

Post Implementation Performance Evaluation of Enterprise Resource Planning in Saudi Arabian Public University

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Abstract

In the past 5-10 years many organizations have attempted more from stand alone business information systems to integrated systems referred as Enterprise Resource Planning (ERP). ERP systems are used to integrate high levels of business process integration for improving internal/external communication at different levels. Many organizations have experienced difficulties in realizing their advantage and a number of ERP projects have been considered unsuccessful. So in this study post-implementation of ERP will be viewed and undertaken from the prospective of performance evaluation. Most of the research focuses on single implementation in one country as implementation of ERP varies according to requirements and cultures. Until now, no attention has been given on post-implementation performance evaluation of ERP and its customer value in academic institutions in Saudi Arabia. The goal of this paper is to discover the post-implementation performance evaluation factors of ERP in a public university of Saudi Arabia and its customer value.

The paper will start by general introduction with an overview about enterprise resource planning (ERP). Then, it will summarize the literature work with possible managerial techniques. In next section, implementation issue of ERP and critical success factors will be discussed. Finally, the paper will close with a conclusion

Keywords: Enterprise Resource Planning (ERP), Information Technology(IT), Materials Requirements Planning (MRP),Critical Success Factors of ERP

1. Introduction

In a constantly ever changing global business environment, firms have no other choice but to expand their capabilities and sharpen their competitive edge. In order to achieve this goal, an increasing number of organizations are turning to Enterprise Resource Planning (ERP) systems. Enterprise resource planning, or ERP, is an information technology strategy to merge all information within an organization to create a comprehensive information infrastructure encompassing all organizational units and functions. The strategy requires a central database which places all organizational information into a unified format so that it may serve as a resource in meeting the data needs of managers, stakeholders, customers, employees, and suppliers from a local to a global context (Davenport, 1998).

Davenport (1998) suggests that ERP is the most important development in the corporate use of information technology (IT) in the 1990s and 2000s. Ehie and Madsen (2005) define an ERP system as an integrated software solution that spans the range of business processes that enables companies to gain a holistic view of the business enterprise. An ERP system allows the integration of functions, divisions of businesses in terms of information exchange and flow, and the integration of business functions as diverse as accounting, finance, human resources, operations, sales, marketing, customer information and even the supply chain (Koh & Saad, 2006; Motwani et al, 2002; Tarn et al, 2002; Kumar & Van Hillegersberg, 2000; Palaniswamy & Frank, 2000).

The ERP market had a spectacular year, with total revenue growing by 14% and license revenue up an amazing 18% from 2005. While sales of traditional ERP applications were very healthy in 2006, many vendors also saw substantial revenue growth from the acquisition of other software companies. Globalization, centralization, and regulatory compliance were the key drivers for continued ERP investment among large corporations. In the small and midsize business (SMB) segment, which continues to outgrow the overall market, companies are buying new ERP systems in response to new customer requirements and the desire to participate in the global market.(AMR Research,2007)

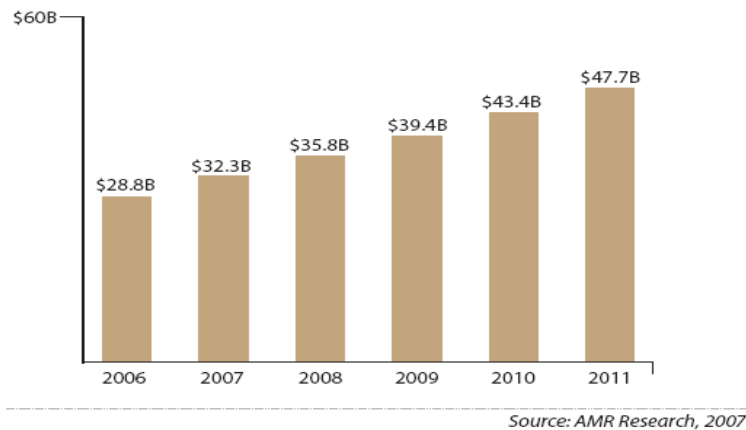


Chart 1: ERP Application Revenue Estimate 2006- 2011

By looking at ERP systems into higher education prospective, it includes not only the traditional functions of finance, human resources, and payroll, but also the unique functional operations of advancement, development, student information, enrollment, recruitment, and financial aid, to name just a few. Therefore, ERP is essentially defined as a multi-module packaged software application, or system, in pursuit of the organization's business processes and information-processing needs. Furthermore, ERP utilizes a common centralized database to provide organizations the opportunity for more efficient and effective use of human, financial, material, and other organizational informational resources (Al-Mashari, 2003; Fui-Hoon Nah, Zuckweiler, & Lee-Shang Lau, 2003; Holsapple & Sena, 2003; Sawyer & Southwick, 2002). At its most basic level, ERP is simply using computer technology, consisting of hardware and software components, to store and track data and information in support of the institutional mission and objectives.

