Organizations and ERP Systems: Conceptualizing Fit

ERP Track

Abstract: The high failure rates and mixed results of Enterprise Resource Planning (ERP) projects necessitate investigations that enhance our understanding of the issues involved in implementing these complex systems. The prospect of identifying and concentrating on a small number of important priorities is essential throughout the implementation of ERP systems. We explore the conceptual applicability of Critical Success Factor (CSF) analysis and present a model that "conceptualizes the fit" of ERP in organizations by integrating organizational characteristics and CSFs to ensure the desired the value of enterprise systems. Appropriate propositions are drawn and implications for practice, research and theory are identified.

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Introduction

The speed with which organizations have embraced and implemented Enterprise Resource Planning (ERP) systems over the past few years has been phenomenal. Designed to solve the problem of fragmentation of information in large organizations and promising the seamless integration of all the information flowing through a company (Davenport, 1998a), benefits of a properly selected and implemented ERP system can be significant. However, difficulties to realize the promised benefits have plagued many ERP implementations and many are "pulling the plug" even after investing millions of dollars (Bailey, 1999).

Apart from being profoundly complex pieces of software requiring large investments of money, time, and expertise (Davenport, 1998b) ERP systems differ from custom development in three ways: (1) the user may have to make changes to business processes and procedures, or (2), the user may need to introduce customizations, and (3) the user becomes dependent on the vendor for assistance and updates (Lucas, Walton, and Ginzberg, 1988). While system settings may be modified to more closely fit the customer's organizational structure, business practices and workflow (Chalmers, 1999) a study of SAP R/3 found that most customers find that at least 20% of their need functionality is missing from the package (Scott and Kaindl, 2000). In the midmarkets, few vendors seem to have packaged the right combination of technology, functionality, and services to provide the appropriate level of value and comfort (Hill, 1999). In the international context, Soh, Kien, and Tay-Yap (2000) identified three types of misfits (data, functional, and output) and proposed a spectrum of misfit resolution strategies which trade off between the amount of organizational change and the amount of package customization required. We therefore believe that central to achieving the promised benefits of enterprise systems is the concept of fit or alignment between the technology and the organization which is well established in the strategy and IT literatures (e.g., Henderson and Venkatraman, 1993; Luftman, 1996). Specifically, it is assumed that lack of fit results in diminished performance benefits (Burn and Szeto, 2000).

An old fable of *The Blind Men and the Elephant* by John Godfrey Saxe tells about seven blind men who examine an elephant. One touches the trunk, the other his ear, the third his legs, and so forth. Each of them incapable of seeing the whole comes up with a completely different description. The elephant is variously a wall, a spear, a snake, a tree, a fan or a rope depending on which feature of the animal each man seizes. The notion of ERP fit is like the elephant in the fable, a complex, multivariate phenomenon, whose parts we need to understand to comprehend the whole but which we cannot simply arrive at by adding its parts. This paper conceptualizes our vision of ERP fit and seeks to extract key dimensions and issues that are relevant to research and practice and that help us comprehend the whole.

Aligning ERP with Strategy: Business Driven Implementation

The need for alignment between IT applications and strategy is well established in the literature. In the manufacturing sector which has extensive investments in information technologies an IT application should be aligned with a company's manufacturing strategy in terms of competitive priorities and process structure. (Kathuria, Anandarajan, and Igbaria, 1999; Kathuria and Igbaria, 1997). Kotha and Swamidass (2000) found that a fit between certain dimensions of strategy and advanced manufacturing technology was associated with superior performance. ERP projects should thus demonstrate a clear link to organization strategy and be business rather than technology driven to ensure they achieve their desired impact.

Careful Selection of the Appropriate Package

Choosing the right ERP software that best matches the organizational information needs and processes is critical to ensure minimal modification and successful implementation and use (Janson and Subramanian, 1996). Selecting the wrong software may mean a commitment to an architecture and applications that do not fit the organization's strategic goals (Robinson and Dilts, 1999) or business processes. Interestingly though, the ERP selection process often lacks a structured process with companies evaluating a limited set of criteria (Hecht, 1999).

Project Organization

Project Management

While many in the IS business consider project management an oxymoron, its importance in IT projects is well–documented, and numerous methodologies and management tools exist. The contingency approach to project management suggests that project planning and control is a function of the project's characteristics such as project size, experience with the technology, and project structure, and several other variables (Applegate et al., 1999). The vast combination of hardware and software and the myriad of organizational, human and political issues make many ERP projects huge and inherently complex, requiring new project management skills (Ryan, 1999).

Steering Committee

A project management structure with a "steering committee", consisting of senior management from across different corporate functions, senior project management representatives, and end users who will have daily contact with ERP, is an effective means of ensuring appropriate involvement (Slater, 1998; Chimni, 2000) and make ERP succeed (Sumner, 1999). The steering committee is usually involved in system selection and monitoring during implementation, and management of the outside consultants. This is critical to the successful implementation of an ERP system (Bingi, Sharma and Godla, 1999)

Use of Consultants

Many organizations use consultants to facilitate the implementation process. Consultants may have specific experience in specific industries, comprehensive knowledge about certain modules, and may be better able to determine which suite will work best for a given company (Piturro, 1999). Performance ratings for consultants have been mixed (Cooke and Peterson, 1998). Major concerns stem from financial ties to the recommended software vendor, lack of expertise and experience in ERP appropriate to the business, and inability of consultants to transfer knowledge to internal employees (Piturro, 1999). The adoption of a vendor-only approach may be more effective than the vendor-consultant approach due to greater communication and coordination costs in the three-way network (Thong, Yap, and Raman, 1994).

