2011 International Conference on Social Science and Humanity
IPEDR vol.5 (2011) © (2011) IACSIT Press, Singapore

Comparison of ERP Implementation Process of Two Organizations: An Exploratory Research

Gede Rasben Dantes
Department of Information Management
Ganesha University
Singaraja, Bali, Indonesia
e-mail: rasben_dantes@yahoo.com

Zainal Arifin Hasibuan
Faculty of Computer Science
University of Indonesia
Depok, Jawa Barat, Indonesia
e-mail: zhasibua@cs.ui.ac.id

Abstract— **This study was aimed at comparing the ERP implementation process in two different organizations located in two different countries. Organization A is a company engaged in the field of PCB printed, while organization B is a company engaged in the field of data storage devices. Case study approach was used in order to do an exploratory research on ERP implementation process that can effect to ERP implementation success. Interviews were done in both structured and unstructured methods with manager, keyusers, user, consultant and project manager who were the main team on implementation this system. Comparison of the ERP implementation process is viewed from three different attributes, namely: people, process & organization, and technology. Each organization had different experience in ERP implementation process. But in general, organization B had a better process of ERP implementation than the organization A. So that organization B could achieve successful implementation of ERP in terms of benefits and performance. Although the cost and time spent are not in accordance with the planning. Organization A, on the other hand, failed on ERP implementation in terms of budget, time schedule, benefit and performance.**

Keywords: ERP implementation process, people attributes, process and organization attributes, technology attributes.

I. INTRODUCTION

Enterprise Resource Planning (ERP) is one of the integrated information systems that support business process and manage the resources in organization. This system integrates a business unit with other business unit in the same organization or inter-organization. ERP is needed by organization to support day to day activity or even to create competitive advantage.

Different from information systems in general, ERP is an integration of hardware technology and software that has a very high investment value. However, a larger capital investment on ERP does not always give a more optimal return value to the company. In Indonesia, [7] found out that almost 83.33% of companies implementing the ERP systems did not succeed in their implementations. While [19] and [11] found that more than 50% of the companies implementing ERP in the world failed to gain optimal return value. Others research shown that 50% of the companies implementing ERP failed to gain success, while in China, only 10% of the companies gained success [20]. These continuing study on the ERP implementation process show how critical ERP implementation is yet in IT investment.

Therefore, on this study we do the comparison of ERP implementation process between two different organizations. The comparison has done in terms of three different attributes, namely: people, process & organization, and technology. By comparing the two organizations are expected to provide experience on the ERP implementation process in each company and also to extract about the critical components in the ERP implementation process. So, in the future this kind of problem should not happen anymore.

II. RESEARCH METHODOLOGY

On this research, we use case study approach in order to do an exploratory research on ERP implementation process that can effect to ERP implementation success. The exploratory research is defined as research type that has emphasis on the discovery of ideas and insights [5].

The interviews have been done both structure and unstructured on this case study with manager, key users, user, consultant and project manager who are the main team on implementation this system.

These methods aim to get some experiences and insights from respondents on ERP implementation. Company's and respondent's name do not mention on this study, because of confidential. However, we have quarantined the data accuracy that gathered from respondents through interview.

III. RESULT AND DISCUSSION

A. Brief History of Organizations

Organization A is a private organization that operates in the PCB printed sector with their more than 500 employees. It is now a key player in the global PCB market, servicing customers in the automotive, computer peripheral, consumer electronics, telecommunication, healthcare and instrument & control.

Organization B is a private organization that operates in the data storage and electronics sector with their more than 500 employees. Since its presence on end of 1999, millions of products have been shipped out to the major league customers in the industry all over continents. Continues to

outclass the operations is always the company philosophy in a away sustaining the business competitiveness.

B. Comparison of ERP Implementation Process

On this paper, we will compare an ERP implementation process between two organizations. Although two organizations operate in different country, we do not emphasize on culture that underlies in them.

To compare ERP implementation process, we had divided into three attribute, namely: people, process & organization, and technology. Each attribute has the respective components that affect to ERP implementation process.