2. Literature Review

Enterprise Resource Planning (ERP) is a useful system to organize activities, decision, and information flows across many different functions and departments in a firm (Jacobs and Weston Jr., 2007; Basoglu et al. 2007; Koh et al., 2008). ERP is the leading approach to integrate business management and information technology. Basoglu et al. (2007) defined ERP systems as _integrated software solutions used to manage an organization's resources. According to Watson and Schneider (1998), ERP is an integrated, customized, packaged software-based system that handles the majority of an enterprise's system requirement in all functional areas, such as accounting, human resources, finance, sales, marketing, and manufacturing. ERP systems provide a seamless integration of all the information flows in an organization to eliminate cross-functional coordination issues in the business process (Davenport, 1998). Therefore, ERP can be defined as an integrated information system that supports the business processes and functions through managing the entire organization's resources efficiently and effectively.

2.1 History of ERP

The main focus of manufacturing industry in the 1960's was on inventory control (Mabert et al, 2000). Most of the heavy software which used mainframe power was designed to manage inventory based on traditional concepts. It was in late 1960's when the focus expanded to total inventory management, a system called Inventory Management And Control (IMC) which uses bills of material and master schedules to determine company raw material requirement. In the 1970's, Inventory Management And Control (IMC) then quickly evolved to Materials Requirements Planning (MRP) which had more functions and tools such as capacity planning, forecasting and resource analysis to address priority and capacity management. The next stage of evolution was Manufacturing Resource Planning, also known as MRP2, in 1980's where more

powerful extensions were made to the original MRP which included sales, operation planning, financial interface and simulation. In early 1990's, MRP 2 functions were further enlarged to cover new areas such as engineering, finance, human resource and project management. The term **ERP (Enterprise Resource Planning)** was then used to describe this new extension which was broader in scope, stronger in integration and more effective in dealing with multiple internal and external units (Mabert et al, 2000).

2.2 Present and Future of ERP

ERP market is a fast expanding market, with total revenue expected to grow by an average of 11% from 2008 to 2011 (AMR Research, 2007). ERP market worldwide is predicted to expand to USD35.8B, USD39.4B, USD43.4B and USD47.7B in the year 2008, 2009, 2010 and 2011 respectively (AMR Research, 2007). Globalization, centralization, and regulatory compliance were the key drivers for continued ERP investment among large corporations (AMR Research, 2007). In the small and midsize business segment, which continues to outgrow the overall market, companies are buying ERP in response to new customer requirements and the desire to participate in the global market (AMR Research, 2007). Many scholars believe that ERP have now reached a level where both software vendors and users understand the technical, human resource and financial resources required for its implementation and ongoing use (Jacobs & Bendoly, 2003). Most ERP today have various modules to deal with the complex corporate needs such as production, accounting, procurement, distribution, field service, material planning, capacity planning, production planning, sales planning, sales order processing, customer service and business planning modules (Hamilton, 2003). ERP should now enter an era of relatively easy configuration that takes weeks, with implementation completed at most in 2–3 months. Major corporations have realized the benefits of short implementation cycles and many are striving to implement a module in 6 months or less (Jacobs & Bendoly, 2003). The project management issues related to large and medium scale implementations will be significant when ERP involves conflicting business and personal cultures from various departments (Jacobs & Bendoly, 2003).

ERP systems are being developed continuously and nowadays they can encompass all integrated information systems that can be used across any organization (Kumar et al, 2003). Koh et al (2007) says that ERP may evolve into a loosely named iteration called extended ERP. Extended ERP provided backbone financial transaction processing capabilities along with Supply Chain Management (SCM), Customer Relationship Management (CRM), Sales Force Automation (SFA), Advanced Planning and Scheduling (APS), Business Intelligence (BI), and e-business capabilities (Rashid et al, 2002)

2.3 ERP as a Popular Managerial Technique

Since early 1800's, the utilisation of various management theories has become an important force to improve the ways organization are run (Khong & Richardson, 2003). History has shown that many management practices have been contrived in the past 250 years (Hammer & Champy, 1993). Management practices constantly evolve and become the backbone of many successful organizations (Gulledge, 2006). There are arguments that management ideas developed by Henry Fayol and Frederick Taylor years ago may not be appropriate in the dynamic, turbulent and competitive environment today" (Khong & Richardson, 2003). Therefore, many new management techniques are adopted by firms such as Total Quality Management (TQM), Just In Time (JIT) and Human Resource Management (HRM) (Khong & Richardson, 2003). ERP has been considered as the most popular managerial tools and philosophies in the late 1990s (Hamilton, 2003). Effective use of ERP has become a key discriminator of competitive advantage for American firms, particularly for the large multinational corporations (Blanchard,1998).

