# SME'S ENTERPRISE RESOURCE PLANNING IMPLEMENTATION, COMPETITIVE ADVANTAGE AND MARKETING PERFORMANCE: FINDING FROM CENTRAL JAVA, INDONESIA

**Susilo Toto Raharjo, Mudiantono, Mirwan Surya Perdhana**

*Faculty of Economics and Business, University of Diponegoro, Semarang*

*E-mail: mirwan.perdhana@undip.ac.id*

**Abstracts**

Enterprise Resource Planning (ERP) is an integrated application software for widespread use in the organization. The aim of this study is to determine factors that affect the successful implementation of ERP in Small and Medium Enterprises (SMEs) in Central Java in order to build competitive advantage and increase marketing performance. To test the 9 hypothesis, this study utilized data from 107 SMEs in Central Java. The results revealed that variable hardware and software selection have the greatest influence toward the successful implementation in Small and Medium Enterprises. It is suggested that SMEs should gain knowledge and solidify its business process reengineering before implementing ERP.

**Research paper**

**Reference** to this paper should be made as follows: Raharjo, S. T., Mudiantono, Perdhana, M. S. (2016). "SME's Enterprise Resource Planning Implementation, Competitive Advantage, and Marketing Performance: Finding from Central Java, Indonesia", Journal of Entrepreneurship, Business and Economics, Vol. 4, No. 1, pp. 22–44.[1]

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[1] This paper is a revised and expanded version of a paper presented at the International Conference on Entrepreneurship, Business and Social Sciences, Indonesia in 2015

**Introduction**

The aim of this study is to determine factors that affect the successful implementation of Enterprise Resource Planning (ERP) in Small and Medium Enterprises (SMEs) in Central Java in order to build competitive advantage and increase marketing performance. Verville et al. (2005) and Price waterhouse Coopers (1999) describes ERP as an information system package that integrates process based information and information inside and outside functional areas in an organization or a set of modules that connect the back office operations and front office business processes. With ERP, organization could increase its productivity, lower their operational cost, gaining competitive advantage and make better use of their internal resources (May et al., 2013).

There is no special characteristic for companies to implement ERP. The system was adopted mainly by large companies due to the high cost consideration. At the present times, there are many SMEs that have implemented ERP system. Some ERP vendor has also adjusted its products to the meet SMEs' need, thus providing SMEs with opportunity to utilize effective business strategy along with the efficient use of information technology. Successful implementation of ERP system will leaning the process in the company and improve overall effectiveness, increase competitiveness, improving customers response and support strategic initiatives (Sandoe et al., 2001).

Martin (1998) stated some benefits of utilizing an ERP package: 1) the increasing integration of data in the organization, 2) enabling business process engineering which leads to the process orientation and business process cost reduction, and 3) providing global capabilities through common

world-class business processes. Nevertheless, the implementation of ERP is usually a big project, complex, involving a group of people and resources in large numbers and under tight time schedule. It is unsurprising that many companies fail to implement ERP under such conditions (Davenport, 1998; Avnet, 1999; Buckhout et al., 1999).

There are many evidences that ERP system cannot be implemented right on time and in accordance with the existing budget. Reports related to the ERP implementation failure are also high. Nevertheless, if company manages to successfully implemented ERP systems, important benefits such as increased customer service, better production scheduling and manufacturing cost reduction can be obtained. Despite the low success level of ERP implementation, companies that have successfully implementing ERP gained many benefits and have fully utilized the ERP potential in their organization. Approximately 90% of problem during ERP implementation were the implementation delay and the implementation cost that exceeding the ERP budget (Martin, 1998).

In a study toward 120 companies, Winahyu (2005) found that there are 6 variables that determine ERP implementation success. These six variables are the support from top managements, effective project management, Business Process Reengineering, software and hardware selection, education and training and vendor support. In other study, Nah and Delgado (2006) states that there are seven key factors of success ERP implementation: vision and a business plan, change management, communication, compensation for ERP team and expert, management support, project management and system selection. Plant and Willcocks (2007) stated four key im-

portant factors: the support from top management, dedicated resources, co-operation between departments and support from suppliers.

A survey conducted by the Pusat Studi ERP Indonesia in 2008 found that there are three main problems in implementing ERP in Indonesia: internal conflict; the lack of support from top management; and competency of teams implementing ERP (Pusat Studi ERP Indonesia, 2008; Radovic Markovic et al., 2014). The majority of companies implementing ERP operate in large scale, with trends showing that SMEs begin to utilize ERP for their operations. SMEs use ERP in a relatively simple information technology (Hamilton, 2007) with relatively high implementation failure (50-60%).

