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Success Factors and Potential Problems in Applying of Enterprise Resource Planning (ERP) Systems

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Abstract

This study aims to review and analyze the industry and academic literature on Enterprise Resource Planning (ERP) systems, in order to identify possible trends or factors, which may help future ERP initiatives. The study diagnosed potential problems with ERP systems and determined how to solve it. It also provide criteria's to measure the success of the implementation of ERP systems.

Keywords: Enterprise Resource Planning (ERP); Information Technology (IT); Project Management.

1. Introduction

The value that the ERP systems provides for the organization is manifested in the fact that such systems assist the organization in effectively restructuring the flow of information between and across all the organizational processes. This is because such systems are designed to automate and incorporate the majority of organization's business value chain processes (Gattiker and Goodhue 2005), which include, but not limited to, product planning, accounting, sales and marketing, logistics, human resources, and inventory management. Utilizing ERP systems as an enabler of efficient organizational functions and processes will translate into strategic benefits for the organization (Xu, 2010). Such strategic benefits include: operational excellence, efficient decision making process,, efficient organizational competitiveness, increased return on organizational investments, and ultimately organizational survival (Dehning et al. 2007). As a result, the widespread utilization of the ERP systems in organizations has been one of the most significant occurrences in the Information Technology (IT) starting in the early nineties (Vogt, 2002).

2. Concept and Importance of ERP

Recent organizational interest in the application and implementation in ERP systems is due to the fact that the business landscape has significantly changed during the past two decades. Globalization has forced organizations to deal with a whole new set of ways and means to deal with the intense competition. Therefore, organizations are seeking to work smarter by increasing productivity while decreasing cost of operations. Organizations are also forced to seek new markets and expand its business and customer base which in many cases would be on a global level. The recent implementation of information systems as strategic business partner has also forced organizations to deal with the influx in the rapid advancements in technology and its tools one of which is ERP systems which aid organizations in their efforts to computerize and integrate all company functions such as sales, marketing, and manufacturing (Karsak & Ozogul, 2009). However, the output of such integration are massive amounts of data which managers utilize to effectively accomplish such critical organizational tasks as human resource management, customer service, financing, and inventory management (Vogt, 2002). As a result, the concept of ERP has been a very tempting organizational initiative for many organizations. Some researchers went as far as referring to ERP as the complete solution to all of the organization's information system needs (Brown & Vessey, 2000).

It is evident in the business and Information Technology (IT) literature that organizations on a whole recognize the various benefits that ERP systems bring to their businesses; however, it is also evident in such literature that many of these organizations do not realize that the cost of a failed ERP initiative can be very high (Davenport, 1998). Many research studies have concluded that ERP systems do not in fact assure the business the benefits that ERP advertises itself to be able of accomplishing (Brown & Vessey, 2000). In fact, these research studies indicate the only 15 to 20% of all ERP implementations are successful (Brown & Vessey, 2000). As a result,

researchers and experts in the field of IT and ERP implementation have conducted studies that seek to identify ways and strategies for the successful implementation of ERP. The rest of this paper will attempt to construct a framework for successful implementation of ERP systems taking into consideration such ways and strategies.

3. Potential problems with ERP systems

In order to construct a framework for the successful implementation of ERP systems, it is incumbent upon us to first identify the factors that lead to the failed ERP implementation efforts. Second, take each factor individually and attempt to recommend organizational actions that ensure the non-existence of such factor. Consequently, we will achieve organizational readiness and fertile organizational environment that is suitable for the successful implementation of ERP systems. It must be noted here that based on the review of literature, the factors influencing the failed implementation of ERP systems are many. Therefore, the scope of this paper is to focus on the empirical work by presented by Vogt (2003). According to Vogt (2003) ERP systems have two major implementation issues: generality and complexity, which can bring about certain potential problems such as:

3.1 Cultural barriers:

Even though top management know the foreseeable benefits of implementing an ERP system, this view is not necessarily shared with the rest of the employees who consider such implementation as a major organizational change. Information systems on a whole, especially ERP systems, have been identified as a major source of organizational change and reengineering (Seddon, et al., 2003). The nature of the ERP systems is that it integrates all business functions; therefore, the potential for employee resistance to the major change that ERP systems bring about is very high (Ke et al., 2006). Therefore, the organization must endure a rigorous learning process that focuses on bridging the gap between what the organization knows and the knowledge that ERP demands that the organization must attain as a prerequisite to the implementation of ERP (Ke et al., 2006). Shahin and Ainin (2012) presented empirical evidence which indicate that in order for the organization to accomplish such learning process it must first create an open organizational culture that is result oriented, and employee oriented. Shahin and Ainin (2012) indicated that there is a positive correlation between open organizational culture and the successful implementation of ERP. This is due to the fact that the successful implementation of ERP systems requires the integration between the various organizational functions which in turns requires collaboration and team work amongst the employee population. Organizations with open culture have the necessary ingredients, such as cooperation, collaboration, and consensus that lead to successful creation of cross-functional teams that are required for the successful implementation of ERP systems (Shahin & Ainin, 2012).

3.2 Organizational Knowledge management

Information Technology (IT) projects on a whole require the organization to put forth an elaborate organizational learning process to ensure the successful implementation of such costly projects (Scott et al., 2000). The organizational learning process is a cyclic process where organizational knowledge is identified, collected, classified, stored, and distributed to members of the organization. IT project implementation yields organizational knowledge on both the technological as well as the business levels (Scott, J.E. & I. Vessey, 2000). Such knowledge becomes more comprehensive and complex when it comes to the implementation of ERP since such implementation is complex and it requires the integration of all business functions (Ke et al., 2006). Therefore, a careful and well planned for organizational learning process becomes even more critical (Scott et al., 2000).Consequently, organizations must endure a rigorous learning process that is endorsed in the implementation of ERP system in order to bond the gap between the organizational knowledge regarding such implementation and what such implementation requires the organization to know (Ke et al., 2006).

According to Scott et al. (2000), organizational knowledge that is gained as the result of failed ERP implementation can be an important factor in the planning for a successful ERP implementation. Chiang (2013) presented a study based on the analysis of two ERP implementation cases which one was successful and the other was a failure. Based on the analysis of these two cases, Chiang (2013) indicates that in the case of the successful ERP implementation, the organization's ability to learn from failure was a key factor in the success of such implementation. This is due to the fact that learning from failure inspires double-loop learning process; therefore, leading to gradual positive organizational change in culture and environment which is required for the successful implementation of ERP systems. To accomplish such learning from failure approach, the organization must adopt a phased approach to implementing ERP systems (Chiang, 2013). Learning from failure can also be manifested by utilizing benchmarking and seeking industry best practices related to successful implementation of ERP systems. The complexity of the ERP systems implementation must trigger the organization's readiness and

willingness to partner with experts and consultants with broad knowledge and experience in the implementation of ERP systems (Ko et al. 2005). This is due to the fact that a typical organization scarcely has the knowledge, the know-how, and the expertise that are needed for the successful implementation of ERP systems (Haines et al. 2003). Therefore, such knowledge, know-how, and expertise can be attained by the organization via these experts and consultants (Haines et al. 2003).

3.3 ERP project management and top management support

Traditionally, IT projects start off with a definition of requirements as well as the goals and objectives that the project will meet and will accomplish. This is what Bhatti (2005) refer to as the conceptualization of goals and objectives. Even though clear goals and objectives are a critical success factor in ERP implementation, they can also present potential issues due to the fact that it is difficult to determine the beginning of an ERP project since such a project is business endeavor rather than a project (Bhatti, 2005). As a result, it is highly recommend that the approach to ERP implementation should be a phased one with each phase having its own clear goals and objectives.

