ERP SYSTEMS IMPLEMENTATION IN MALAYSIA: THE IMPORTANCE OF CRITICAL SUCCESS FACTORS

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ABSTRACT

In order to survive in a rapidly changing business environment, organizations must improve their own business practices and procedures. Enterprise resource planning (ERP) systems can be considered as the most important development in the corporate use of information technology and are beginning to be the backbone of organizations. The difficulties and high failure rate in implementing ERP systems have been widely cited in the literature. Factors affecting ERP implementation are complex and abundant and numerous authors have identified a variety of factors that can be considered to be critical to the success of an ERP implementation. In this paper, the critical factors that affect ERP systems implementation success in Malaysia have been identified and the importance of these factors have been investigated. Through a comprehensive review of the literature, 10 factors were found to be critical to ERP implementation success. The importance of these factors was investigated within Malaysian companies using questionnaire survey method. "Top management support" and "Clear goals and objectives" have been shown to be the extremely important factors for ERP implementation in Malaysia.

Keywords: e*nterprise resource planning, ERP system, ERP implementation, critical success factors*

INTRODUCTION

Today, the business environment is rapidly changing. Companies face the challenge of increasing competition, expanding markets, and rising customer expectations. This increases the pressure on companies to lower total costs in the entire supply chain, shorten throughput times, drastically reduce inventories, expand product choice, provide more reliable delivery dates and better customer service, improve quality, and efficiently coordinate global demand, supply, and production [1]. In order to survive in this situation, organizations must improve their own business practices and procedures. Improvements to business processes can take one of three forms [2]:

a) improving process reliability through six sigma and other total quality tools,
b) reducing process complexity through lean manufacturing, and
c) coordinating the individual elements of the overall set of business processes through enterprise resource planning (ERP).

The Educational Society for Resource Management (formerly known as the American Production and Inventory Control Society, APICS) defines ERP as: "A method for the effective planning and controlling of all the resources needed to take, make, ship and account for customer orders in a manufacturing, distribution or service company" [3]. Organizations look to enterprise resource planning as a significant strategic tool of competition. ERP plays an important role in today's enterprise management and is beginning to be the backbone of organizations [4]. ERP is probably the most rapidly growing system area in operations today [5].

According to a survey conducted by the Economist Intelligence Unit (EIU) [6], it predicted that winners of 2010 in Malaysia are likely to possess the following attributes:

• flexibility of business model, organization and technology,
• openness to change, and ability to change rapidly,
• view of IT as a competitive weapon, and integral to strategy, and
• willingness to invest in people as a strategic asset.

The EIU's survey predicted among emerging technologies such as mobile technologies, nanotechnologies, embedded systems (e.g. Radio Frequency Identification (RFID)) and data management and analytics, Malaysian firms will turn mainly to data management and analytical tools to help achieve their innovation and customer learning objectives in 2005-2010.

The "Malaysia, Policies, Incentives and Facilities for SMEs" issued by Ministry of International Trade & Industry (MITI) indicated that the Malaysian government provided a financial assistance scheme as "Grant for ICT Application" for SMEs [7]. The scheme provided assistance for purchasing of ERP software for manufacturing and manufacturing related services. The Small and Medium Industries Development Corporation (SMIDEC) is responsible for allocation of this grant.

SMIDEC in "SMI Development Plan (2001-2005)" indicated that enhancing the technological capability of SMEs is crucial in their drive towards being globally competitive. Industry and government need to identify the critical enabling technologies required by industry to meet future demands. The key functional technologies identified for SMEs in the various sectors can be generally classified into three groups:

- business process technologies,
- design and manufacturing process technologies, and
- materials and product technologies.

One of the prerequisites for SMEs to scale-up the technology requirement is the adoption of ICT, without which, SMEs risk losing out on global opportunities. Enterprise resource planning (ERP) and other information and communications technology (ICT) applications to facilitate electronic commerce are among the key functional technologies that suggested for business process technologies [8].

Due to fully utilized allocation of "Grant for ICT Application" scheme, SMIDEC has provided another grant as "Soft Loan for ICT Adoption". This scheme provides assistance in the form of soft loan for SMEs to use ICT to improve competitiveness, efficiency and productivity. One of the objectives of this scheme is to acquire enterprise resource planning software [9].

Although ERP has been recognized as a useful tool, in practice, there are many difficulties in compelling people to implement it effectively [4]. Shehab et al. [10] noted that the implementation of an ERP system is an extensive, lengthy and costly process, typically measured in millions of dollars. The high failure rate of ERP implementation calls for a better understanding of its critical success factors (CSFs).

CRITICAL SUCCESS FACTORS FOR ERP SYSTEMS IMPLEMENTATION

According to Bullen [11] the concept of critical success factors (CSFs) was first introduced in 1979. The CSFs approach has been used by managers as a framework for strategic planning to direct them in determining those elements that must go right to succeed in achieving goals and objectives. The CSFs method has three steps:

1) listing the goals and objectives,
2) identifying the CSFs necessary to achieve the goals and objectives, and
3) suggesting ways in which the CSFs are to be measured.