There are four classifications of ERP users (Hamilton, 2004), namely classification A, B, C and D. Classification A is company that has fully implemented ERP across the company. Classification B refers to the company that uses part of the ERP system in their site. Classification C Company utilizes ERP for recording sales information, purchase order entry and accounting systems. The last classification, D, refers to company who use only Management Information System. At the present, there have been some ERP modules designed for SMEs (Global Solutions, 2012). Examples can be drawn from Indonesian Telecommunication Company (Telkom) product "Bostoko" which includes Point of Sales (POS), inventory management and accounting module (Telkom Indonesia, 2013). Other modules can be used by Small and Medium Enterprises is as follows: Cooperative Management Module, Savings and Loan, Sales Module, Purchasing Module, Warehouse Module, Manufacturing Module, Accounting module, Human Resources module, Administration module, Document Management Module and Point of Sales Module (POS).

Literatures have described the high failure rates and difficulties faced by company in implementing ERP (Davenport, 1998). According to Larsen & Myers (1997), ERP implementation tends to be successful at the beginning, but it will fails deliberately. ERP implementation will create new consequence for company: high operational cost. This is a big problem especially for SMEs and company with limited capital. There is a need to increase the ERP implementation's success in order to help them achieve competitive advantage and increase their marketing performance.

Based on the research background that has been presented, the present study raise questions as follows:

1. What is the most important factor for successful ERP implementation for SMEs?
2. Does the successful ERP implementation influence the company's competitive advantage and marketing performance?

**Literature Review and Hypotheses**

This study utilizes four factors for successful ERP implementation: the support from Top Management, software and hardware selection, training and education, and Business Process Reengineering.

In order to support ERP implementation, top management must clearly identify the priority that wants to be achieved for the project (Wee, 2000). The commitment from senior management is vital, especially for the allocation of resources (Holland & Light, 1999). According to Winahyu (2005), the supports from top management have two main aspects: supportive leadership and providing the resources needed for the project. Another concluding statement from Duchessi et al. (1998) stated that training and

commitment of top management are the main determinant for the successful ERP implementation.

The commitment of top management should be emphasized on all parts of the organization. Support from top management is a critical factor to the viability of the project.

*H 1: The greater the support of top management, the greater the success in the ERP implementation.*

*H2: The greater the support of top management, the greater the company's competitive advantage.*

Business Process Reengineering (BPR) is described by Hammer and Champy (1993) as rethinking and redesigning processes to improve company's performance in terms of cost, quality, speed and service. BPR incorporate the strategy to promote business innovation with a strategy to undertake major improvement on business processes, improving organization's strength in order to compete successfully in the market. Companies need to set goals and objectives; thus, organization's vision and system needs to be communicated to all employees. Top managements are those who responsible in introducing new system implementation at the company (Roberts & Barrar, 1992).

Information technology plays an important role in business process reengineering. Information processing capability and computer connectivity could fundamentally improve the efficiency of business processes. It can also increase the cooperation and communication between management and operation staffs. Thus, a match between business processes and the hardware/software used is important in ERP implementation (Holland & Light, 1999 and Sumner, 1999).

An organization will be benefited if their business process could fit the software used with minimal customization or no modification at all (Holland & Light, 1999; Roberts & Barrar, 1992; Sumner, 1999). Modifications have to be avoided to reduce errors and to ensure that the software can still be upgraded to the newer version (Rosario, 2000). Modeling tools could be utilized to customize business process; so that user do not have to change the code on the device' software (Holland & Light, 1999).

It is important to review and to redesign business processes (Rosario, 2000). In choosing ERP system package, company could consider whether vendor support is available, and whether the package support system implementation that have been carried out previously (Roberts & Barrar, 1992). One of the problems associated with the application of the system package is the lack of compliance among the features available in the software with organization's business process and information requirements (Janson & Subramanian, 1996). A stand-alone ERP system will not be able to improve the performance of the organization unless an organization reorganizes its business processes (Hammer & Champy, 1993; Bingi et al., 1999). According to Willcocks and Sykes (2000), new business models and re-engineering will promote the choice of technology; which is one of the key success factors in for ERP success.

