

# **THE EFFECT ERP PRODUCT TO IMPROVE ENTERPRISE PERFORMANCE**

## **(Framework Research)**

Z.J.H. Tarigan<sup>1,2</sup>, Djumilah Zain, Surachman, Djumahir<sup>2</sup>

<sup>1</sup>Industrial Engineering Department, Petra Christian University, Surabaya, Indonesia

<sup>2</sup>Management Department, Brawijaya University, Malang, Indonesia.

### **ABSTRACT**

ERP system is a technology to integrate information system for all department in a company and inter-companies on their business processes area, for small or medium company. It was used by word class manufactures to increase their performance. From many research results, found that ERP implementation can improve enterprise performance quickly but the others were fail.

The paper discusses a conceptual framework of the effect of ERP product technology (software and hardware) to enterprise performance. Where ERP product technology Indicators are accuracy data, reliability product, system respon, system stability, system integrity and completeness. This research tries to explain ERP product technology implementation to improve Indonesian enterprise performance, especially in East Java.

Key-words : ERP product, ERP implementation, enterprise performance

### **1. Introduction**

ERP (Enterprise Resources Planning) technology integrate all department function i.e. marketing, production system, logistics, finance, human resources and etc. Leon (2005) said integration data in ERP technology based on a single data entry and another functions can use that data entry (i.e. a department function entry data in a computer system, those data can be used others department in a company).

ERP Program can manage business process in small, medium and big manufacturing firm via sharing database and as a tool of reporting for all department. ERP systems are a major managerial tool and technology that requires the multidisciplinary attention of operations management, information systems, finance, marketing, organizational behavior and human resources fields. That is because they are operational systems that rely heavily on data and information with profound strategic implications for any organizations.

Implementation of electronic business solution or e-business in Indonesia started since 2002. Finance division is mostly using this application. Since 2002 the Indonesian businessman believe that application of technology e-business can increase their performance, especially for the process operation efficiency (Warta Ekonomi, 2002).

This research based on survey of 33 respondent found that 54,2 % company implemented application of e-business i.e. enterprise resources planning, supply chain management dan customer relationship management. From the same research, 31 of 33 company respondents (93,9 %) said that finance division mostly used this application. Form research result by Warta Ekonomi found: manufacture mostly used e-business solution in aplication e-business (41,9 %), and the *e-business* application can increase operational productivity (26 respondent from 33 sample or 78,8 %).

## **2. Literature Review**

The potential benefits of successfully implementing an ERP system is large, and even, according to Markus et al., (2000), critical to organizational performance and survival. ERP systems can potentially allow a company to manage its business better with potential benefits of improved process flow, better data analysis, higher quality data for decision-making, reduced inventories, improved coordination throughout the supply chain, and better customer service.

Gargeya dan Brady (2005) define the primary all the factors were lumped into six logical groupings. These factors either led to the success of an implementation project, or to its failure. As all factors listed within an article were evaluated, one would expect companies to often identify more than one factor as being primary to success/failure. The following is six factor groups:

1. Worked with ERP functionality/maintained scope

Scope is the initial “blueprint” of an implementation plan. Within this original plan, budgetary and resource needs are established. During the course of the project, it can be easy, often transparently so, to become so involved in details that additional responsibilities or requirements are added or affected.

2. Project team/management support/consultants

The successful project team is cross-functional, consisting of the most knowledgeable people in the organization, the team, at all teams, must be dedicated to the project, and have no other responsibilities within the company. A successful implementation is only achievable when high-level executives have a strong commitment to the project and consultants all out to support this project.

### 3. Internal readiness/training

The “people element” and training aspect of an ERP implementation have historically received the least amount of attention. The “people element” and training aspect of an ERP implementation have historically received the least amount of attention. The people element must be handled on two levels. At one level, employees must be trained on the new system in order to use it to continue day-to-day operations. Not unexpectedly, the most common failure factor reported was that of “readiness for change”. Implementing an ERP system completely changes the culture within an organization, and many companies have found themselves hard pressed to accomplish this successfully.

