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Organizational performance effects of ERP systems usage: The impact of post-implementation changes☆

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Abstract

This paper examines the long-term financial performance effects of ERP system changes/revisions for firms that have previously reported ERP adoptions. The study is motivated by the mixed results of recent studies examining the financial effects of ERP systems and by studies which demonstrate that ERP implementations are modular in nature and thus may yield organizational performance gains or losses as a result of discrete changes that might be initiated after the initial system implementation. This study empirically examines the extent to which discrete changes to ERP systems over a post-implementation time-frame impact on firms' ability to deliver long-run financial performance. It further examines whether the timing and nature of system transformation during the post-implementation period presents a significant moderating condition of ERP performance outcomes. We specifically consider the ERP-adopting firms previously examined by Nicolaou [Nicolaou, A.I. 2004a. Firm performance effects in relation to the implementation and use of enterprise resource planning systems. *Journal of Information Systems 18* (Fall): 79–105] and track them for changes/revisions in the form of enhancements, upgrades, abandonments and switches during the post-implementation period. Two research hypotheses are developed in the study which posit that both the nature and the timing of system implementation changes represent significant conditions for ERP post-implementation success.

From the original sample of 247 firms used in Nicolaou [Nicolaou, A.I. 2004a. Firm performance effects in relation to the implementation and use of enterprise resource planning systems. *Journal of Information Systems 18* (Fall): 79–105], a total of 83 firms were identified to report 182 discrete changes during their ERP system post-implementation period. The results suggest that, in general, subsequent changes in ERP systems often help resolve or surface implementation issues that affect subsequent use of and success from the use of such systems. Specific findings indicate that ERP-adopting firms, which initiate early

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enhancements in the form of either add-ons or upgrades, may enjoy superior differential financial performance in comparison to other ERP-adopting firms' differential performance. Late enhancements and both early and late abandonments lead to apparent differential performance deterioration for the ERP-adopting firms. These findings support the theoretical propositions developed in the study The study's findings provide an important contribution to the ERP systems success literature and present important insights for future research in this area.

Keywords: ERPS post-implementation; Financial performance; ERPS change events

1. Introduction

This paper examines the long-term financial performance effects of ERP revisions (enhancements, upgrades, abandonments and switches) for firms that have previously reported ERP adoptions. The study is motivated by the mixed results of recent studies examining the financial effects of ERP systems.

Prior studies such as Hunton et al. (2003) found that while ERP adopters demonstrated no change in their post-ERP financial performance, the financial performance of non-adopters deteriorated during the post-implementation period. Poston and Grabski (2000, 2001), on the other hand, reported mixed and somewhat contrarian differences between ERP adopters and non-adopters on a number of financial performance measures. While ERP-adopting firms did no better than their counterparts on some measures, the non-adopting firms actually improved their performance on others.

In a long-term examination of differences between ERP adopters and non-adopters, Nicolaou (2004a) reported that a lag of at least 2 years was necessary before adopters would begin to demonstrate positive differential financial performance in comparison to their non-adopting peers. While the time lag may partly explain the results obtained by Poston and Grabski (2000, 2001), a number of conditions were also found to moderate the degree to which use of ERP systems would result in positive differential returns for adopting organizations.

In this paper we examine the change/revision condition as a moderating factor to ERP systems success. We posit that the complexity and scope of ERP systems is such that the implementation process typically does not end when the system goes live. In fact, the implementation of ERP systems is considered a strategic investment decision (Cooke and Peterson, 1998; Wah, 2000) with benefits expected to accrue over several periods of time as opposed to one-time windfall gains (Nicolaou 2004a,b; Shang and Seddon, 2000). Additionally, ERP implementations are often modular in nature and thus may yield productivity gains or losses as a result of discrete changes that might be initiated after the initial system implementation (Holland and Light, 2001; Markus et al., 2000; O'Leary, 2000).

Past research overwhelmingly reports that the immediate after-effects of ERP implementations are fraught with productivity and profitability problems (Davenport, 1998; Poston and Grabski, 2000, 2001; Hitt et al., 2002; Hunton et al., 2003; Nicolaou, 2004a,b). These are thought to be due to possibly severe systems integration problems, misalignment between people, processes and technology, and overall change management issues during and shortly after the implementation process (Nicolaou, 2004a; Murray and Coffin, 2001; Peterson et al., 2001; Ross and Vitale, 2000; Scott and Vessey, 2000; Soh et al., 2000; Stephanou, 2000). Similar productivity paradoxes between IT investment and firm performance have also been recorded with other IT implementations (Bhattacharya et al., 1997; Barua et al., 1995; Brynjolfsson, 1993; Weill,