In response to ERP systems implementation issues, there has been a developing body of academic literature which addresses the difficulties of ERP implementation by proposing CSFs and process models of the implementation. Both are aimed at better planning and hence, more successful ERP implementation [10]. Factors affecting ERP implementation are complex and abundant and numerous authors have identified a variety of factors that can be considered to be critical to the success of an ERP implementation [1]. Zhang et al. [5] summarized 12 previous studies that proposed CSFs for ERP systems implementation. Through an extensive literature review in books, journals and Internet 16 more studies that discussed CSFs for ERP systems implementation were found and summarized. In the case where the author(s) published more than one article in the area, only the latest publication was used. Considering this criteria, 28 articles were reviewed. In this review wherever necessary, it has been provided a common name for the same concept named differently by the various authors.

These 10 factors are:
1) top management support,
2) clear goals and objectives,
3) communication,
4) effective project management,
5) business process reengineering,
6) data accuracy and integrity,
7) suitability of software and hardware,
8) vendor support,
9) education and training, and
10) user involvement.

A brief description of each one of these factors is discussed below:

1) Top Management Support

Top management support in ERP implementation has two main facets [12]:
a) providing leadership; and
b) providing the necessary resources.

2) Clear Goals and Objectives

This factor is related with concerns of project goals clarification and their congruence with the organizational mission and strategic goals.

3) Communication

Communication should be of two kinds [13]:
a) inwards the project team, and
b) outwards to the whole organization.

4) Effective Project Management

There are five major parts of project management [12]:
a) having a formal implementation plan,
b) a realistic time frame,
c) having periodic project status meetings,
d) having an effective project leader who is also a champion, and
e) having project team members who are stakeholders.

5) Business Process Reengineering

Dimensions concerning business process reengineering are [12]:
a) company's willingness to reengineering,
b) company's readiness for change, and
c) company's capability of reengineering.

6) Data Accuracy and Integrity

Data accuracy is absolutely required for an ERP system to function properly [1]. A fundamental requirement for the effectiveness of ERP systems is the availability and timeliness of accurate data [14].

7) Suitability of Software and Hardware

Two aspects should be cared when selecting software and hardware [12]:
a) compatibility of software/hardware and company's needs, and
b) ease of customization.

8) Vendor Support

According to Zhang et al. [5] three dimensions of vendor quality are classified as:
   a) service response time of the software vendor;
   b) qualified consultants with knowledgeability in both enterprises' business processes and information technology including vendors' ERP systems; and
   c) participation of vendor in ERP implementation.

9) Education and Training

Three aspects concerning the contents of training are [12]:
   a) logic and concepts of ERP,
   b) features of the ERP system software; and
   c) hands-on training.

10) User Involvement

There are two areas for user involvement when the company decides to implement an ERP system [12]:
   a) user involvement in the stage of definition of the company's ERP system needs; and
   b) user participates the implementation of ERP systems.

METHODOLOGY

Questionnaire survey method was selected following the previous study to evaluate the importance of the CSFs that have been found through literature review. A postal survey questionnaire was used as the research instrument. The questionnaire is focused on the importance of critical success factors that clarified from literature review. It identifies the respondents' perception of the importance of CSFs in the ERP implementation process. For each of these factors, a number of elements or statements were formulated through the definition and description of each one in the literature. The respondents were asked to rate the degree of importance of each CSFs in ERP implementation based on a 5-level Likert scale. The rating scale ranged from: '1-very unimportant (VU)', '2-unimportant (U)', '3-neutral (N)', '4-important (I)', '5-very important (VI) and '6-not applicable (NA)'. The target respondent in each firm was the chief information officer (CIO), the director of MIS, IT Manager or any person responsible for ERP System since they are directly involved in ERP system.

Survey Population

This survey is an empirical study on Malaysian enterprises that are running ERP system. An extensive search was conducted in literature available in the libraries, journals and internet to find Malaysian companies that have implemented an ERP system. Hence many academicians, practitioners, ERP providers, consultants and government agents were contacted. Through the Multimedia Development Corporation website (www.msc.com.my), about 40 local ERP providers were found and contacted via email. Some of the major worldwide ERP vendors were also contacted through their local branch in Kuala Lumpur. SMIDEC was enquired to check whether they have any information about ERP system in SMEs. Some companies were identified from the brochures and catalogs presented in SAP Summit'05 that was held on July, 2005 at the Sunway Pyramid Convention Center in Kuala Lumpur. From these initiatives a reasonable number of samples were collected. The total number of the companies that were found running ERP system is 232.

RESULTS AND DISCCUSSIONS

Response Rate

Out of the 232 sets of survey instrument distributed, 50 usable responses were received. Regarding to this fact the survey response rate is 22%. According to Yusof and Aspinwall [14], a response rate of 20 to 25% is normal for mailed questionnaires. Therefore, the response rate of this study could be considered reasonable for data analysis. The response rate of 22% when compared with other CSFs studies for ERP systems, is higher than Nah et al. [15] (5.4%), Somers and Nelson [16] (13.5%) and Yingjie [4] (21%), but lower than Mabert et al. [17] (28.8%) and Zhang et al. [12] (34%).