### 4. Deal with organizational diversity

Organizations have many cultures. Individual branches of the same organization have their own ways of doing things, and each function/department operates with different procedures and business requirements. Not unexpectedly, the larger, more global companies cite their diversity as an obstacle to success. Individual units and groups are often companies of their own right, and do not wish to be assimilated into one corporate culture.

### 5. Planning/development/budgeting

Planning a sophisticated ERP project should not be taken lightly or with little force thought. As mentioned before, there are enormous potential costs associated with such an undertaking. In addition to the high costs paid out before the go-live date, there can and have been major expenses incurred by companies that were unable to fully develop a comprehensive plan.

### 6. Adequate testing

System testing has proven to be the key element of success for some companies and a direct cause of failure for others. Unrealistic fears of delaying the “go-live” deadline indicated that senior executives were not completely “in tune” to the importance of completely testing the implementation; even that resulted in a slight delay.

Many researcher to do research in success adopting ERP implementation, another factors success implementation ERP are listed in Tabel 1.

**Tabel 1. Success Factors in Adopting ERP Implementation**

Researcher		Sun, et al. 2005	Yusuf, et al. 2006	Umble, et al. 2003	Hong, Kim 2002	Zang, et al. 2005	Mashari 2003	Wu & Wang 2007	Soja 2006	Kumar, et al. 2003
Variable										
1	Top management comitment	-	✓	✓					✓	
2	Cost & Time	✓	✓						✓	
3	Organization Culture		✓		✓	✓	✓			✓
4	Schedule & Objective	✓		✓						✓
5	Aspect technique		✓							
6	Vendor & Consultant		✓			✓		✓		
7	Facility Supporting		✓							✓
8	Top management capability			✓					✓	
9	Key User Team			✓		✓		✓	✓	✓
10	Product Data Management			✓	✓				✓	
11	Performance measurement			✓			✓			
12	Business Process				✓	✓	✓			✓
13	End user				✓	✓	✓			
14	Strong of Product ERP (Software & Hardware)					✓	✓	✓	✓	✓
15	Training & Education			✓			✓	✓		✓
16	Finance								✓	
17	System					✓			✓	✓

Many researchers identified the failure in adopting ERP, some failure factors implementation ERP are listed in Tabel 2.

**Tabel 2. Failure Factors in Adopting ERP**

Researcher		Huang & Palvia 2002	Huang et al., 2004	Sheu et al., 2003	Xue et al., 2005	Gargaya Brady 2005	Wang et al., 2005	Beheshti 2006	Koh et al., 2006	Wu & Wang 2007
Variabel										
1	Top management comitment	✓	✓							
2	Cost & Time			✓		✓		✓		
3	Organization Culture	✓	✓	✓	✓	✓		✓	✓	
4	Schedule & Objective				✓					

**Tabel 3. Factors failure adopting implementation ERP (Cont.)**

5	Aspect technique									
6	Vendor & Consultant					✓		✓		✓
7	Facility Supporting				✓					
8	Top management capability						✓		✓	
9	Key User Team		✓			✓	✓	✓		✓
10	Product Data Management									
11	Performance measurement					✓			✓	
12	Business Process	✓	✓			✓			✓	
13	End user		✓							
14	Strong of Product ERP (Software & Hardware)	✓	✓							✓
15	Training & Education		✓	✓		✓				✓
16	Finance									
17	System						✓			

Based on the explanation of Table 1, there are some success factors in adopting ERP and from Table 2 there are some failure factors in adopting ERP in practical and theoretical. From both table we found a research gap about implementation ERP which contradict each other such that make key users confuse. But, some organization in global era expected a benefit from ERP implementation, as shown on Table 3.

**Table 4. Tangible and intangible benefits of ERP systems**

Tangible benefits	Intangible benefits
Inventory reduction	Information visibility
Personnel reduction	New/improved processes
Productivity improvements	Customer responsiveness
Order management improvements	Cost reductions
Financial cycle improvements	Integration
Information technology cost reduction	Standardization
Procurement cost reduction	Flexibility
Cash management improvement	Globalization
Revenue/profit increase	Supply/demand chain
Transportation/logistics cost reduction	Business performance
Maintenance reductions	Dismantling inefficient legacy systems
On-teame delivery improvements	

### **3. Research Hypothesis and Conceptual Framework**

By successful of implementing ERP technology, manufacturing can increase their performance. Sarkis and Gunasekaran (2003) stated that ERP systems are highly complex information systems. The implementation of these systems is a challenging project and involves a high level of investment that place tremendous demands on corporate time and resources. Many ERP implementations have been classified as failures because they did not achieve predetermined corporate goals. Facility preparation is needed to accelerate implementation ERP.