**H 3: The better the Business Process Reengineering implemented by the company, the greater the success chance in ERP implementation.**

**H4: The better the Business Process Reengineering implemented by the company, the greater the company's competitive advantage.**

Education and training refers to the preparation process where employees and management are given explanation about the logic and the

overall concept of ERP system (Martinsons & Westwood, 1997; Sum, Ang & Yeo, 1997). Therefore, people in organizations can have better understanding on how how their work relates to other functional areas of the company. There are three aspects of training, namely: training concept, where organization's members will be given rationale of the ERP system implementation; followed by explanation regarding the advantage of ERP systems, and direct training.

According to research conducted by Sum, Ang & Yeo (1997), the training should not be limited for specific areas only. Participants should be taught the logic and the overall concept of ERP, as it will show employees why the change (to the ERP system) needs to be done. A more specific training is also needed to minimize user's anxiousness in operating the computer.

*H 5: The better the training and education prior to the ERP implementation, the greater the success of the ERP implementation.*

ERP packages provide standards business process and common solutions software for its customers. In the case where the company's business process is unique/special, ERP may not be able to fully meet the company's needs. Thus, management has to choose ERP software that suits it needs. ERP vendors utilized platform hardware – a set of operating system and database which made the ERP software only compatible with some of the operating system in the organization. Therefore, company needs to firstly determine what is the main problem that wants to be solved with the implementation of ERP software, then, select the most suitable ERP systems that can be used to solve it. With regards to the hardware requirements, it can be

determined and selected later, and need to be adjusted with the system requirements.

According to Zhang, Lee & Banerjee (2002) in Winahyu (2005), there are three aspects that need to be given attention in the selection of software and hardware, namely: software/hardware compliance with the company's needs; Ease of customization, and ease for upgrading the ERP to the newer version.

***H 6: The higher the accuracy of software and hardware selection match the company's needs, the greater the success in the ERP implementation.***

Competitive advantage is a company's unique position to grow and face direct competition with its competitor (Hofer & Schendel, 1978). Competitive advantage could take form as mergers, acquisition and takeover conducted by the company for profit generating purpose. In order to gain competitive advantage, company needs to switch its traditional information-generating procedure, follow the recent technological trend and expand the scope of their information system.

***H 7: The greater the success in the ERP implementation, the greater the company's success in achieving competitive advantage.***

Marketing performance is an important element for the organization, since it used to measure the success of a company. Ferdinand (2000) stated that marketing performance is an indicator that often used to measure the impact of the strategy utilized by the company. Many companies spend a lot of resources to be able to implement the company strategy to achieve 3 final goals: increase in sales, customers and company's profitability (Ferdinand, 2000).
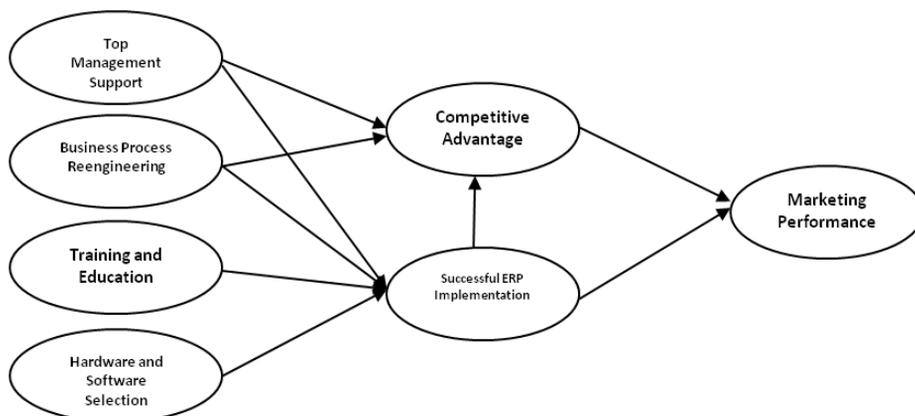
The choice of strategy implemented will have effect on company's performance. Weston (1998) stated that profitability is the most used criteria to measure company's performance. Profitability shows the company's ability in selling their product and also shows their total capital. Similar opinion was also stated by Voss (2000), who explained that sales performance can be observed from total sales, the number of customers, profitability and sales growth. In summary, marketing performance reflect company's ability to transform themselves in facing the long term challenge of the business environment (Keats et al, 1998).