People Attributes

1) Top Management Support

Successful implementations require strong leadership, commitment, and participation by top management [12, 16]. They will provide the necessary resources and authorization in order to achieve ERP implementation success [3]. Management should monitor the project progress and provide clear direction of the project.

Organization A has a good top management support, but they do not control and monitor the ERP implementation process. The top management gives all their authorization and responsibility to the project manager. This lead to the ERP project cannot be run well. Thus, many users/keyusers are involved on this project does not commit to work.

Organization B has also a good top management support and they always do coordination with the project team. Periodically, they have a meeting to discuss about the project progress and problems that arise during the implementation process. Different with organization B, users/keyusers highly committed and motivated to engage in successful implementation of this system.

2) Team Work

ERP implementation teams should be composed of people who are chosen for their skills, past accomplishments, reputation, and flexibility. These people should be entrusted with critical decision making responsibility [6, 18]. Management should constantly communicate with the team, but should also enable empowered, rapid decision making [4]. The implementation team is important because it is responsible for creating the initial, detailed project plan or overall schedule for the entire project. The team also involves all functional departments and demands the effort and cooperation of technical and business experts as well as end-users [3].

In organization A, the team member cannot work properly. They assume that the ERP implementation project is the work of IT department. They also do not receive incentives or rewards of this additional works. Therefore, the role and management support are needed in this condition. Top management also does not put pressure on team project in this implementation process.

Whereas, in the organization B, team members are very committed and able to share responsibility. Team members are key user in each unit. Every team member received an incentive or reward in his involvement. But top management always put pressure on the project team so that this project can run successfully.

3) User Involvement

User involvement refers to the psychological state of the individual and is defined as the importance and personal relevance of a system to a user [3]. It is also defined as a user's participation in the implementation process. The users will involve in the stage of definition of the company's ERP system needs and also in the implementation of this system.

In organization A, users/keyusers do not commit and often release their responsibility, because this project as additional work for them. While they have their daily work which must also be completed. Therefore, top management support is needed. In organization B, users/keyusers are very committed, because they are released from daily responsibilities. So they can focus on this project.

4) Use of Consultant

The selection of appropriate consultant greatly affects the success of ERP implementation. Using of consultant who has knowledge in the industrial field and ERP system properly that can help the company to develop and implement a system align with the company business's need. Many of ERP consultants have no much experience in ERP implementation process.

In organization A, ERP consultant have replaced two times. This is because the organization sees the implementation progress did not meet the organization's expectation. The consultant team's skill is not in accordance with earlier agreements and change of personnel always occurs while the project is running. The consultant has no much experience in ERP implementation. To avoid this happening, the organization should conduct a rigorous selection in selecting an ERP consultant.

In organization B, the consultant has a mature capability in the ERP implementation process. They have considerable experience in ERP implementation. The consultant team also has skills that met with the organization's expectation and is able to cooperate with an internal team.

Process and Organization Attributes

(1) Clear Goal and Objective

Clear goals and objectives are essential to guide the organization in achieving the successful implementation of ERP. This is intended to achieve the implementation of ERP in accordance with the time and costs have been determined and in accordance with company business needs. According to [3] there are three things important in the implementation of ERP systems, namely: project scope, cost, and time.

In organization A and B, the companies have no clear goals and objectives in this ERP implementation. ERP project was driven from parent company (top down driven). It aims to facilitate the data consolidation and integration.

Many users think that the previous system more in line with company business's need. Therefore, the companies should do the evaluation of technology before adopting it.

(2) ERP Implementation Strategy

There are several opinions about the ERP implementation strategy. According to [17], ERP implementation strategy can be divided into: clean sheets, customizing and best of bread. There is also a distinguished classify into: big bang, pilot project (by module), and parallel implementation [8].

In organization A, the ERP implementation strategy that was used by company is a pilot implementation. Starting with the implementation of finance and controlling (Fi-Co) module, followed by other modules, and end with human resources (HR) module. The company only implements the core modules. But it still maintains legacy systems, thus causing substantial customizing and also changes in the standard ERP program. This causes a lot of inconsistency of data on the ERP system. Changes that occur in the standard ERP program will also cause difficulties in the upgrade version of ERP system.

