition of management control has been the subject of several books that have contributed significantly to the development of the role and scope of the discipline (Rouissi, 2020). This study explains various definitions of management control as well as the role of management controllers and perceptions of management controllers.

Kallunki *et al.*, (2011) defines management control as "The relationship between information processing and management control functions generally resembles an economic network with its users." The results of the enterprise (production, commercial activity, shares, return on investment, etc.) appear through the dashboard tool, which is generated from programs for collecting and processing accounting and financial information developed by engineers. This definition indicates the importance of information systems for management control. Management control can be defined as the process of decision support. It should inform decisions and create an interim budget

to develop the necessary tools to monitor the results (dashboards, indicators) and to highlight differences and explain their causes (Teittinen *et al.*, 2013; Beuren *et al.*, 2019).

According to Alomari & Mohd (2020), "Management control seeks to design and implement information tools intended to enable managers to act while achieving overall economic coherence between goals, means and achievements". It should be considered a useful information system for conducting business because it controls the efficiency and effectiveness of actions and means to achieve goals (Alomari *et al.*, 2018). For this reason, this study tries to try to develop some of the last definitions because it emphasizes the relationship between information systems and management control.

B. Management Controller Role

Management controllers of large enterprises are increasingly faced with articulated information systems around integrated management software (Caserio & Trucco, 2020). The decision system can help them in their work. Faced with the standardization of information sources and the "software vision" imposed on them, management controllers must structure and equip themselves with tools capable of integrating into sometimes complex structures and environments (Sbarba & Marelli, 2018).

The emergence of new technologies changed the organization of management control functions. In fact, management controllers are faced with two logics: financial problems derived from the hierarchy and performance to concrete messages coming from the field (Rouissi, 2020). Its role is to assist managers in decision making and to influence the behavior of cost goals (the level of production to be achieved, the financial, human and technical resources to be implemented).

Therefore, the management controller must pay attention to the internal and external environment of the enterprise in order to identify primitive developments and possible changes (Rouissi, 2020). It must also collect information, memorize it while waiting for its use, process the data, and finally communicate this information. The management controller must know how to collect information, modulate it and make it readable and understandable (Nawawi & Fazri, 2022). One of the important contributions of this profession to managers is that it is a decision-making tool (Verma & Kumar, 2016).

C. Perception of Management Controllers

According to Rouissi (2020), "The perception of management controllers is an important factor for the success of management control". Perception is described as how management controllers understand from upstream to downstream the flow of information circulating, so that existing opinions or messages can be well distributed in every part of the organization (Pervan and Dropulić, 2019).

As a result, the management controller is considered an auditor or inspector when he has no responsibility or authority to assess and sanction. In addition, if he contributes by being part of the company's management system, he is not responsible for it (Alomari *et al.*, 2018). The level of

satisfaction of the management controller is also estimated to be related to the good quality of the systems installed in the company, the high usability perceived by its users, and finally good communication management is also needed in the process of its implementation (Verma & Kumar, 2016). With this explanation, the following hypotheses can be proposed:

- H₃:** The better the utility perceived by the user, the higher the level of satisfaction of the management controller.
- H₄:** The better the communication between users, the higher the satisfaction of the controller increases.

RESEARCH METHODS

Survey analysis

The survey results were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). PLS-SEM is a causal network modeling method of latent variables, which aims to maximize the variance described from endogenous latent variables (Hair *et al.*, 2012). PLS-SEM provides an estimate of the relationship between variables and constructions (measurement models) and between constructions (structural models) (Kallunki *et al.*, 2011). In particular, PLS-SEM is suitable for analyzing: 1) complex relationships with some dependent variables; 2) problems with the scarcity of previous theoretical literature; 3) small sample size; 4) abnormal data, and 5) latent variable formative action, using SmartPLS software (Ringle *et al.*, 2012; Hair *et al.*, 2019).