3. Implementation Issues of ERP

Extensive research has been published which deals with various issues in implementing ERP. Several works address ERP technical issues pertaining to hardware architecture, data standards, system configuration and software integration (eg Jordan & Krumwiede, 1999; Markus & Tanis, 2000; Olinger, 1998). Others consider tactical issues such as process and organizational adaptation, measurement of the benefits, and resistance to change (Glass, 1998; Laughlin, 1999; Swan et al, 1999; Hammer & Stanton, 1999; Jacobs & Whybark, 2000; Soh et al, 2000). Hammer and Stanton (1999) link ERP with reengineering issues, since ERP provides feedback that flows horizontally across the business. They argue that firms should use ERP as an integrative mechanism to create a new style of management. Zain (1995) consider strategies as an important issue in implementing ERP. Some companies develop ERP in house while others outsource ERP to the third party or simply use off-the-shelf software bought at the market. Some companies use phased transition strategies instead of making a complete drastic migration from legacy system to ERP system (Zain, 1995). Zain (1995) says that different companies used different key roles in the implementation of ERP project such as top management, customers, consultants, academics, outside sponsors, employees, business partners and even government regulators. Zain (1995) also stresses the significance of training and development programme prior to the implementation of ERP. Many researchers look at critical success factors (eg top management support, sufficient training, proper project management, communication, etc) that lead to the success of ERP implementation (Bingi et al, 1999; Kumar &

Hillegersberg, 2000; Griffith et al, 1999; Holland & Light, 1999; Hong & Kim, 2002; Verville & Halington, 2002; Willcocks & Sykes, 2000). Few researchers focus on the cultural issues involved in the alignment of ERP implementation to business processes (Bowersox et al, 1998; Davenport, 1998). Bowersox et al (1998) state that ERP was not only a software package but also a way of doing business. Davenport (1998) confirms that many failures of ERP implementation are due to the lack of alignment with business culture and needs. He further cautions that firms could lose their competitive advantage by adopting processes that are indistinguishable from competitors. He even suggests that firms should restrain from ERP investment until further study of its business implications is fully understood. Jacobs and Whybark (2000) stress on customer issues in ERP implementation. Using the furniture industry as a reference, they illustrate how ERP implementation could lead to disaster unless adequate consideration is given to customer needs and demand. They stress that two factors, centralization of information and flexibility of production systems, should be simultaneously taken into account to match customer requirements as firms implement their ERP systems across their organization.

4. Critical Success Factors of ERP

It is crucial that organisations understand the critical success factors (CSF) involved in the implementation so as to optimise benefits from investment in innovation (Keen, 1981; Cooper & Zmud, 1990). Many corporate leaders and IT managers viewed ERP as part of their company technological innovation (Sweat, 1998). Van De Ven et al (1989) defines the processes of innovation as the development and implementation of new ideas by people who over time engage in transactions with others within an institutional context. Van De Ven et al (1989) indicate that there are many crucial factors that are associated with successful technological innovations. Most CSFs can be categorized according to the stage of innovative processes which include initiation, implementation and evaluation (Hage & Aiken, 1970) or idea evaluation, implementation, problem solving and diffusion (Utterback, 1971). The issue of critical success factors (CSF) and ERP implementation have drawn much interest from researchers (Rickards & Bessant, 1988). Table 1 shows that many researchers cite common CSFs. Hence, there is a well-established and strong consensus among the various researchers regarding the CSFs in the implementation of ERP.