ERP benefits cannot be fully realized unless a strong alignment and reconciliation mechanism is established between technical and organizational imperatives based on the principles of process orientation (Mashari et al., 2003). It is suggested in the taxonomy that measurement takes place in a balanced perspective, and for the purpose of providing useful information that can enable the decision making process and, which can help deliver the corporate objectives and therefore lead the business competitively forward.

Bradford & Florin (2003) that business process re-engineering have not relationship with effective team and key user satisfaction, and different with Zhang et al., (2005) business process re-engineering have a positive affect with effective team and key user satisfaction, because business process re-engineering will to easy customization software. Soja (2006) composition team implementation which have an experience and knowledge ERP have a positive affect with design business process.

H1 = “Effective key user team ERP project have a positive relationship with effective design of business process”.

Wu & Wang (2007) key user satisfaction have a positive affect and significant with technology product ERP. Zhang et al., (2005) ERP package software suitability have a positive relationship with user satisfaction and individual impact, because can to reduce customization, team and cost. Bradford & Florin (2003) state technical compatibility technology ERP have not relationship with effective key user in customization hardware and software ERP.

H2 = “Effective key user team ERP project have a positive relationship with strong of product ERP”.

Data accuracy is absolutely required for an ERP system to function properly. Because of the integrated nature of ERP, if someone enters the wrong data, the mistake can have a negative domino effect throughout the entire enterprise. Therefore, educating users on the importance of data accuracy and correct data entry procedures should be a top priority in an ERP implementation.

H3 = “Effective key user team ERP project have a positive relationship with data management”.

Xue et al., (2005) The eight obstacles are language, report and table format, effective design business process re-engineering, economic reform impact, cost-control system, human resource problem, price issue, and connection with ERP service companies. Bradford & Florin (2003) have a statement that business process re-engineering has not correlation to performance manufacture. Zang et al., (2005) redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed. Implementing an ERP system involves reengineering the existing business processes to the best business process standard. Process fit have a positive affect to increase performance manufacture (Hong & Kim, 2002).

H4 = “effective design business process can reduce activity of process in manufacturing and a positive affect to increase performance manufacture”.

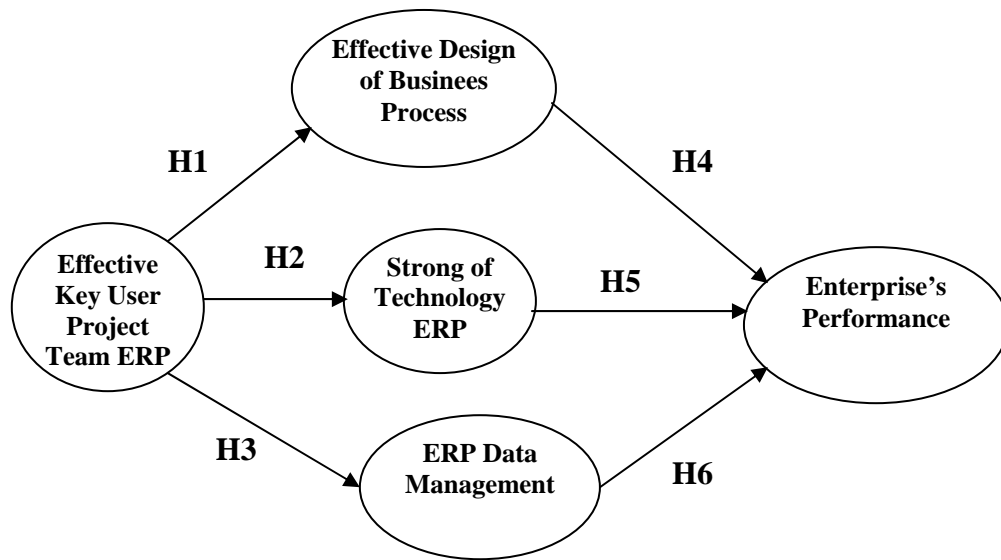
Bradford & Florin (2003) statement that technical compability technology ERP have not correlation with organizational performance. Hardware, software, system management and interface data in ERP technology will increase industry objective especially in cost (Sun et al., 2005).

