ERP Adoption in Indian Organizations

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INTRODUCTION

Enterprise resource planning (ERP) systems integrate various functions and processes in organizations. ERP software is developed in the form of different modules, each of which helps to perform distinct functions within the company. The modules interface with the same database and are integrated so that workflows can be designed across different modules. The software helps standardize business processes and ensures organization-wide availability of transaction data. ERP software evolved from earlier manufacturing resource planning (MRP) systems, which included inventory management, procurement and production planning functions. The implementation of ERP software started in the early 1990s and during the late 1990s, the growth rate of the ERP market was between 30 to 40%. As of 2001, 30,000 companies around the world had implemented ERP and the total value of the ERP market was at $25 billion. There is not much literature relating to ERP implementation and adoption in companies in Asia and other parts of the developing world. These organizations face issues that are significantly different from those faced by organizations in the developed world, because of differences in the sophistication of IT use, and in the cultural and social contexts. In this article, we describe some experiences that companies in India have gone through in implementing ERP systems. We present a framework for analyzing the critical factors and issues that influence the ERP adoption process, and highlight the areas of opportunity and risk. The framework is sufficiently general so as to be extended to other developing countries.

BACKGROUND

The implementation of ERP software is quite different from traditional software development. ERP software is a single program that is bought off the shelf and then configured to include the specific characteristics of processes of individual companies. Parts of the software have to be customized such that they can correctly represent the workflow and processes of the particular company. This is a complex process, requiring many activities to be carried out. Most studies have described the implementation process in terms of stages.

Ross and Vitale (2000) suggest that ERP implementation is done in five stages. The *design* phase deals with planning and standardization, where an organization chooses the specific package and decides on the extent of customization required. In the *implementation* stage, the software is implemented and goes live. In the *stabilization* phase, the firm adjusts to the new system and integrates it into its existing operations by identifying and smoothing out integration hiccups. The *continuous improvement* stage is marked by additions to the existing functionality of the ERP package through add-ons from other vendors. Organizations typically implement data warehousing, data mining, customer relationship management (CRM) and supply chain management (SCM) software to augment the transaction-based capabilities of the ERP software. In the *transformation* stage, the organization starts to see the benefits of the ERP system, in terms of more efficient processes and possibly better information exchange with partners, leading to flexibility and responsiveness.

Rajagopal (2002) proposes a six-stage model. In the *initiation* stage, organizations study possible business benefits, such as IT infrastructure integration and business process re-engineering, which might make ERP adoption necessary. The *adoption* stage consists of activities such as investment decisions and cost-benefit analysis related to choice of the package and the vendor. In the *adaptation* stage, the system is implemented and becomes available for use. In the *acceptance* stage, users become more comfortable with using the ERP system, their requirements are incorporated, and the overall benefits of the system become apparent. In the *routinization* stage, system integration is realized, users fully accept the system and its use becomes a routine activity. Finally, during the *infusion* stage, the organization looks to the next level of benefits that might be available. The organization moves beyond "just" using the system—it uses the available information to enhance the performance of different functions.

In the model proposed by Markus and Tannis (1999), the *chartering* stage comprises review and selection of the package and consultants, and clarifying the business related factors that make ERP a necessity. The *project* stage describes different aspects of the implementation process and consists of project management, software customization and process re-engineering. During the

shakeout, managers familiarize themselves with the software. System bugs are reported and fixed and the operational effects on the business are felt. Finally in the *upward and onward* phase, strategic business benefits from ERP occur, additional technical skills are built and upgrades are planned for.

ERP implementation results in significant changes in the IS architecture, redesign of process, increased managerial competence and comfort with new technology and a greater role for IT in critical processes (Scott et al., 2000). A number of factors influence the ERP adoption process. First, strong leadership support is important for ensuring the availability of resources and manpower, and for signaling to the employees the importance of the software (Baskerville et al., 2000; Bingi et al., 1999; Markus, 1999; Parr et al., 1999; Sarkar et al., 2000). Second, open and honest communication about the ERP initiative results in greater understanding of organizational needs and hence quicker acceptance of the software (Davenport, 1998; Holland et al., 1999; Mendel, 1999). It also helps employees understand the rationale for ERP implementation and enables them to appreciate problems in existing systems. A third influencing factor is the skill and competencies of the implementation team. Implementation teams that are technically strong, empowered to make decisions, politically close to important people in the organization and have a good understanding of end-user needs, enable organizations to minimize implementation difficulties and time and cost overruns (Askenas et al., 2000; Baskerville et al., 2000; Ferranti, 1998).

THE ADOPTION OF ERP SOFTWARE IN INDIA: A PROCESS MODEL

Issues and Problems

The first ERP systems were adopted in India in the mid 1990s and the Indian ERP market grew at an average rate of 70% over the years 1995 to 20011. As of 2001, about 800 companies had implemented ERP software2. The study of ERP implementation experiences in Indian companies is an interesting case of new technology adoption because many Indian companies go from very rudimentary IT-based systems to sophisticated ERP systems in one quantum jump (Sharma, 2001). We studied the ERP adoption processes of 25 companies from 10 different industries in the manufacturing and service sectors, which had implemented ERP software, to understand the factors that characterize the ERP adoption process in Indian companies. This article presents the findings in the form of an overarching framework that describes different aspects of the ERP implementation process of companies in India.

A Framework for Analyzing the Adoption of ERP in Indian Organizations

The ERP implementation process in Indian companies can be modeled as a *phase-stage* process framework, as shown in Figure 1. Each cycle in the spiral represents a single phase of implementation, in which a given number of modules are implemented. The innermost cycle represents the first phase and subsequent phases are introduced as more modules are implemented. The number of cycles or phases that are required depends on the characteristics of the individual organization, like annual turnover, size, complexity of organizational processes and IT readiness. Each phase has three stages and the activities carried out within a stage are shown alongside the section representing the stage.

The *planning stage* consists of activities before the ERP software is implemented. These include drawing up a business case and providing justification for the implementation of ERP, such as improvement of critical operational parameters. They also involve making decisions about whether to re-engineer processes using the *"best practices"* feature of the software or to customize the software to existing needs and processes. Planning activities revolve around the functioning of the IS department. In many cases, the IS function is not considered a very important one, prior to the implementation of the ERP software. Since ERP systems have great reach and are technically very complex software, it is essential to change the status of the IS function. Related planning activities therefore include giving greater powers to existing IS functional heads or instituting new CIO positions, which are powerful and visible, and can take charge of the implementation process. IS professionals trained in both technology and business are recruited. On the technology front, anticipated changes involve migration of data from legacy systems into an integrated platform, integration of existing application programs into the ERP system, and connection of separate servers and terminals into a single networked configuration. There is also an accompanying need for training and technical skill acquisition for maintaining the new systems. External consultants are recruited in order to help with software configuration, customization and expertise transfer. Since the ERP project is usually much larger than any previous IS project in terms of the scale of resource commitment, range of operations affected, and the number of people involved, the risk of failure is perceived to be high. Therefore it is essential to plan ahead for extra resource allocation and increases in IT budget, in case of unforeseen problems during implementation.

The *implementation* stage deals with issues that are required to be addressed once the implementation pro-

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