



What leads to *post*-implementation success of ERP? An empirical study of the Chinese retail industry

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ABSTRACT

Enterprise Resource Planning (ERP) systems have been implemented globally and their implementation has been extensively studied during the past decade. However, many organizations are still struggling to derive benefits from the implemented ERP systems. Therefore, ensuring *post*-implementation success has become the focus of the current ERP research. This study develops an integrative model to explain the *post*-implementation success of ERP, based on the Technology–Organization–Environment (TOE) theory. We posit that *ERP implementation quality* (the technological aspect) consisting of project management and system configuration, *organizational readiness* (the organizational aspect) consisting of leadership involvement and organizational fit, and *external support* (the environmental aspect) will positively affect the *post*-implementation success of ERP. An empirical test was conducted in the Chinese retail industry. The results show that both ERP implementation quality and organizational readiness significantly affect *post*-implementation success, whereas external support does not. The theoretical and practical implications of the findings are discussed.

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1. Introduction

Enterprise Resource Planning (ERP) systems have been increasingly adopted by organizations across various industries in both developed and developing countries. A recent survey has estimated the global market for the ERP to be US\$ 47.7 billion in 2011 (Jacobson, Shepherd, D'Aquila, & Carter, 2007). Nevertheless, numerous studies and reports have demonstrated that expected benefits cannot be easily derived from ERP systems at the *post*-implementation stage (Yu, 2005). The effective deployment of ERP systems to generate benefits has puzzled many organizations. However, few studies have systematically studied this issue. Therefore, the primary research problem to be addressed in this study is the *post*-implementation success of the ERP.

ERP systems, defined as “configurable information systems packages that integrate information and information-based processes within- and cross-functional areas in an organization” (Kumar & Hillegersberg, 2000, p.22), have acquired wide acceptance among numerous organizations across various industries (Huang & Palvia, 2001). Since an ERP system can support nearly all business functions and simultaneously provide a unified link between the components of an entire business (Ke & Wei, 2006),

it has been believed to produce great benefits for adopting organizations. These benefits include reduction of unit labor costs and inventory levels, enhancement of customer services and operations efficiency, and improvement of an organization's capability for panoptic control (Kayas, McLean, Hines, & Wright, 2008; Sia, Tang, Soh, & Boh, 2002). Although ERP systems were originally developed in the manufacturing sector, their aforementioned benefits have attracted other industries to adopt them as well. Retailing is such an industry. Retailers focus on maintaining customer's satisfaction and have to manage a growing variety of products. Accordingly they need a powerful information technology (IT) system such as ERP to help them in the competitive environment.

However, after implementing ERP systems, many organizations learned that the deployment of ERP systems was not as successful as expected (He, 2004; Sun, Yazdani, & Overend, 2005). Rather, a large portion of implemented ERP systems only fulfilled part of their effectiveness (Escalle, Cotteleer, & Austin, 1999). Even giant companies such as Boeing and Whirlpool have experienced this adverse situation (Boudette, 1999; Weston, 2001). Since an ERP system is an organization-wide information system (IS) with numerous modules, its deployment often involves extensive knowledge and resources within and outside an organization (Nah, Zuckweiler, & Lau, 2003). Dealing with these issues would put heavy demands on organizations. This is especially true for the retailers. Unlike manufacturers that use Material Requirement Planning (MRP) or Manufacturing Resource Planning (MRPII), which are the predeces-

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sors of the ERP, retailers lack the experience of deploying such an IS. Consequently, they would run into more difficulties in deploying the ERP system at the *post*-implementation stage and would like to know how to achieve *post*-implementation success.

Nonetheless, the *post*-implementation of ERP is an understudied research topic (Gattiker & Goodhue, 2005; Staehr, Shanks, & Seddon, 2002). The extant research mainly focuses on the implementation stage, especially investigating critical factors that lead to implementation success (Holland & Light, 1999; Nah et al., 2003; Umble, Haft, & Umble, 2003). Maximizing benefits and obtaining continuous improvement from implemented ERP systems have gradually emerged as a second wave of research on ERP (Shanks, Seddon, & Willcocks, 2003; Yu, 2005).

So far, only a few exploratory studies have been devoted to investigating the *post*-implementation success of ERP. However, the results of these studies are rather fragmented. They examined the *post*-implementation success from some isolated perspectives, such as the ERP delivery system, the ERP vendor, and the degree of organizational changes (Federici, 2009; King & Burgess, 2006), but none formed a synthesizing view of the *post*-implementation success of ERP. Therefore, the first research question is: *What is the underlying mechanism that governs the post-implementation success of ERP?*

To address this research question, we applied the TOE theory to investigate the *post*-implementation success of ERP. Since an ERP system serves as a business infrastructure once it is operational, its effective deployment is contingent not only on the implemented system itself but also on the organization and the business environment. Taking these characteristics of ERP deployment into consideration, we used the TOE theory as the theoretical grounding to identify a set of technology-, organization-, and environment-related factors that will affect *post*-implementation success.