*H 8: The greater the Company's Competitive Advantage, the greater the marketing performance of the company.*

*H 9: The greater the success of ERP Implementation, the greater the marketing performance of the company.*

**Theoretical Framework**

**Figure 1.** Theoretical Framework

Source: Wee (2000), Holland & Light (1999), Zhang, Lee & Banerjee (2002), Duchessi, et al. (1998), Sum, et al. (1997), Winahyu (2005), Keats et al. (1998).

## Research Methods

This study utilized primary data according to variables used. Table 1 present all variables and indicators in this study. The focus of this research is Small and Medium Enterprises (SMEs) who belong to category 3 and 4. From these categories, 110 companies were taken with quota sampling method. From these numbers, 107 companies were selected based on the convenience sampling criteria. Structural Equation Model was used to test all the hypotheses.

**Table 1.** Variables and Indicators

| Variable | Indicators | Previous Research |
|---|---|---|
| **o** | | |
| **Top Management Support** *(Indonesian: Dukungan Manajemen Puncak)* | • Commitment to project<br>• Resource provider<br>• Leadership | Wee (2000), Holland & Light (1999), Roberts & Barrar (1992), Zhang, Lee & Banerjee (2002) in Winahyu (2005), Duchessi, et al. (1998) |
| **Business Process Reengineering (BPR)** | • Company's willingness to reengineer its business process<br>• Company's readiness toward business process<br>• Company's ability to reengineer its business process<br>• Communication | Roberts & Barrar (1992), Bingi et al. (1999), Holland & Light (1999), Sumner (1999), Hammer & Champy (1993), Willcocks & Sykes (2000) |
| **Hardware and Software Selection** *(Indonesian: Ketepatan Pemilihan Software dan Hardware)* | • Hardware and software suitability<br>• Ease for customization<br>• Ease for upgrading to the newer version | Zhang, Lee & Banerjee (2002) in Winahyu (2005) |
| **Education and Training** *(Indonesian: Pendidikan dan Pelatihan)* | • ERP concept and logic<br>• ERP software supremacy<br>• Direct training | Martinsons & Westwood (1997), Sum et al., (1997) |

| | | |
|---|---|---|
| **Successful Enterprise Resource Planning Implementation** | • System quality<br>• Information quality<br>• User satisfaction<br>• Effect toward company and individual | DeLone & Mclean (1992) |
| **Competitive Advantage** *(Indonesian: Keunggulan Bersaing)* | • Cost efficiency<br>• Market acquisition<br>• Competitive Price | Dewi (2006) |
| **Marketing Performance** *(Indonesian: Kinerja Pemasaran)* | • Sales<br>• Customers<br>• Profit | Widihastuti and santoso (2012) |

## Results and discussion

Data analysis determines whether the success of ERP implementation of SMEs in Central Java Province were influenced by the support of top management, effective project management, business process reengineering, hardware and software selection, education and training as well as support from ERP vendor. When the company manages to successfully implement the ERP, competitive advantage will be achieved.

## Type of Industry

Respondents in this study were divided into 4 categories: culinary (including restaurant, catering or other culinary business), service, grocery store and others. The percentages of each respondent's category are as follows:

**Table 2.** Type of Industry

| No. | Type of business | % |
|-----|------------------|-------|
| 1 | Restaurant | 15.89 |
| 2 | Service | 37.38 |
| 3 | Grocery store | 39.25 |
| 4 | Others | 7.48 |
| Total | | 100 |

Source: primary data developed in this study

## Type of ERP Modules

From 10 ERP modules available for SMEs, respondents mostly utilized administration module (17.79%), followed by HRM module (15.95%) and sales module (15.54%).

**Table 3.** Type of ERP Modules

| No. | Type of modules | % |
|---|---|---|
| 1 | Cooperation management, savings and loans | 1.23 |
| 2 | Sales | 15.54 |
| 3 | Purchasing | 9.82 |
| 4 | Warehousing | 8.18 |
| 5 | Manufacturing | 1.64 |
| 6 | Accounting | 12.27 |
| 7 | HRM | 15.95 |
| 8 | Administration | 17.79 |
| 9 | Document Management | 5.93 |
| 10 | Point of Sales | 11.65 |
| Total | | 100 |

Source: primary data developed in this study

**Model testing**

The next step is the analysis of Structural Equation Model (SEM) analysis. Data processing results is shown in Figure 2. The model analysis models meet the fit criteria. Composite model was used and all the observed indicators is considered valid with the value above 0.5, thus, there were no indicators excluded from the model.