Sample selection and data collection

To test the hypothesis, a survey was conducted on a sample of 90 accounting managers, finance / treasury managers and human resources managers from manufacturing companies in several industrial estates in Banten Province who have used an ERP system for at least 2 years (Kallunki *et al.*, 2011; Nawawi & Fazri, 2022). Of the questionnaires sent with a cut off deadline of 14 days, the returned questionnaires were 28 or with a response rate of 31.11%, as in the following table:

Table 1 - Distribution of research questionnaires

Submission	Total	Returned	Response rate
Questionnaires	90	28	31,11%
Questionnaires used (meet the criteria)	28	-	-

Source: Data processed (2023)

The position profiles of respondents whose data can be used as material for the analysis of this study are as follows:

Table 2 - Respondent's position profile

Position	Total	Percentage
Finance/Treasury Manager	16	57%
Accounting Manager	9	32%
Human resources Manager	3	11%
Total	28	100%

Source: Data processed (2023)

The types of respondents' business fields based on the profile of the questionnaire answer results as material for the analysis of this study are as follows:

Table 3 - Respondent's line of business

Line of business	Total	Percentage
Food and beverages	3	11%
Furniture	4	14%
Feed	2	7%
Textile	1	4%
Metal	7	25%
Chemistry	3	11%
Mechanical & Electronics	4	14%
Automotive	2	7%
Garment	2	7%
Total	28	100%

Source: Data processed (2023)

Construct Measurement

The assessment of the implementation of the ERP system will be measured by the satisfaction of the management controller, which will be considered as a variable that will be explained in the model that has been submitted with 6 survey questions using a likert scale of 7 (seven) out of a value of 1 if not used at all in the company up to a value of 7 if it is very intensively used in the company. While the explanatory variables are the quality of the information provided, the quality of the proposed system, utilities, and communication using a likert scale of 7 (seven) out of a value of 1 if it is very low in supporting business processes to a value of 7 if it is very high in

supporting business processes. Also, it will be ensured to determine what dimensions can have an effect on the satisfaction of management controllers as once developed by Rouissi (2010).

Hypothesis testing

Hypothesis testing is judged by the magnitude of the t-statistical value. The limit for accepting or not accepting the proposed hypothesis is 1.96 using the SmartPLS statistical test tool version 3.0. If the value of $t < 1.96$ then the hypothesis is not accepted or which means it accepts the null hypothesis (H0) (Ratmono & Sholihin, 2014; Hair *et al.*, 2019)

RESULTS AND DISCUSSION

The PLS-SEM approach needs to assess the validity and reliability of measurement models and structural models (Ringle *et al.*, 2012). This analysis was performed for the entire respondent data set. To assess the measurement model, the following steps are evaluated: 1) composite reliability; 2) factor loading for each indicator included in the latent variable, and 3) cross-validated similarity (Kock, 2015). As shown in table 4, the composite reliability, cronbach alpha and R square values reached satisfactory levels (>0.70) for each data (Hair *et al.*, 2019). Convergent validity for latent constructs is measured by Average Variance Extracted (AVE) and square roots of AVE. As indicated by Hair *et al.* (2012), the AVE for latent constructs should be higher than 0.50. Therefore, it is possible to conclude that the quality of the outer model is good (Kock, 2015).

Table 4 - Data quality test results

	AVE	√AVE	Composite Reliability	Cronbach Alpha	R-square
QS	0,814	0,902	0.841	0.829	0.774
QI	0,792	0,890	0.813	0.806	0.761
UTI	0,872	0,934	0.917	0.887	0.831
COM	0,825	0,908	0.886	0.864	0.826
LSMC	0,763	0,873	0.804	0.795	0.742

Source: SmartPLS output (2023)

The results of the hypothesis test using PLS-SEM can be seen in table 5. The system quality of ERP affects the satisfaction of management controllers with a statistical t value of 11,814, then the quality of ERP information also affects the satisfaction of management controllers with a t-statistical value of 23,173. Furthermore, the utility of the ERP system also directly affects the satisfaction of management controllers with a t-statistical value of 16,328. Then, communication had no effect on the satisfaction of management controllers with a t-statistical value of 1,816.