In organization B also uses a pilot implementation strategy. It only implements the core modules. But the company fully replaces legacy systems with ERP system. This expected to facilitate consolidation of data and avoid the double entry into the legacy systems and ERP system. This method works better than in organization A, but data analysis and migration play an important role.

(3) Project Management

Successful ERP implementation requires that the organization engage in excellent project management. This includes a clear definition of objectives, development of both a work plan and a resource plan, and careful tracking of project progress [1]. The project plan should establish aggressive, but achievable, schedules that instill and maintain a sense of urgency [15]. The project should identify the modules selected for implementation as well as the affected business processes. If management decides to implement a standardized ERP package without major modifications, this will minimize the need to customize the basic ERP code. This, in turn, will reduce project complexity and help keep the implementation on schedule.

In organization A, the selected internal project manager has no information technology (IT) background, but he knows the existing company's business process very well. Basically, he is one of the employee who is resistant to the ERP implementation. Because he is the most control system used before the ERP implementation. The top management is trying to embrace him with giving a responsibility in this project.

In Organization B, the selected internal project manager has an IT background and also knows the organization's business process very well. But he has no a good leadership, so he cannot organize people (project team) and business unit well. However, he has a great commitment in this implementation project, because of pressure from top management level.

(4) Change Management

The existing organizational structure in most companies is not compatible with the structure, tools, and types of information provided by ERP systems. ERP system imposes its own logic on a company's strategy, organization, and culture. Thus, implementing an ERP system may force the reengineering of key business processes and/or developing new business processes to support the organization's goals [2]. The changes may significantly affect organizational structures, policies, processes, and employees [9]. If people are not properly prepared for the imminent changes, then denial, resistance, and chaos will be predictable consequences of the changes created by the implementation. However, if proper change management techniques are utilized, the company should be prepared to embrace the opportunities provided by the new ERP system and ERP will make available more information and make attainable more improvements than at first seemed possible. The organization must be flexible enough to take full advantage of these opportunities [4]. In organization A and B, the change management is not working properly.

(5) Risk Management

According to [10] conducted a Risk Management not only identify but also preparation if the occurrence of events that are not desirable. Each project application of information technology brings the essential elements of risk because it is likely that progress will deviate from the plan at some point in the project life cycle. ERP implementation project risk described as uncertainty, liability or vulnerability that could cause the project to deviate from established plans. Good planning and the adoption of a systematic risk management are crucial in project completion on time, and on-budget in compliance with all requirements [13]. There are no risk management in ERP implementation process in the organization A and B.

(6) Business Process Reengineering

In organization A, business process reengineering (BPR) has not done prior to implementation of ERP system. ERP's business process was adjusted in order to be aligned with organization's business process. Therefore, they do a lot of changes to the standard ERP program.

Whereas, in organization B, BPR has done prior to implementation of ERP system, but it was not radical. Organization's business process was adjusted in order to be aligned with ERP's business process. So they just make small change to the standard ERP program. It is very influential on the inconsistency of data and ease of system upgrades.

(7) Communication

Communication is one of the most challenging and difficult task in the ERP implementation project. It is considered a critical success component on ERP implementation process. It is important to create an understanding, an agreement on implementation and sharing of information between project teams and communicate the outcomes and goals to across organizational within each stage of implementation [14]. Communication should start early on ERP implementation project. It can include an overview of the system and reasons for applying it as consistently and sustainable [3].

In organization A has not established a good communication between consultant team and users. This is because the users do not have a good commitment to this project (as explained above). However, in organization B has established a good communication between consultant team and users. Because users have a great commitment to this project. They can focus to it, because they no longer do his daily job.

(8) Training

Education/training is probably the most important critical success component. ERP implementation requires of knowledge to enable people to solve problems on the system. If the employees do not understand how a system works, they will invent their own processes using those parts of the system they are able to manipulate [15].

In organization A, IT people who will be responsible for each module provided the external training for 3 months. But, users do not get an adequate training both in terms of quality and needless time allocated.

In organization B, IT people who will be responsible for each module, only provide the internal training. Likewise the users only received internal training from the consultant that is inadequate both in quality and time allocated.