FACTORS	AUTHORS
Top management support	Kong & Richardson (2003), Hamilton (2003), Hammer (1997), Zain (1995), Khan & Martin (1989), Slevin & Pinto (1987), Kerzner (1987), Bessant (1982)
Project missions and strategies	Hamilton (2003), Zain (1995), Nicholas (1989), Slevin & Pinto (1987), Bessant (1982)
Project schedule and planning	Zain (1995), Nicholas (1989), Kanter (1983), Kerzner (1987), Slevin & Pinto (1987), Dimitris (2001)
Appropriate operational technology	Khan & Martin (1989), Slevin & Pinto (1987), Bessant (1982), Power & Dickson (1973)
Appropriate personnel, skills and expertise	Khan & Martin (1989), Kanter (1983), Kerzner (1987), Slevin & Pinto (1987), Bessant (1982), Power & Dickson (1973)
Strong control system, monitoring and feedback	Zain (1995), Nicholas (1989), Kanter (1983), Kerzner (1987), Slevin & Pinto (1987), Bessant (1982), Power & Dickson (1973)
User acceptance	Hammer (1997), Volkoff (1999), Zain (1995), Slevin & Pinto (1987), Laughlin (1999), Markus (1999)
Crisis Management	Slevin & Pinto (1987)
Strong Project Communication	Kong & Richardson (2003), Zain (1995), Nicholas (1989), Slevin & Pinto (1987), Bessant (1982)
User participation	Zain (1995), Nicholas (1989), Khan & Martin (1989), Power & Dickson (1973)
Change Management	Kong & Richardson (2003), Kerzner (1987), Power & Dickson (1973)
Organizational fit and adaptability	Zain (1995), Kerzner (1987), Bessant (1982), Soh, Kien & Yap (2000)
Human motivation, support and consideration	Cidy (2000), Khan & Martin (1989)
Progressive corporate culture and work climate	Zain (1995), Khan & Martin (1989), Rosenbloom & Abernathy (1982), Ekvall & Tangerberg (1986), Howel & Higgin (1990)

Table 1 . Critical Success Factors in ERP Implementation

4.1 Customer Value

Customer value is referred to as the degree of benefits perceived by customers as a tradeoff between what customers receive and what they sacrifice. Customer value is a source of competitive advantage for business firms. Tu (1999) defined it as the extent to which customers perceive a firm's products as having higher value, as well as their degree of satisfaction with these products. However, the customers' perceived value can easily be confused with customer satisfaction (Sweeney and Soutar, 2001). While perceived value occurs at various stages of the purchasing process, customer satisfaction and referral are more related to post-purchase and post-use evaluation (Tu, 1999; Woodruff; 1997; Sweeney and Soutar, 2001). Customer value comes from meeting the current needs of customers more efficiently, from identifying the customer needs proactively, and from meeting new customer needs or new needs of existing customers (Carter, 2005). Customer value is also related to improved customer service and more accurate customer invoices. To faster customer service a firm can also connect new systems to the ERP system (e.g. a system optimizing distribution routes). An ERP system enables faster response to customers. Customers who perceived increased benefits and are satisfied with the quality and features of products are likely to refer new customers to purchase the firm's products (Tu, 1999). In his paper, Joo (2007) proposed seven customer value factors based on a literature review and the technology acceptance model (TAM): economy, convenience, speed, personalization, community, emotion, and trust. From his model, four important factors for customer value through ERP implementations are identified. They are value for money, convenience, timely response, and reputation for quality. The list of sub-constructs, along with their definitions and supporting literature are provided in Table 2.

Constructs	Definitions	Literature
Value for money	The degree to which a customer perceives value because a firm has lowered a product's price.	Nasution and Mavondo, 2008; Joo, 2007; Tu, 1999; Chand et al., 2005; Sweeney and Soutar, 2001; Petrick, 2002; Zeithaml, 1988
Convenience	The degree to which a customer perceives value because the firm has provided convenient information and service.	Joo, 2007; Chand et al., 2005; Petrick, 2002
Timely response	The degree to which a customer perceives time saving because a firm quickly acts upon customer needs.	Joo, 2007; Tu, 1999; Chand et al., 2005; Petrick, 2002
Reputation for quality	The degree to which a customer perceives product quality and performance.	Nasution and Mavondo, 2008; Sweeney and Soutar, 2001; Petrick, 2002; Zeithaml, 1988

Table 2 . List of customer Values

5. Conclusion

This paper has shown the author's perspective on ERP and its importance in all fields of life and organizations. Its importance in academics such as in public universities might not be overlooked. Critical success factors as mentioned in paper must be analyzed to minimize the failure of ERP. Each ERP implementation varies according to requirements and cultures. Therefore, there is dire need of analyzing the post implementation of ERP. Success of ERP must be analyzed by having the performance evaluation of ERP. This could be done easily in the post implementation phase of ERP by selecting the factors outlined in the paper.

Future research is required to implement this idea and do testing in some Saudi public universities.

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