Moreover, most extant studies on the *post*-implementation success of ERP were based on a case study approach; hence, a quantitative examination of the key factors affecting the *post*-implementation success is still lacking. Furthermore, these previous studies were mostly conducted in the manufacturing sector. Since retailers are service-oriented while manufacturers are production-oriented, the relative effects of the factors on the *post*-implementation success of ERP may differ across different industries. Thus, the second research question of this study is: *What are the relative impacts of the various factors that we identified on the post-implementation success of ERP in the retail industry?*

By addressing these two research questions, this study theoretically developed a comprehensive research mode that explains the *post*-implementation success of ERP, and we conducted a field survey in the Chinese retail industry to empirically test the research model.

The rest of this paper is organized as follows. Section 2 introduces the theoretical background and proposes the research model of the *post*-implementation success of ERP. Section 3 elaborates on this research model and develops the hypotheses to be tested. Section 4 describes the research methodology. Section 5 reports the results. Section 6 discusses the findings and presents the implications of these findings to both research and practice, the limitations of the study, and future research directions. Section 7 concludes this paper.

2. Theoretical background

This section briefly describes the application of ERP in the retail industry and then introduces the concept of the *post*-implementation success of ERP, followed by a review of the TOE theory.

2.1. ERP application in the retail industry

The ERP has enjoyed fast deployment in the retail industry. As the variety of products increases and the retailer size expands, it becomes a challenge for retailers to sell the right product to the right customers at the right time and price. The front- and back-ends as well as various functional departments of retailers have to be tightly connected to handle this tough situation. However, the individual-task-based IS is obsolete and cannot support the retailers' requirements (Ngare, 2007). Hence, many retailers have turned to powerful ERP systems. A descriptive survey of informatization in the Chinese retail industry shows that more than half of surveyed retailers, especially the ones applying chain operations, have adopted or plan to adopt ERP systems (Zhu, Li, Qian, Chen, & Chen, 2008). The ERP modules implemented by each retailer are different, but the distribution requirements planning (DRP) module was mostly adopted by retailers, for they emphasize the assortment and distribution of products. This module helps retailers better manage out-bound and in-bound logistics as well as inventories (Helms & Cengage, 2006; Martin, 1995). Although ERP proliferates in the retail industry, research on ERP in this new context is limited. Therefore, studies in this field can catch up with the practical developments of ERP and consequently provide some insights on the successful deployment of ERP systems.

2.2. Post-implementation success of ERP

An ERP system is assimilated into an organization through a sequence of stages, and this research focuses on the *post*-implementation stage of ERP. It typically starts from the normal operation of the ERP system and lasts until the system is replaced with a new one (Markus & Tanis, 2000). Thus, this stage is after the shakedown phase, in which the ERP system is tested before its normal operation is realized (Haekkinen & Hilmola, 2008). Only when the *post*-implementation of ERP succeeds can the entire ERP initiative be considered successful. Therefore, the focus of this research could be of great interest to organizations whose ERP systems have been implemented.

As the assimilation of an ERP system is a dynamic process with successive interim goals, the success of an ERP initiative should be differentiated and measured against the objectives of each stage (Markus & Tanis, 2000). For example, implementation success is measured by the ERP project cost within the budget and the project span within the time schedule (Yusuf, Gunasekaran, & Abthorpe, 2004). The *post*-implementation success of ERP is a complex concept described by several perspectives such as organizational performance and the financial return on investment in ERP (Ifinedo, 2006; Sedera & Gable, 2004). Among them, acquiring benefits from the deployed ERP systems epitomizes the *post*-implementation success of ERP (Al-Mashari, Al-Mudimigh, & Zairi, 2003). At the *post*-implementation stage, an organization conducts business through the ERP system, and naturally focuses on the benefit realization from the deployment of such a system.

An ERP system permeates an organization by deeply affecting a variety of processes, thereby manifesting the benefits at multiple levels. Shang and Seddon (2003) conceptually classified the benefits into five categories as follows:

- *Operational benefits*: The advantages brought about by the ERP system into operational processes such as procurement, inventory management, and customer service.
- *Managerial benefits*: The efficiency and effectiveness that the ERP system introduces into managerial decision processes.
- *Strategic benefits*: The competitive advantages supported by the ERP system in terms of business growth, innovation, differentiation, and so on.

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