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Financial impacts of enterprise resource planning implementations

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Abstract

Debate exists regarding the contribution of information technology to firm performance reflecting predictions of a positive, negative, or nonexistent relationship. Prior research has examined technology and firm performance in the aggregate, however, this study focuses on a specific technology — Enterprise Resource Planning (ERP) and its impact on firm performance. Economic and industrial organization theories provide the basis for the examination of how ERP systems affect firm coordination and transaction costs. ERP systems are expected to: (1) reduce costs by improving efficiencies through computerization; and (2) enhance decision-making by providing accurate and timely enterprise-wide information. These effects should be associated with improved firm performance. This research finds, after accounting for within-firm variances, no significant improvement associated with residual income or the ratio of selling, general, and administrative expenses in each of the 3 years following the implementation of the ERP system. However, a significant improvement in firm performance resulting from a decrease in the ratio of cost of goods sold to revenues was found 3 years after the ERP system implementation (but not in the first or second year after implementation). Further, there was a significant reduction in the ratio of employees to revenues for each of the 3 years examined following the ERP implementation. © 2001 Elsevier Science Inc. All rights reserved.

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1. Introduction

According to a 1999 survey of large multinational companies conducted by META Group, the average cost to implement and own an Enterprise Resource Planning (ERP) system is US\$15 million per year and the time to deploy it has averaged 23 months (Knorr, 1999). Analysts reported that 70% of Fortune 1000 firms had or were in the process of installing ERP systems in 1998 (Hoffman, 1998), and that the ERP market experienced a compound annual growth rate of 35% in 1998 (Shepherd, 1998). Given this significant investment in ERP systems, the economic issue of whether ERP technology is associated with improved firm performance remains unanswered. This question is empirically addressed using archival financial data of Compustat firms that implemented ERP systems.

1.1. Description of ERP

Most ERP software available on the market (i.e., from vendors like J.D. Edwards, Baan, Oracle, PeopleSoft, and SAP) is structured into different modules. Typical modules include accounting, human resources, manufacturing, and logistics. Each module is business process-specific, accesses a core/shared database, and can be considered a single application from both a user interface and software structure point of view. This structure enables users to develop module-specific competencies and vendors to swiftly modify software structure with new release updates (Rizzi and Zamboni, 1999). One of the major features of ERP software is the integration between modules, data storing/retrieving processes, and management and analysis functionalities (Davenport, 1998; Hoffman, 1998). ERP provides the same functionalities of previous stand-alone systems while allowing access to enterprise-wide information by employees throughout the entire company on a controlled basis.

1.2. Reasons firms adopt ERP

Many firms that implement ERP systems strive to reduce redundancy and inconsistency in data through the creation and maintenance of a central database of corporate information. Errors are reduced and employees have access to current information for decision-making. Data reentry errors and omissions from one business process to the next are eliminated (Rizzi and Zamboni, 1999; Latamore, 2000). The ERP architecture also facilitates integration across different applications (i.e., information sharing across business processes) supporting concurrent and automatic updates, without the need for manual intervention. This reduces labor costs, bureaucracy, and errors (Latamore, 2000). Given these features of ERP, firms implementing ERP systems should experience an overall reduction in cost and a general improvement in decision-making activities.

Anecdotal evidence also suggests that firms expect ERP systems to deliver improved firm performance. Specifically, firms expect ERP systems to result in (Brown, 1997;

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