



Post-implementation practices of ERP systems and their relationship to financial performance



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ABSTRACT

Using econometric analysis, this study provides empirical evidence to support a cause-and-effect relationship of managerial actions to financial performance in a post-ERP implementation stage. Senior information systems managers reveal the state of affairs, providing a snapshot reference during that time period. Financial figures were collected for firms who were matched to our survey instrument. Regression analysis establishes that increased technological competence affects net sales, relationships with outside experts affect earnings, return-on-assets and return-on-investment, top management support affects net sales and net income, long-range planning negatively affects earnings, and the sharing of information between departments affects net income, return-on-assets and return-on-investments.

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1. Introduction

A company implements an information system with the expectation that it will produce financial benefits and that these benefits can be maximized using proper managerial techniques. The accountability of investments in information systems is a frequent subject of study. Answers to the question of the return-on-investment in information technologies have created controversy because of the varied definitions of firm performance. One category of operationalization of firm performance, and the one used in this study, is defined in financial terms, thereby emphasizing the central question of whether the information system has improved profits and financial ratios. Because achieving success using Enterprise Resource Planning Software (ERP) is difficult, studies on ERP abound in various fields, ranging from the technological, operational, and strategic to accounting fields. However, there is a clear lack of empirical evidence of the cause-and-effect relationship between managerial practices that lead to the success of ERP systems and the financial returns of such systems [59]. This study contributes to the literature by providing empirical support for such relationships in a timeframe that encompasses a post ERP-implementation stage. This study considers the time necessary to exploit and receive financial

returns following an ERP implementation project. There is a great need for continued improvement and assessment as ERP use evolves over time, and one of the most important issues in measuring ERP success is exactly when one measures it [36]. Hence, firms that adopt ERP systems must be concerned with success, not just at the point of adoption but also in post-implementation.

ERP systems require a great degree of coordination and complex technological infrastructure within a firm. While Top Fortune 500 businesses and multinational organizations initially adopted ERP, small- to medium-sized businesses (SMBs) around the world are now implementing this software. ERP, as the name implies, is an integrated system that meets the information needs of an entire enterprise. "Enterprise Systems" is a term used to describe systems that integrate data from different departments into one system and one database. They allow seamless integration of information flows and business processes and support information sharing for operational efficiency [33]. ERP systems have transformed organizational processes by streamlining planning with up-to-date data that are integrated across departmental lines that include production information and customer input [5]. Notwithstanding the sizable amount of ERP literature from an array of different perspectives, the level of understanding of how and why some companies succeed and some fail in their implementation of ERP is inadequate [49].

Studies indicate that ERP implementation is viewed as a project, which, by definition, has a beginning and ending date. Implementing an ERP system usually takes a little over one year

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[29]. Once implemented or live, the ERP project does not end. Rather, it continues indefinitely. Thus, research into post-implementation success is relevant. The belief that an ERP project is complete when the system goes live is common but misleading [49].

Few studies combine financial performance measures with managerial and organizational measures. Mithas et al. [38] developed and tested a theoretical model that measured the influence of the information management capability on financial results using the following financial metrics: revenue, profits, market position, cash-to-cash cycle time, and earnings per share in firms that had installed various enterprise systems, including ERP. The authors found a significant link between information management capability and financial results that was moderated by three management capabilities: performance management, process management, and customer management. However, other research has identified contradictory effects from ERP implementations. Furthermore, ERP systems have garnered many complaints because they demand organizational discipline and strict adherence to standardized processes. In general, information technology (IT) can come to be viewed by business leaders as either a liability or an asset [21]. Management that has experienced difficulty in establishing profitable IT strategies and is disappointed with the company's IT tends to perceive IT as a liability and may undervalue its importance to organizational growth. Alternatively, management that perceives IT as an asset tends to consider IT necessary to the organization's success and as a mechanism for transformation [21].

This study provides empirical evidence of the predictability of the financial performance of companies that exercise certain managerial actions recommended in the literature as key determinants for the successful implementation of ERP software. Our study focuses on the following constructs identified in the IS literature as predictors of ERP success: technological competence, relationships with outside experts or consultants, top management support, long-term planning and objectives, strategic direction, and the sharing of knowledge.