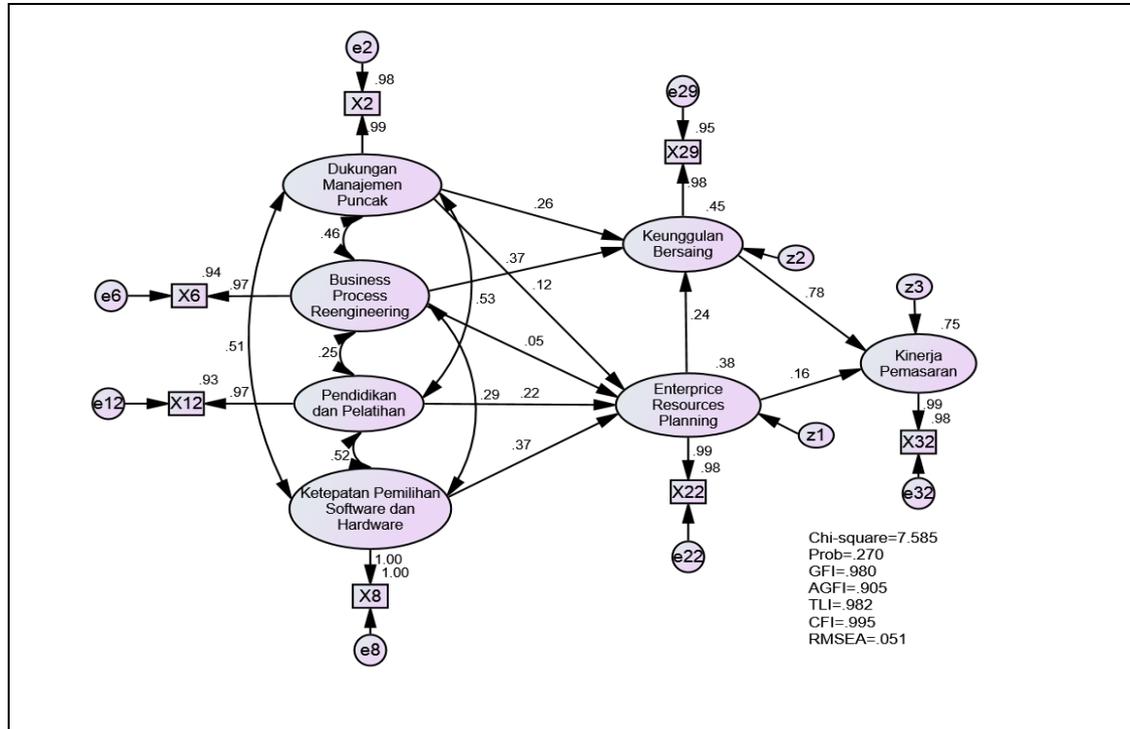**Figure 2**. Structural Equation Model Result

**Table 4.** Full Model Results

| Criteria | Cut-off Value | Result | Evaluation |
|---|---|---|---|
| Chi-Square | $X^2$, df=6 | 7.585 | Good |
| Probability | p 5%=316.819 | 0.270 | Good |
| GFI | ≥0.05 | 0.980 | Good |
| AGFI | ≥0.90 | 0.905 | Good |
| TLI | ≥0.90 | 0.982 | Good |
| CFI | ≥0.95 | 0.995 | Good |
| CMIN/df | ≥0.95 | 1.264 | Good |
| RMSEA | ≤2.00 | 0.051 | Good |

**Table 5.** Regression Weight Analysis

| | Estimate | S.E. | C.R. | P |
|---|---|---|---|---|
| ERP <--- Top Management Support | 0.116 | 0.109 | 1.063 | 0.288 |
| ERP <--- Education and Training | 0.222 | 0.105 | 2.114 | 0.035 |
| ERP <--- Business Process Reengineering | 0.049 | 0.093 | 0.526 | 0.599 |
| ERP <--- Software and Hardware Selection | 0.369 | 0.099 | 3.728 | *** |
| Competitive Advantage <--- ERP | 0.238 | 0.087 | 2.722 | 0.006 |
| Competitive Advantage <--- Business Process Reengineering | 0.366 | 0.091 | 4.039 | *** |
| Competitive Advantage <--- Top Management Support | 0.262 | 0.096 | 2.734 | 0.006 |
| Marketing Performance <--- ERP | 0.163 | 0.062 | 2.647 | 0.008 |
| Marketing Performance <--- Competitive Advantage | 0.78 | 0.063 | 12.415 | *** |

**Results and Discussion**

Hypotheses in this study were tested by analyzing the Critical Ratio (CR) value and the Probability (P) obtained from the result. The statistical criteria require CR value above 1.96 and P value below 0.05. If the data analysis results match the value criteria, a hypothesis is accepted. Table 5 it can be concluded that all hypotheses formed is accepted.