Technology Attributes

(1) Infrastructure

According to [3], an adequate IT infrastructure, hardware and networking are critical to a successful of ERP system implementation. It is clear that ERP implementation involves a complex transition from legacy information systems and business processes into an integrated IT infra-structure and business processes across the organization.

In organization A, the complexity of the ERP system is not supported by adequate infrastructure. This effect on system performance. So that, when the system is going life, a few months later the system started to slow down. Then slowly, the company will make an improvement to its infrastructure. While in organization B, it has an adequate infrastructure to support the complexity of ERP system. So it can support the system with better performance.

(2) Data Analysis and Migration

That's another important thing on ERP implementation process is data analysis and migration. We have to do a data analysis and migration from legacy system into ERP as a new system in the company. Many problems arise in this process stage. Therefore, the company always does a parallel implementation between legacy and ERP system. Until the ERP system is stable, and then the legacy system will be cut off.

In organization A, ERP consultant does not have a good capability in data migration, so a lot of data migration performed by internal IT department. The consultant also did not validate the data very well, so there is still the wrong data because of the migration process. In organization B, the data migration performed by consultant with the help of users with a great commitment. So that migration data can be run well. In line with organization A, the consultant also did not validate the data accurately.

(3) Strong ERP Product

Strong ERP product is determined by the product selection process. Normally, before the company chosen one of ERP product, it will do the evaluation of the product. However, a lot of companies implement the ERP system because of technology driven, instead of the organization business driven. That's actually caused the problem. Currently, a lot of ERP system product in the market. So, the company need to choose one of them to support their operational process or the company can use best of bread strategy (choose the best module from each product). But, this kind of strategy will give the company another integration problem.

In organization A and B, the ERP product selection was not done properly. ERP implementation is more driven by technology itself, instead of organization's business need. This is one of critical component that caused the failure of ERP implementation.

From differences of view of ERP implementation process in two organizations which have been described above, the organization A has failed on ERP implementation in terms of budget, time schedule, benefit and performance. Likewise, in organization B has spent money and time were not as planned. But the benefit and performance obtained in accordance with their expectation.

IV. CONCLUSION

In order to achieve successful implementation of ERP system, the company needs to consider some important components of the ERP implementation process. In this paper we divide into 3 important attributes, namely: people, process & organization, and technology which includes: (1) Top management must be able to coordinate with project teams and also to constantly monitor project progress and provide clear direction; (2) Team work should consist of people who understand the business process in each unit well and also has a commitment in the successful implementation of this system. Pressure from the top management is very important in this condition; (3) Companies must perform well in determining the selection

of consultants who will assist in the implementation of ERP; (4) Companies must make a clear assessment criterion, such as: experience in ERP implementation, whom their client, the skill description of each team member, etc. It also make a clear agreement in the implementation of the project, for example: there is no change of team members during the process of implementation (except the consent of both parties); (5) Companies should have clear goals & objectives that can guide the organization in order to achieve successful ERP implementation, top management commitment is needed; (6) Companies need to select the ERP implementation strategy in accordance with the conditions of the organization. Running in parallel between the legacy system and ERP system in a long time is not recommended; (7) Project managers must have strong leadership and really have a strong commitment to the success of ERP implementation. He also must well understand the existing business process and have an IT background; (8) Change management must exist in every ERP implementation process, because it will impact more to the process change rather than changes in technology; (9) Risk management must be done prior to the implementation of ERP, so it can identify and also prepare alternative solutions, if anything undesirable happens; (10) BPR should be done before the implementation of ERP. That can optimize an existing business process for creating competitive advantage for company; (11) Good communication must be kept among the consultants, the internal project team and users (the role of project manager is needed); (12) Need to do a proper training both in quality and quantity; (13) A mature infrastructure is very important in the implementation of ERP systems. This will support the complexity of ERP systems, so that good performance can be obtained; (14) Data analysis and migration is an important component in the ERP implementation process, because errors in this process will result in data inconsistency (rubbish in, rubbish out); (15) The Company must have a good evaluation in determining the ERP product to be adopted. The technology must be implemented fully in accordance with the needs of the organization (not driven by the technology itself).