Instrument Validation

Instrument validation is a prior and primary process in empirical research. The content validity of the instruments was established through the adoption of the CSFs by extensive reviewing of the relevant literature and a pilot test. As shown in Table 1, the Reliability Coefficients (the Cronbach's alpha) value is 0.9302 that shows a high internal consistency. Since the Cronbach's alpha is greater than 0.7 therefore from this result it can be concluded that this instrument is reliable.

Table 1: Reliability analysis

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)				
Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	194.2245	441.0111	21.0003	36
Reliability Coefficients N of Cases = 50.0 Alpha = .9302		N of Items = 36		

The Importance degree of CSFs

The respondents were asked to rate the degree of importance of each item of CSFs for ERP implementation based on a 5-point Likert scale. The answers were rated by level of agreement, including not applicable, and very unimportant (disagree) to very important (agree). The mean of each CSF score is shown in Table 2.

Table 2: Average rating of CSFs by degree of importance

CSF	CSFs Items	Mean	Std. Dev.	CSF Mean
Top management support	Leadership by Top Management	4.54	0.706	4.59
	Resources Allocation by Top Management	4.64	0.631	
Clear goals and objectives	Clear Goals	4.54	0.676	4.44
	Similarity of Objectives with Mission	4.34	0.717	
Communication	Communication with Project Team	4.30	0.707	4.22
	Communication to Organization	4.14	0.729	
Effective project management	Formal Plan	4.20	0.833	4.00
	Realistic Time Frame	4.34	0.658	
	Periodic Meetings	4.06	0.740	
	Project Leader	4.04	0.856	
	Stakeholder Members	3.32	1.151	
Business process reengineering	Willingness to Reengineering	4.20	0.670	4.15
	Readiness to Change	4.20	0.756	
	Capability of Reengineering	4.06	0.793	
Data accuracy and integrity	Availability of Accurate Data	4.42	0.702	4.38
	Integrity of Data	4.34	0.745	
Suitability of software and hardware	Fit Between Selected Software/Hardware & Needs	4.18	0.825	4.15
	Ease of Customization	4.12	0.895	
Vendor support	Service Response Time	4.42	0.835	4.32
	Qualified Consultants	4.32	0.913	
	Vendor Participation	4.22	0.887	
Education and training	Providing Logic & Concepts	4.18	0.850	4.25
	Training the Features	4.26	0.723	
	Hands-on-Training	4.32	0.794	
User involvement	Involvement in Definition of Needs	4.22	0.764	4.22
	Participation in Implementation	4.22	0.648	

Among these CSFs "Top management support" is given the high score by respondents. This CSF with an average of 4.59 is the most important CSF for ERP implementation. The second most important CSF is "Clear goals and objectives". The degree of importance of the first two CSFs identified by this study is the same as Somers and Nelson [16] findings on USA ERP users. In Yingjie's [4] investigation on ERP CSFs among Finnish ERP users, "Business process reengineering" and "Effective project management" have been given the less important degree by respondents as this study on Malaysian firms confirms it. The order of CSFs by degree of importance is illustrated in Figure 1.
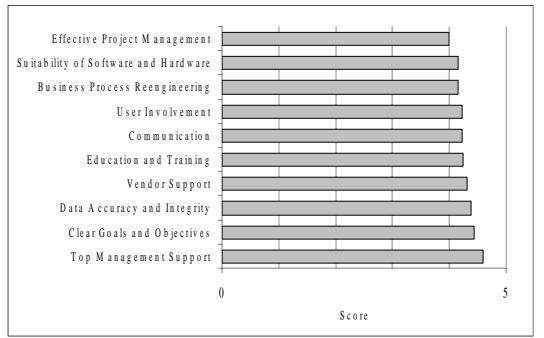

Figure 1: Order of CSFs by degree of importance

The empirical data shows that allocating the necessary resources by top management is the most important duty of top managers in ERP implementer companies. Having clear project goals will prevent a failure implementation project. Sharing information within the project team is the most important thing for good communication. Effective ERP project management can not be done without a realistic time frame. The ERP implementers' willingness to reengineering is key factor for business process reengineering during ERP implementation. The companies that aim to implement their ERP systems successfully should provide accurate data in their organization. These companies should try to find the suitable ERP software and hardware that best fit with their needs. The service response time of a vendor is the most important factor of a vendor for supporting a successful implementation. Functional training (hands-on training) is very important to persuade a successful education and training in an ERP implementation. ERP systems can not be implemented successfully without participation of the users in the definition stage of the ERP system needs and also in the implementation process. ERP implementers' managers should focus and full control on these tasks and activities to make certain their implementation process success.

CONCLUSIONS

This study aims to identify and evaluate the critical success factors affecting ERP implementation in Malaysia. Critical success factors may ensure effective ERP implementation and a realization of the promised benefits. Factors affecting ERP implementation are complex and abundant. A total of 10 critical success factors for ERP implementation have been identified based on a review of the related literature. Based on the survey's empirical data, the two factors of "Top management support" and "Clear goals and objectives" have been shown to be the extremely important factors for ERP implementation in Malaysia.

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