Table 5 - Impact test results

Path Construct	Original sample estimate	Standard deviation	T-Statistic
QS -> LSMC	0.814	0.031	11.814
QI -> LSMC	0.821	0.043	23.173
UTI -> LSMC	0.819	0.029	16.328
COM -> LSMC	0.726	0.174	1.816*

Source: SmartPLS output (2023)

In particular, PLS-SEM analysis shows that the system quality of the ERP positively affects the level of satisfaction of the management controller. Thus, hypothesis 1 is confirmed (the better the quality of the system, the higher the satisfaction level of the management controller). In addition, hypothesis 2 is also confirmed (the quality of information affects the level of satisfaction of management controllers). In fact, the results of PLS-SEM show that the better the quality of information, the higher the level of satisfaction of the management controller that is felt. Hypothesis 3 is also confirmed (the better the utility perceived by the user, the higher the level of satisfaction of the management controller). Finally, hypothesis 4 is not confirmed positive, which means that good communication between users does not necessarily increase the level of satisfaction of management controllers.

The test results show that the quality of the ERP system with more complete modules allows the creation of integrations that can pave the way for information disclosure in every line of the company (Chapman & Kihn, 2009; Nawawi & Fazri, 2022), Improve data management (Kallunki *et al.*, 2011), improve reliability and punctuality (Heredia-Calzado & Duréndez, 2019).

The quality of information presented in the right format for the use of each business unit of various services within the company will support its smooth operation (Rouissi, 2020). Likewise, this information is clear, accurate, and updated for better decision making (Estébanez, 2021). Likewise, the quality of information whose information input is localized in one repository, can minimize misinformation, redundancy and inconsistency, so that management can more closely filter the information currents received to conclude a decision (Rouissi, 2020). Indeed, "A single repository, technically produced by the presence of a relational database, is the basis of all computer programs present in an ERP system and promotes information consistency. Information capture lies in the organization in one place avoiding inconsistencies and redundancies". (Rouissi, 2020; Caserio and Trucco, 2020).

So, in the end is that "good quality of information "is possible only thanks to the good integration of information, since it can promote the exchange of information between different departments, making it possible to provide greater consistency to the organization, due to which it will be possible to coordinate certain processes in the company (Rouissi, 2020). Thus this will give

satisfaction to the controller as their objectives are achieved after obtaining information that is fully adapted to their needs (Rouissi, 2020; Shatat & Shatat, 2021).

Quality information can occur when the utility of the user is getting better (Rouissi, 2020). Better utilities can increase user productivity. The use of an ERP system with more complete modules makes it easier for the flow of information circulating to be centralized and filtered properly (Alhatabat, 2020), Therefore, management controllers feel more benefits when the information obtained is more accurate (Caserio & Trucco, 2020). Meanwhile, more frequent communication is not so necessary when the company's system is well integrated (Rouissi, 2020). Communication is much more necessary when the system is still limited, there is minimal coordination and the flow of information is still exchanged manually by the user (Strother *et al.*, 2012; Hung *et al.*, 2019).

CONCLUSION

In conclusion, ERP radically changed accounting practices within the enterprise, by encouraging the formalization of operations, automation, and securing the recording of operations. They have made it possible to apply an event-driven accounting approach into practice (Rouissi, 2020). Data collection is ERP's main contribution to management controllers, and leads to harmonization and improvement of budget information.

The formation of an ERP is an organizational project, corresponding to the survey of skills and trade as well as the redefinition of power games and the evolution of corporate culture and its value system. Therefore, ERP provides management to be able to control the means of its development: the use of client/server databases, and the creation of reports and dashboards tailored to the needs of users (Beuren *et al.*, 2019). The role of the management controller, then, is to provide indicators that correspond to the needs of the user. But studies conducted on the impact of ERP on management control functions revealed that technological instrumentation is rarely used for a long time on such models, and can change with the times. This observation proves the ambiguous nature of the influence of ERP on the management controllers function.

Therefore, the technical system makes operational and management actions more transparent. Thanks to data standardization, they facilitate the consolidation and feedback of information (Lu *et al.*, 2018), and the role of controlling management and transfer of accounting knowledge to field managers, which has significantly improved performance through system quality, better information quality, user utility, real-time data management, and easy error identification. As with every study, there are some drawbacks to erp usage and poor development planning for data conversion and a less user-friendly interface (Sekimoto, 2018), and device usage skills that are lacking from the user. In fact, this paper resulted in some lack of ERP technical expertise. For future studies, aspects of the relationship between information and communication systems can be

developed that determine their potential impact on the quality and utility of user satisfaction management.

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