V. FUTURE RESEARCH

In line with the findings of this study which discovers the experience of ERP implementation process in two different organizations, on further research needs to develop an ERP implementation methodology that can provide guidance for companies in implementing ERP. This methodology consists of the stages in implementing ERP, and activities that need to be done in each phase. These activities will consist of critical components in the ERP implementation process, namely: people, process & organization and technology.

REFERENCES

[1] H. Akkermans, and V.K. Helden, "Vicious and virtuous cycles in ERP implementation: a case study of interrelations between critical success factors", European Journal of Information Systems, vol.11, Issue. 1, 2002, pp. 35-46.

[2] E. Bernroider, and S. Koch, "Differences in characteristics of the ERP system selection process between small or medium and large organizations", Proc. of the Sixth Americas Conference on Information Systems, 2000, pp. 1022-1028, Long Beach: CA.

[3] T.R. Bhatti, "Critical success factors for the implementation of enterprise resource planning (ERP): empirical validation", The Second International Conference on Innovation in Information Technology (IIT), 2005.

[4] S. Chang, "ERP life cycle implementation, management and support: implications for practice and research", Proceedings of the 37 th Hawaii International Conference on System Sciences (HICSS'04) - Track 8, 2004.

[5] A.G. Churchill, "Marketing research methodological foundations", New York: The Dryden Press, 1995.

[6] M. Daneva, "Six degrees of success or failure in ERP requirements engineering: experiences with the ASAP process", International Workshop on COTS and Product Software: Why Requirements are so *Important.* 11th IEEE International Requirements Engineering conference. Monterey Bay, September 2003.

[7] G.R. Dantes, and Z.A. Hasibuan, "The relationship of organization maturity level and enterprise resource planning (ERP) adoption (case study: ERP implementation in Indonesian companies)", Proceedings of the 14th International Business Information Management Association Conference, June 23-24, 2009, Istanbul, Turkey, ISBN: 978-0-9821489-3-8, 2444-2456.

[8] T.H. Davenport, "Mission critical (realizing the promise of enterprise systems)", Boston, Massachusetts, Harvard Business School Press, 2000.

[9] S. Dezdar, and A. Sulaiman, "Successful Enterprise Resource Planning implementation: taxonomy of critical factors", Industrial Management and Data System, Vol. 109, No. 8, 2009, pp. 1037-1052.

[10] R.M. Donovan, "Strategy and preparation are critical success factors", 1999, http://www.rmdonovan.com/pdf/perfor_99_5.pdf.

[11] C.X. Escalle, M.J. Cotteleer, R.D. Austin, "Enterprise Resource Planning (ERP): technology note", Harvard Business School Publishing, Boston, MA, 1999.

[12] C.P. Holland, and B. Light, "A critical success factors model for ERP implementation". IEEE Software, vol. 16, no. 3, May/June 1999, pp. 30-36.

[13] P. Iskanius, "The ERP project risk assesment - a case study. world congress on engineering", London, UK, 2009.

[14] Y. Kim, Z. Lee, S. Gosain, "Impediments to successful ERP implementation process", Business Process Management Journal, Vol. 11, No.2 , 2005, pp. 158-170.

[15] S.P. Laughlin, "An ERP gameplan", *Journal of Business Strategy,* January-February 1999.

[16] D.H. Lee, S.M. Lee, and D.L. Olson, "The effect of organizational support on ERP implementation", Industrial Management and Data System, Vol. 110, No. 2, 2010, pp. 269-283.

[17] D.E. O'Leary, "Enterprise Resource Planning System (systems, life cycle, electronic commerce, and risk)", Cambridge University Press, Cambridge, 2000.

[18] M.A. Rothenberger, M. Srite, and K. Jones-Graham, "The impact of project team attributes on ERP system implementations", Information Technology & People, Vol. 23, No.1, 2010, pp. 80-109.

[19] P.A. Trunick, "ERP: promise or pipe dream?", Transportation and Distribution Journal, Vo. 40, No. 1, 1999, pp. 23-26.

[20] Z. Zang, M.K.O. Lee, P. Huang, L. Zhang, and X. Huang, "A framework of ERP systems implementation success in China: an empirical study", International Journal Production Economics, 2002.