Traditionally, ERP projects failed due to complexity, cost, lack of consultants and experts in ERP project implementation, and lack of vendor support. To overcome such challenges, Ram et, al. (2013) in their empirical study have identified two critical factors that significantly influence the implementation of ERP projects. These are: Project management and training and education. In their study Ram et, al. (2013) utilized structural equation modelling on data collected from a large sample of companies in order to observe the influence of these critical success factors on the implementation of ERP projects in these companies. They concluded that effective project management is responsible for the transferring of the different project resources into meaningful and useful output. They also concluded that effective project management helps project leaders to exercise control over project costs, complexity, and expected outcomes.

According to Ram et, al. (2013), providing effective training and education for those who are involved in the ERP project implementation is a critical success factor in the successful of such implementation. This is due to the fact that such training and education will ensure a smooth and effective process for the continuous acquisition and transfer of the explicit and the tacit knowledge that is needed for the entire life cycle of the ERP project implementation. Such knowledge can be obtained utilizing such resources as consultants, formal training, and continuous vendor support.

Bhatti (2005), indicated that management support during the implementation efforts of an ERP project is manifested through providing the leadership and the resources needed. Bhatti (2005) further indicates that it is crucial that management overlook and supervise the progress of implementation efforts as well as provide input on how these efforts should proceed. Management must pave the way for a change process that will involve considerable amount of learning (Bhatti, 2005).

3.4 Functional coordination

According to Kim et al. (2005), organizations that focused on coordination between the different business functional areas had much higher success rate when implementing an ERP project. Such coordination is manifested in the form of commitments to resources and the sharing of information. Kim et al. (2005) further indicate that it is often the case that a failed ERP implementation initiative is mainly due to problems that take place in the early phases of project initiation. Such problems which stem from lack of organizational support and technical knowledge. To avoid such chances for failure, Kim et al. (2005) indicates that management must establish organizational consensus and dedication to the success of the ERP project. Management must also focus on making sure that the technical staff who is responsible for the implementation of the ERP system have the know-how to understand the overall design mandates of such system (Kim et al. 2005).

Daneva and Wieringa (2006) share the same view held by Kim et al. (2005) with regards to the importance of functional coordination in the successful completion of an ERP effort. Daneva and Wieringa (2006) indicate that such coordination can be accomplished by using different mechanisms such as:

- Utility-oriented mechanisms, which refer to the agreement among the players and stakeholders involved in the implementation of the ERP system about the benefits of such coordination.
- Process-oriented mechanisms, which refer to the establishment of a continuous cross functional processes such as customer ordering or product provisioning processes.
- Semantics-oriented mechanisms, which refer to the agreement among the players and the stakeholders involved in the implementation of the ERP system with regards to interpreting common and critical pieces of information.

- Communication-oriented mechanisms, which refer to the diffusion of information across the organization's network.

4. Measuring for success

Measuring the success of the implementation of ERP systems has been the subject of considerable research. According to Wang and Chen (2004), assessing the success of an ERP project can be examined from three different standpoints depending on which phase of the development life cycle the project is undergoing. These standpoints according to Wang and Chen (2004) are:

- Operational, which refers to the requirement that the ERP system once implemented, should have the anticipated functionality.
- Financial, which indicates that focus should be on ascertaining that the ERP system take into account key organizational performance indicators.
- Project implementation, which indicates that the success of an ERP project would accomplished if the system meets budget as well as time constraints.

The Aberdeen Group (2009) conducted a study of 920 Small to Midsize Businesses (SMBs) who have implemented ERP projects in their organizations. The study indicates that while growth, improving customer service and response time were key factors for these SMBs that led them to considering ERP project implementation, still the number one factor that led these SMBs to consider ERP project implementation was to cut the cost of operations. Therefore, the study was aimed at measuring the success of these SMBs in their ERP implementation using the Return On Investment (ROI) as the vehicle for assessing such success.

