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ERP Systems Benefit Realization and the Role of ERP-Enabled Application Integration

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INTRODUCTION

One of the key challenges facing businesses after ERP systems implementation is discerning how to realize pre-implementation benefits. ERP systems are complex software solutions that integrate information and business processes within and across functional areas of business (Davenport, 2000). These systems represent a major departure from the legacy systems and functional information systems that were widespread in the past. Some organizations have successfully implemented and benefited from their ERP system deployments (Nwankpa & Roumani, 2014) and have indeed achieved operational efficiencies and other far-reaching positive changes (Jones et al., 2008), while other organizations are left to grapple with ways to translate pre-implementation expectations into actual post-implementation benefits (Gattiker & Goodhue, 2005). Despite a large body of ERP research literature from a number of different perspectives most published research continues to struggle to adequately explain these mixed results in post-implementation outcomes and benefits (Markus et al., 2000; Nwankpa et al., 2013). As organizations continue to invest in ERP systems, the overarching question for management becomes how they can optimally realize the potential benefits from their ERP system.

ERP systems as platform technologies provide not only a common business process within the organization but also create an integrated platform that permits the adoption and integration of third party non-ERP applications (Liu et al., 2013; Nwankpa et al., 2013). Thus, organizations with ERP systems can leverage on this information superiority and integrate additional non-ERP applications such as e-commerce applications, customer relationship management (CRM) systems and supply chain planning systems. This level of integration enabled by an ERP system can extend functionalities such as connecting a website to an ERP system as well as advancing information visibility across an organization's value chain (Nwankpa et al., 2013). For instance, integrating CRM and ERP applications can improve operational efficiencies by enabling value-chain processes to adjust promptly to each other (Liu et al., 2013). Firms with CRM applications and ERP systems are able to leverage the CRM applications' ability to extract customer information from multiple customer touch points as well as ERP systems ability to configure product offerings, scheduling, order fulfilment and interdepartmental information exchange (Liu et al., 2013). Given the critical role ERP-enabled third party application integration, studies on ERP benefits that combine ERP-enabled application integration are needed to develop a better grounded theoretical understanding and devise more effective ERP benefit realization practices.

To this end, this study sets out to examine a central research question that has not been adequately investigated in the ERP benefit literature: (i) Is there a positive implication of ERP-enabled application integration on overall ERP benefit? And if yes, what are the antecedents of ERP-enabled application integration? This study at-

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tempts to answer this question by conceptually and empirically testing an integrated research model that combines the framework of ERP-enabled application integration and overall ERP benefits with survey data collected from employees in a wide range of United States firms.

The rest of the article is arranged as follows. The next section reviews the extant research on existing ERP system factors, ERP-enabled integration and ERP benefits, and based on this review the study will develop research hypotheses and propose a theoretical model. Next, a description of the research design and data collection, as well as data analyses using structural equation modeling is presented. Next, a discussion and conclusions will be presented.

BACKGROUND

ERP System Benefit

Earlier studies on ERP benefits had mixed results. Poston and Grabski (1986) used archival data to examine a group of firms before and after ERP implementation and found no post-implementation general financial improvement. However, a subsequent study found that the financial performance of non-ERP adopters actually decreased over time when compared to those of ERP adopters that remain unchanged (Hunton et al., 2003). Mabert et al. (2000) examined ERP system benefits in US manufacturing firms and found that although ERP use was pervasive in the US manufacturing sector, the system did not lead to significant operating expense reduction. On the contrary, Shang and Seddon (2002) demonstrated that the implementation of ERP systems resulted in significant operational benefits. They developed five dimensions of ERP benefits namely, operational, managerial, strategic, IT infrastructure and organizational and concluded that ERP benefit realization was in fact a continuous process with specific benefits realized at different rates in different core processes and in different organizations. O'Leary (2004) identified tangible and intangible ERP benefits and argued that benefits vary across industries, especially intangible benefits. Gattiker and Goodhue (2005) examined ERP benefits by applying a two-phased model that delineated intermediate ERP benefits and overall ERP benefits. They operationalized and measured intermediate benefits as "task efficiency" and "coordination improvement". These benefits, they argue, will occur at the functional and operational levels within the firm but will contribute to the firm's overall ERP benefits (Gattiker & Goodhue, 2005) and concluded that realizing the intermediate benefits is critical to attaining the overall ERP benefits. Similarly, Chou and Chang (2008) decomposed these intermediate benefits in a bid to gain more insight and understanding and found that customization and organizational mechanisms are key drivers of intermediate ERP benefit while reaffirming the role of intermediate benefits as predictors of overall ERP benefit.

ERP-Enabled Application Integration

ERP-enabled application integration refers to the extent of real-time communication between an ERP system and another non-ERP application. Such integration enables an organization to increase the visibility of an ERP system by leveraging the functionalities of third party applications with the cross-functional information exchange and integration platform of an existing ERP system (Nwankpa et al., 2013). Application integration enables organizations to remain agile and responsive to their companies needs and keep pace with technological leaps and innovations. Through application integration, firms can extend and enhance functionalities, exchange information with a firm's existing ERP system and better increase visibility throughout the entire value chain (Rai et al., 2006). The extant literature has rendered some support for ERP-enabled application integration. For instance, firms adopting both an ERP system and a CRM application achieved significant improvement compared to firms adopting only an ERP system (Aral et al., 2006).