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Critical decisions for ERP integration: Small business issues

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ABSTRACT

Small enterprises are facing significant challenges to become suppliers of bigger customers due to the excessive costs associated with accessing a vast market of potential customers. It is essential for small businesses to adopt an ERP system to maintain control of their operations and to compete globally. An ERP implementation is expensive and risky for all businesses, but it is still more challenging for small businesses, which have particular characteristics. We identified from archived literature, key decisions necessary in selecting and implementing an ERP system. While these critical decisions are applicable to all types of businesses, the focus of this research was to recommend the best practices for each one of these key decisions for small businesses. We interviewed six small businesses to recommend best practices for the critical decisions: (1) project team structure, (2) implementation strategy, (3) database conversion strategy, (4) transition technique, (5) risk management strategy and (6) change management strategy. Our results indicate that these best practices greatly enhanced the success of an ERP implementation for small businesses. Further, we recommend studying the impact of ERP systems on the small business' participation in supply chain management.

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1. Introduction

Enterprise Resource Planning (ERP) systems integrate all information and processes of an organization into a coalesced system that concerns how people and organizations access, collect, store, gather, summarize, interpret, and use information. An ERP system integrates different components of computer software and hardware to enable information flow throughout the enterprise. An important element of most ERP systems is the use of a unified database to gather data for the different system modules. ERP technology is complex, and its implementation often entails significant risks. In spite of these risks, organizations implement ERP systems for greater visibility into business process. The greater visibility allows companies to adapt readily in a dynamic business environment that calls for a continuous transformation of business processes (Konicki, 2001; Mabert, Soni, & Venkataramanan, 2000; Songini, 2002). The continuous transformation of processes occurs at different levels and in different areas of the organization. Continuous transformation encompasses managing (1) activities that promote changes in the patterns of behavior of customers, people, and organizations and (2) information that leads to changes in the way people use information to engage in knowledge focus activities. An ERP implementation usually affects both suppliers and customers due to the transformation that generally occurs through the technical integration of software, hardware and processes.

The ability of a firm to implement an ERP successfully is of significant importance; ERP is an enabler for technological integration that has evolved from basic Material Requirement Systems (MRP, MRPII) to sophisticated and multimillion-dollar systems that aim to link databases and applications in a friendly manner. The implementation of an ERP system is complex and requires significant investment in consulting and software, which is usually doable only for very large corporations (Andriole, 2006). Moreover, the ability of an organization to evaluate the value creation and economic returns from an ERP system is a difficult task. The source of the difficulty seems to be in the necessary organizational changes for ERP implementation and in predicting the return on investment (Mabert, Soni, & Venkataramanan, 2001). These issues are particularly important within small and medium enterprises (SMEs), where the ERP implementation and evaluation of the potential benefits are still more uncertain (Davenport, 1998; Levy & Powell, 2000).

ERP vendors have been moving their attention toward small businesses by offering simplified and cheaper solutions from both the organizational and technological points of view (Chen, 2001). These vendors are concentrating on the customization process needed to match the ERP system modules with the features of existing processes. However, recent research (Koh & Simpson, 2007; Mabert et al., 2001; Quiescenti, Bruccoleri, La Commare, Noto La Diega, & Perrone, 2006) shows that configuring and implementing

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ERP systems is still an expensive task, even more so in small firms. The company's inadequate information about the cost feasibility structure may make or break its decision to either continue or abandon an ERP implementation. Many small businesses either do not have sufficient resources or are not willing to commit a huge fraction of their resources due to the long implementation times and high fees associated with ERP implementation (Cragg & Zinatelli, 1995; Nah & Lau, 2001). There are many factors involved in the cost analysis structure of an ERP system. Babey (2006) documented that total cost of ownership of an ERP system includes not only the implementation costs but acquisition and long-term ongoing support costs as well. Some issues to consider for ERP cost analysis include updating, upgrading, maintenance, and management of the ERP system.

The majority of small businesses (SB) often have significant constraints in their resources. Nonetheless, they (vendor, contractors, and so forth) still need connectivity among employees, other suppliers, customers, and partners. The connectivity is feasible if these businesses develop the technological capacity to integrate their business processes with other business members to maintain a competitive advantage. Integration of key business processes from end user through original suppliers provides product, services, and information that add value to customers and other stakeholders.