H5 = “ERP technology product give real benefit and have a positive affect to performance manufacture”.

Sun et al., (2005) result that ERP data i.e master data, transactional files, data structure and maintenance data have positive affect to achieve performance manufacture. Report & tabel data have a affect to failure implementation in China, because this Report & tabel data in english language but not recomended in Chinese government regulations.

H8 = “Data management have a positive affect performance manufacture”.

A model conceptual framework for measure the affect ERP product to increase enterprise performance in Fig. 1



**Fig.1. A model for measure the affect ERP product to increase enterprise performance**

#### 4. Indicators of Variable

Indicators of variable of effective key user project team ERP are competency of team project (Rastogi, 1994), experience in technique ERP implementation (Carr & Johansson, 1995), composition team (Hagel, 1993; Zairi and Sinclair, 1995; Dixon et al., 1994; Harrison & Pratt, 1993; Soja, 2006), clear defenition of job team (Rastogi, 1994; Guha et al., 1993; Katzenbach & Smith, 1993).

Indicators of variable of effective design of businees process are tim project understanding and orientation businees, communication process owners (Hammer and Champy, 1993), determination of scope of change businees process (Hall et al., 1993).

Indicators strong of variable of technology ERP are accuracy data, reliability product, system respon, system stability, system integrity and completness (Cantu, 1999; Xue, Y., et al., 2005).

Indicators of variable of ERP data management are accuracy, response time, completeness, system integrity (Wu & Wang, 2007; Sun et al., 2005).



#### 4. Concluding Remarks

In this paper, we had discussed a model conceptual frame work for measure the affect ERP product to increase enterprise performance. In this research we focus on ERP product technology with indicators are accuracy data, reliability product, system respon, system stability, system integrity and completness.

From review of any literatures, we developed 6 hypotheses that connected the effective key user project to manage effective design of businees process, ERP product technology, and data management, which affect to the increasing enterprises peformance.

#### 5. References

- Baheshti, H.M., 2006, "What Manager Should Know About ERP/ERP II", *Management Research New Vol.29 No.4*, pp. 184-193.
- Bradford, M., end Florin, J., 2003, "Examining the Role of Inovation Diffusion Factors on the Implementation Success of Enterprise Resources Planning Systems", *International Journal of accounting Information System 4* pp. 205 – 225.
- Carr, D., and Johansson, 1995, "*Best Practice in Reengineering: What Work and What Dosen't in the Reengineering Process*", McGraw Hill, New York.
- Cantu, R., 1999, "*A Framework For Implementing Enterprise Resources Planning System in Small Manufacturing Companies*", Master's Thesis, St. Mary's University, San Antonio.
- Dixon, J., Arnold, P., Heineke, J., Kim, J., and Mulligan, P., 1994, "Businees Process reengineering Improving in New strategic Directions", *California management review, Summer*, pp. 93-108.
- Gargeya, V.B., and Brady, C., 2005, "Success and Failure Factors of Adopting SAP in ERP System Implementation", *Business Process Management Journal Vol.11 No. 5*, pp.501-516.
- Guha, S., Kettinger, W., and Teng, T., 1993, "Business Process Rengineering: Building a Comprehensive Methodology", *Information System Management, Summer*, pp. 13-22.
- Hagel, J., 1993, "Core Process Redesign: Keeping CPR on Track", *The Mckinsey Quarterly, No.1*, pp.59 – 72.
- Hall, J., Rosenthal, J., and Wade, J., 1993, "How to Make Reengineering Really Work", *Harvard Businees Review November-December*, pp. 119-131.
- Hammer, M., and Champy, J., 1993, "*Reengineering the Corporation: a Manifesto for Businees Revolution*", Harper Businees, New York, NY.
- Harrison, D., and Pratt, M., 1993, "A Methodology For Reengineering Business", *Planning Review March/April*, pp. 6-11.
- Hong, K., and Kim, Y., 2002, "The Critical Success Factor for ERP Implementation: an Organizational Fit Persepective", *Information and Management 40*, pp. 25-40.
- Huang, S.M., Chang, I.C., Li, S.H., Lin, M.T., 2004, "Assessing risk in ERP Projects: Identify and Prioritize the Factors", *Industrial Management and Data Systems Vol. 104 No.8* pp. 681-688.