Organizational Adaptation

Business Process Re-engineering

One of the problems associated with implementing any packaged software is the incompatibility of features with the organization's information needs and business processes (Janson and Subramanian, 1996; Lucas, Walton, and Ginzberg, 1988). ERP implementations frequently

require companies to adapt the organization to the package through extensive business process reengineering. In order to maximize the benefits of ERP investments, the supplementary redesign of business processes promises the highest ROI, but also increases the level of complexity, risks and costs (Kirchmer, 1998).

Change Management Processes

It is estimated that half of ERP implementations fail to achieve expected benefits because companies "significantly underestimate the efforts involved in change management" (Appleton, 1997). Research has shown that effective change management is critical to successful implementations of technology and business process reengineering (Benjamin and Levinson, 1993; Grover et al., 1995). IT-enabled transformation is not a magic bullet but requires a comprehensive approach toward the large-scale process and system changes associated with ERP implementations where change becomes everyone's first priority (Markus and Benjamin, 1997).

User Training

The role of training to facilitate software implementation is well documented in the MIS literature (Nelson and Cheney, 1987; Santhanam and Sein, 1994). Problem ERP implementations and implementation failures have been attributed to lack of user training and failure to completely understand how enterprise applications change business processes (Crowley, 1999, Wilder and Davis, 1998). User training should account for 15 to 20 percent of the implementation budget, and everyone who uses ERP systems should receive training in terms of how they work and how they relate to the business process, and (Marion, 1999; Slater, 1998). Knowledge transfer from the consultant to internal employees is critical (Davenport, 1998b).

Package Adaptation

Proper Configuration of Package

Many ERP systems can be configured to more closely fit the customer's organizational structure, business practices and workflow (Chalmers, 1999). This fine-tuning of the standard system which represents a key process in the implementation of the system (Bancroft, Seip, and Sprengel, 1998) involves accurately translating business needs into appropriate parameter settings to improve productivity and minimize custom modification. While a large number of adaptations are possible, configuring the system involves making compromises and has its limits (Bancroft et. al., 1998, Davenport, 1998b).

Custom Modifications

When options allowed by the system are not sufficient, the enterprise system's code can be modified or rewritten. Because customizations are usually associated with increased information systems costs, longer implementation time, the inability to benefit from vendor software maintenance and upgrades (Janson and Subramanian, 1996) and communication problems with vendor and supplier systems (Davenport, 1998b), customization should only be requested when essential or when the competitive advantage can be clearly demonstrated (Escalle and Cotteleer, 1999).

Interorganizational Collaboration

A substantial support capability is necessary to oversee long-term ERP change. Consequently, the relationship between the software buyer and vendor should be strategic in nature, with the ERP provider enhancing an organization's competitiveness and efficiency (Travis, 1999; Butler, 1999). While large clients may encourage or even demand a software vendor to incorporate modifications into future software releases (Escalle and Cotteleer, 1999), Scott and Kaindl, (2000) found close interorganizational collaboration between the customer and the vendor to be critical for achieving desired package software functionality enhancements.

A Model of ERP Fit

Figure 1 summarizes the major elements of our ERP alignment model which suggests a variety of integration mechanism that are appropriate for bringing about internal consistencies between the technology and the organization's strategy, structure, processes, and people.

See Figure 1

First, ERP projects like any other project should be business, not technology-driven and have a clear link to the organization's strategy. Implementing an ERP system is a careful exercise in strategic thinking, precision planning, and negotiations with departments and divisions (Bingi, Sharma and Godla, 1999) that requires careful selection and the appropriate project management structure and methods. ERP projects frequently require companies to adapt the organization to the package and implement extensive business process reengineering which in turn necessitates appropriate change management processes. Organizational adaptation also involves extensive user training, which is a critical and often neglected factor in ERP implementations. At the same time, proper configurations of the package as well as customizations are adaptations of the technology side that effect the fit between the organization and the ERP package. Based on our discussion, we stipulate a configuration model of ERP fit and propose:

Proposition 1: There are multiple, equally effective ways in which an organization can achieve ERP fit.
Proposition 2: The configuration of integration mechanisms will vary from company to company and are contingent on the contextual factors facing the organization.
Proposition 3: ERP fit provides increased capabilities for financial, growth, and operational performance benefits.

Conclusions and Directions for Future Research

The purpose of our paper was to conceptualize the fit between enterprise systems and organization through a broad variety of integration mechanisms. Our configurational model of fit allows for a number of profiles used to describe enterprise implementations. We believe that this model can be used to guide future research and propose the following research questions adapted from Sambamurthy and Zmud (2000):

- What are the most common configurations of integration mechanisms?
- What contingencies are likely to influence the effectiveness of theses configurations of integration mechanisms?
- What criteria are most important in assessing the effectiveness of alternative integration mechanisms?

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Figure 1. A Conceptual Model of ERP Fit.

System Success and Performance