Hypothesis 1 and 2 gives evidence that top management support influence the success of ERP implementation and will strengthen the company's competitive advantage. It supports previous research by Wee (2000), Holland & Light (1999), Roberts & Barrar (1992), Zhang, Lee & Banerjee (2002) in Winahyu (2005) and Duchessi, et al. (1998) which concluded that the commitment of top management (in this case, the SME owner) is among the utmost important factor determining the success of ERP implementation. The top management commitment is vital for ERP continuity, since in most Indonesian small business, the owner's decision is absolute.

Hypothesis 3 and 4 provides evidence that business process reengineering have positive effect toward the success of ERP implementation and company's competitive advantage. It supports Roberts & Barrar (1992), Bingi, et al. (1999), Holland & Light (1999), Sumner (1999) and Willcocks & Sykes (2000) who stated that the adjustment of business process with the software used is vital for successful ERP implementation. SME's readiness to reengineer its business process will help the owner established the vision for the company.

Hypothesis 5 testing result justify the effect of training and education toward the success of ERP implementation. It supports Martinsons & Westwood (1997) and Sum et al. (1997) who stated that educating employees is vital when company wants to implement ERP. It can be done through giving the explanation regarding the logic concept of ERP. With such explanation, employees will have more understanding towards tasks related to company's functional area. Obviously, this process should be well supported by the SME's owner.

Hypothesis 6 demonstrates that the selection of hardware and software determines the success of ERP implementation. This finding supports previous research by Zhang, Lee & Banerjee (2002), in Winahyu (2005), stating that the selection of hardware and software should be adjusted with the company's needs, since hardware and software could be considered as costly investment. Furthermore, the selected ERP system should be easy to customize and easy to be upgraded to the higher version.

Hypothesis 7 justify the effect of successful ERP implementation toward SME's competitive advantage. It support the research from DeLone & McLean (1992) who stated that successful ERP implementation will improve SME's competitiveness and will help them to expand their market.

Hypothesis 8 and 9 give evidence that successful ERP implementation and company's competitive advantage have positive effects towards marketing performance. It supports the study of Contador and Ferreira (2012) and Tarigan (2012).

## Conclusion and Recommendation

This study utilized respondents data from 107 SMEs in Central Java. Data were analyzed with Structural Equation Model, with the results that all hypotheses were accepted. The result of the study supports previous research conducted by Winahyu (2005) and Nah & Delgado (2006). While the two previous studies used big companies as their sample, this study focus on SMEs; which give this study its own distinctive unique feature. From six variables affecting the success of ERP implementation, Software and Hardware selection variable have the highest regression coefficient (0.369). Thus, Software and Hardware selection could be stated as the most im-

portant variable that affects the successful implementation of ERP. The importance ranking went down to education and training (0.222), top management support (0.116), and business process reengineering (0.049). From the results obtained, this study suggests four alternative scenarios for SME so that they can achieve competitive advantage over their competitors through the successful ERP implementation.

Scenario 1: the better the business process reengineering, the better the probability of ERP implementation success. This variable was formed by 4 dimensions which are: the willingness for company to reengineer, the company's readiness toward their business process, company's ability to reengineer its business process and communication. A company could gain competitive advantage if they are able to determine strategy to achieve its company's vision and mission and tailor their business process to support those aim.

Scenario 2: education and training can be improved in order to increase the success probability of ERP implementation. This variable was formed by three dimensions: ERP concept and logic, direct training and ERP software dominance.

Scenario 3: the top management was put in the third scenario, and was formed through three dimension, which are commitment to project, provider for resources needed and leadership. There is an inevitable argument that the leader's leadership style should be firm in order to implement ERP successfully.

Scenario 4: the last scenario determining the success of ERP implementation is the selection of hardware and software. This variable was formed by three dimensions, which are the suitability of hardware and soft-

ware, the ease for customization and the ease for upgrading to the newer version. SME should find ERP module that is easy to use and have the highest ease for customization.

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