- Huang, Z., and Palvia, P., 2001, "ERP Implementation Issue in Advanced and Developing Countries", *Business Process Management Journal*, Vol.7 No.3 pp.276-284.
- Katzenbach, J., and Smith, D., 1993, "*The Rules for Managing Cross Functional Reengineering Team: Break Point for Strategies for Market Dominance*", John Wiley and Sons, Chicester.
- Koh, S.C.L., Simpson, M., Padmore, J., Dimitriadis, N., Misopoulus, F., 2006, "An Exploratory Study of Enterprise Resources Planning Adoption in Greek Companies" *Industrial Management and Data System* Vol.106 No.7 pp.1033-1059.
- Kumar, V., Maheshwari, B., Kumar, U., 2003, "An Investigation of Critical Management Issues in ERP Implementation : Emperical Evidence From Canadian Organizations", *International Journal Technovation* 23 pp 793-807.
- Leon, A., 2005 "*Enterprise Resources Planning*" McGraw-Hill Publishing Company Limited, New Delhi.
- Markus, M.L., Axline, S., Petrie, D., Tanis, C., 2000. Learning from adopters' experiences with ERP: Problems encountered and success achieved. *Journal of Information Technology* 15, 245–265.
- Mashari, M.A., Mudimigh, A.A., Zairi, M., 2003, "Enterprise Resources Planning: A Taxonomy of Critical Factors", *European Journal of Operational Research* 146 pp. 352-364.
- Rastogi, P., 1994, "Nature, Significance and Rationale of Businees Process Reengineering", *Productivity*, Vol 35 No.3 October/December pp. 467 -476.
- Sarkis, J., Gunasekaran, A., 2003, "Enterprise Resources Planning Modeling and Analysis", *European Journal of Operational Research* 146 pp. 229-232.
- Sheu, C., Chae, B., Yang, C.L., 2004, "National Diffrences and ERP Implementation: Issues and Challenges", *Omega* 32 pp. 361-371.
- Soja, P., 2006, "Success Factor in ERP Implementation: Lesson From Practice", *Journal of Enterprise Information Management* Vol.19 No.6 pp.646-661.
- Sun, A.Y.T., Yazdani, A., Overend, J.D., 2005, "Achievement Assessment for Enterprise Resources Planning (ERP) System Implementation Based on Critical Success Factors (CFS)", *International Journal Production Economics* 98 pp. 189-203.
- Umble, E.J., Haft, R.R., Umble, M.M., 2003, "Enterprise Resources Planning: Implementation Procedures and Critical Success Factors", *European Journal of Operation Research* 146 pp. 241-257.
- Warta Ekonomi, 2002, Warta Ekonomi 6 Juni 2002, [wartaekonomi.com](http://wartaekonomi.com)
- Wu, J.H., Wang, Y. M., 2007, "Measuring ERP success: The key-users "Viewpoint of the ERP to Produce a Viable IS in the Organization", *Computer in Human Behavior* 23 pp. 1582 – 1596.
- Xue, Y., et al., 2005 "ERP Implementation Failure in China Case Studies with Implications for ERP Vendors", *International Journal Production Economics*.
- Yusuf, Y., et al, 2006 "Implementation of Enterprise Resources Planning in China", *International Journal Production Economics*
- Zang, Z., Lee, M.K.O., Huang, P., Zhang, L., Huang, X., 2005, "A framework of ERP systems implementation success in China: An empirical study" , *International Journal Production Economics* 98 pp. 56-80.
- Zairi, M., and Sinclair, D., 1995, "Businees Process Re-engineering and Process Management: a Survey of Current Practice and Future Trends in Integrated Management", *Management decision*, Vol. 33 No.3 pp. 3-16.