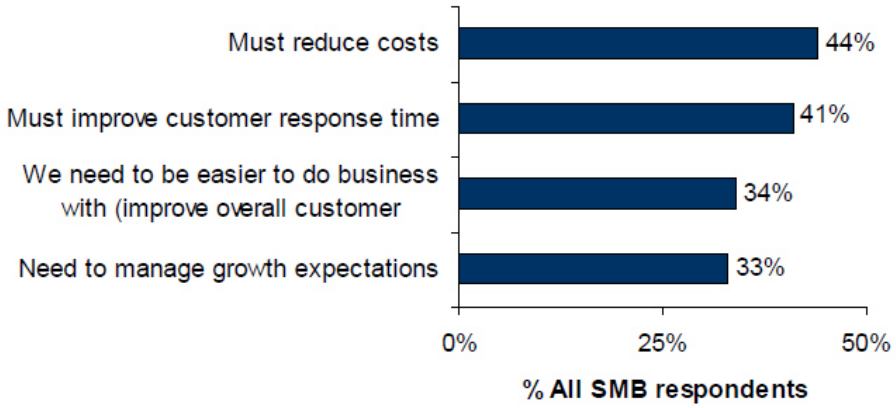

Figure 1: Business Driveres Imacting ERP Strategies (Source: Abrdeen Group, March 2009)

The Aberdeen Group (2009) takes a different approach at assessing the extent of the success of ERP projects implementations. The Group utilized the Return On Investment (ROI) method in an effort to assess such success using a sample of 920 best-in-class companies who implemented ERP projects. The Group classified these companies as best-in-class based on the optimum results that they achieved as a result of their ERP implementation which are as follows:

Reduction in inventory levels	20%
Improvement in inventory accuracy	97%
Reduction in operational costs	19%
Reduction in administrative costs	22%
On-time project completion	94%

According to the Group, the efficiency that ERP bring to the management of inventory is alone sufficient to justify the costs of the ERP investments. To justify such investment, the Group indicates that 100% of these best-

in-class companies utilized the ROI method to rationalize their ERP investments. The investments that organizations make in Information Technology (IT) are huge especially for such IT initiatives as the implementation of ERP projects. As a result, it is incumbent among such organizations to make sure that such huge investments are justified with high return value. Therefore, it seems quite obvious that these best-in-class companies utilized the ROI method to justify the huge investments they made in their ERP initiatives.

5. Conclusion

Enterprise Resource Planning (ERP) systems incorporate major business functions and management practices within an organization. The potential benefits that an organization can realize from the implementation of an ERP system are many. In the meantime, the price of failure of such implementation can be very costly if the organization did not put together strategies to assure a successful conclusion to such implementation.

This study was aimed at reviewing IT and management literature in an effort to identify trends and factors for the successful implementation of ERP projects. This review has revealed that different experts and researchers in the field of ERP implementation have come up with different factors that can lead to the successful conclusion of an ERP project.

While these factors are many, this study has identified what is thought to be the common success factors that were shared in the different studies reviewed. Coordination and communication between the different organizational functions seemed to be shared by many experts and researchers. This factor is important for the success of the ERP project since ERP integrates these different functions.

The change management approach was also identified by researchers as a key factor in the successful implementation of an ERP system. This is because the nature of the ERP systems is viewed as a major organization change and, therefore, should be dealt with as a major change using a change management approach. This leads to the need by the organization to re-examine its entire processes in order to tailor these processes to fit the new ERP. This is what experts and researchers refer to as the Business Process Reengineering (BPR). Going through such process is important for the success of the ERP system since it reduces the amount of customization that has to be done to the system. All of these factors would not be effective unless there is a strong commitment and effective support by upper management. Therefore, many experts and researchers have emphasized the importance of management support and commitment to the implementation of ERP systems. Management support and commitment is the glue that ties all these factors together for the success of ERP implementation.

Future research needs to consider the success factors for the implementation of ERP systems based on different organizational settings and different ERP systems. Such research should conclude with a categorization of these factors in an effort to provide a taxonomy that can be applied to the different implementations of ERP systems.

Management support was found to be also critical for the success of ERP projects, which typical of any IT project. However, management support becomes such a crucial factor for ERP success since the nature of ERP projects is complexity which requires commitments, coordination, and resources which management can effectively supply

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