Moreover, small businesses are considered the backbone of the economy of the United and of other countries around the world (IDC, 2006). In the United States, there are 23 million functioning small business firms (U.S. Census Bureau, 2006) that employ 50% of the private workforce (U.S. Small Business Administration, 2006). In spite of a worldwide active economy driven by small businesses, research on most technology-related issues has focused on large corporations. Small and medium enterprises are facing significant challenges to become members of the global strategic partner network and consequently to become suppliers of bigger customers. These bigger customers were previously out of the reach of SMEs due to the prohibitive costs associated with setting up and maintaining a standardized electronic document interchange system for the exchange of documents (invoices, shipping notices, purchase orders, and so forth) between companies Given the access to such a vast market of global strategic partners, it is very advantageous to SMEs to adopt some sort of ERP system in order to maintain control of their operation among the pressures they will face, meeting not only increased demand, but also the service level expectations of their new customers.

Some developments have taken place to assist small business in documents exchange. Software developers and businesses are actively pursuing the next phase of business integration (B2Bi), namely XML-based Web applications These applications can enable inter-enterprise integration. There are many de facto XML initiatives for vertical or horizontal B2Bi, including ***ebXML***, RosettaNet, HL7, and cXML; however, the diversity of XML formats causes difficulty in facilitating XML-based data exchanges (Peishun, Trappey, & Trappey, 2004). Nonetheless, some companies have adopted the XML hub prototype to engage in documents trade. The hub is developed using widely applied web-based technologies (XML, XSLT, HTTP and JDOM). The hub architecture is applicable to smaller suppliers; the architecture is flexible, scalable, extensible and suitable for a distributed networking environment.

Even though some progress has taken place for electronic document exchange in small businesses, there is no adequate research for a sensible and easy integration of ERP implementation systems. Therefore, for a successful ERP implementation, it becomes necessary for SMEs to carefully evaluate some key implementation decisions. This article investigates the key decisions a small business organization must make about technology integration regarding ERP in order to stay competitive. Our research focus is on Enterprise Resource Planning (ERP), which facilitates the flow of information throughout the organization, and assists enterprises in automating and integrating corporate cross-functions such as inventory control, procurement, distribution, finance, human resources, and product development.

The organization of the remainder of the paper is as follows: Section 2 examines the research literature concerned with ERP basics and implementation and presents some basics of small business and its unique characteristics. Section 3 presents the methodology used to collect data to illustrate the proposed framework. Section 4 examines critical decisions for ERP implementation and formulates a framework for analysis of small business. Section 5 summarizes and discusses the results. The summary of the main points raised by this research leads us to identify opportunities for future research.

2. Literature review

2.1. ERP basics

An ERP system is an information system consisting of software support modules. Some of these modules include utilities for marketing and sales, field service, product design and development, production and inventory control, procurement, distribution, industrial facilities management, process design and development, manufacturing, quality, human resources, finance and accounting, and information services (Anderegg, 2000; Larson, Carr, & Dhariwal, 2005). According to Al-Mashari and Al-Mudimigh (2003), an ERP system is an information technology (IT) infrastructure that facilitates the flow of information within the organization, with suppliers, and with other members of the supply chain. Davenport, Harris, and Cantrell (2004) and Laframboise and Reyes (2005) indicated that ERP combines business processes in both the organization and IT into one integrated solution and is a way of doing business, not merely a software package.

An ERP system contributes to technical areas such as standardization, transparency, and globalization (Akkermans, Bogerd, Yucesan, & van Wassenhove (2003); Kuei, 2002) and assists enterprises in automating and integrating corporate cross-functions. Pereira (1999) indicated that a well-managed ERP could be determinant of strategic competitive advantage.

2.2. ERP implementation

ERP is a process of innovation that enhances data processing, distribution, and service standards via the employment of new methods, hardware, software, and human resources. An ERP system, implemented across an organization, affects almost all the business processes of that organization. As the ERP system spans across functional boundaries, it is closely connected to organizational processes. From a technology perspective, it is integrated with the existing corporate computer software and hardware, thus incurring substantial software and hardware expenses during implementation. ERP implementation costs can be substantial. Florida's Palm Beach County School paid US$ 25 million to install a PeopleSoft ERP platform, according to Computerworld (Careless, 2007). An IT benchmark study notes a 35% increase in average IT cost to support end users, a 40% increase to support human resources, and a 16% increase in HR administration costs (Holland & Skarke, 2001). In a case study of the UK subsidiary of a major U.S. manufacturing company with a turnover of £50 million, more than £3 million was spent on initial implementation, and there was an ongoing support and maintenance cost of £1.8 million (Baker, 2003). Consequently, a detailed analysis of ERP implementation costs and strategic objectives of a business should be carefully considered before undertaking such a project (Babey, 2006).

Literature indicates that factors affecting the implementation of ERP systems in large organizations do not necessarily apply to small

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