This paper proceeds as follows. Section 2 provides a literature review and synopsis of ERP performance measures and the factors that may lead to ERP success. This review serves as the basis for the research hypotheses in this study. Section 3 presents the research methodology used to test the hypotheses and includes a description of the financial ratios used as dependent variables for the five regression equations used in this study. Section 4 analyzes the data and offers the results, and Section 5 discusses those results. A final section concludes the paper.

2. Literature review

2.1. Performance expectations

There are various performance expectations of the software that can be categorized into dimensions that follow the management pyramid categories: operational, tactical or managerial, and strategic benefits. These expectations are explained in detail so that a picture begins to form as to why ERP projects are purchased and implemented in organizations. The operational benefits of ERP software include efficiency measures of reduced turn-cycles in the elaboration of reports, swiftness in data sharing, and improvements in data quality due to reduced redundancies [45]. ERP is tied to cost cutting performances that lead to improved supply-chain efficiency, faster financial reporting, more visible data and a higher capacity for producing high-quality analytics and a process-centered mentality [45]. Additionally, ERP is noted for other efficiencies, such as reduced inventory, decreased labor costs, and faster financial closings. Managerial

outcomes are derived from the improved decision making of managers, who can access comprehensive, up-to-date reporting mechanisms and drill down capabilities using ERP [49]. Managerial expectations include better resource management and better performance control [49]. In terms of the strategic dimension, the primary expectations of ERP software are that it support business growth through information sharing with suppliers, customers and other business alliances, reduce costs under a cost-leadership strategy or promote differentiation and increased sales through customer relationship modules and e-commerce capabilities. Qu et al. [44] suggest that an organization's long-term plans and decisions should be driven by the company's internal and industry dynamics that affect their strategic policies and implementation. A properly implemented ERP supports the strategic plan of an organization by optimizing its business processes and creating competitive advantages [1,9].

Frequently, we find that there is a distinction between the financial and non-financial benefits of ERP. Financial benefits are defined as those that have the ability to achieve profits, whereas non-financial benefits are intangible, such as customer satisfaction, product quality, and user satisfaction. Seddon et al. [47] developed a model outlining key organizational benefits in enterprise systems in both short-term and long-term timeframes in which they list integration, process-optimization, and improved access to information as key long-term benefits. Integration refers to the merging of information systems or making processes transparent and unifying data from multiple sources. Process-optimization has a strategic impact and is defined as an attempt to improve the efficiency and effectiveness of a process [47]. The third benefit, improved access to information, can be described as providing timely, accurate, and relevant information to decision makers [47].

2.2. ERP costs

The benefits of an ERP system are vast and enticing for CIOs. However, how well these benefits translate into financial gains for a company is controversial. ERP systems are costly, complicated, and require extensive planning to be successfully implemented, used, and exploited [4]. The expenditures associated with an ERP system include the purchase of software, hardware, network investments, and consulting fees [4]. Post-implementation adjustments are common. Although the costs differ for each company, the bigger the company and the more integrated the ERP system, the larger the expense [4]. In 2010, the mean ERP implementation cost was \$5.48 million, and the average implementation timeframe was 14.3 months [29]. With so much time, money and human resources that must be invested, ERP projects pose significant business risks for organizations [24].

In project management terms, a successful project is defined as one that has a positive impact on the organization, is completed on time, and remains within the allotted budget [6,25]. It is surprising to find that many ERP investments are unsuccessful. Muscatello and Parente [39] believe ERP failure rates can be as high as fifty percent [6]. Only thirty-four percent of IT projects initiated by Fortune 500 businesses prove to be successful, and ERP implementation projects appear to have the same failure rate [6,40]. Fox-Meyer Drug, Mobile Europe, Dell and Applied Materials had unsuccessful and discarded ERP projects [6,13]. Other unsuccessful ERP ventures were recorded by Whirlpool, Hershey, Waste-Management, Inc. and W.L. Gore & Associates [6,54]. Brown and Vessey [7] explained that ERP project failure can ruin the entire business. Nelson [40] detailed how Nike's ERP implementation in 2000 created a major inventory problem that cost the company \$100 million in profits. Bradley [6] concluded that ERP projects are very risky. Due to their comparatively high

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