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The influence of centrifugal and centripetal forces on ERP project success in small and medium-sized enterprises in China and Taiwan

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Abstract

Successful implementation of Enterprise Resource Planning (ERP) systems has become a critical facilitator for efficient operations management in both developed and developing economies. The study presented in this paper uses a novel "Centripetal and Centrifugal Forces" (CCF) model developed in the context of global new product development projects, to examine the way that the interaction of factors relevant to project management contributes to successful ERP implementation processes. Based on regression analysis of responses from 244 small and medium-sized manufacturing firms in Taiwan and China collected in May 2006, we find that the balance of centrifugal and centripetal forces fosters ERP project success, a result which has significant impacts on ERP project management practice. The study also opens up a new direction for future research on ERP implementation processes in that it suggests a novel way to model the interaction of project management factors. In addition, the new measures regarding project success and project management developed and validated in this study should prove to be useful for researchers studying ERP implementation processes.

Keywords: Enterprise Resource Planning (ERP); Small and medium-sized enterprises (SMEs); Implementation; China; Taiwan

1. Introduction

Mainland China has successfully encouraged foreign investment with an open-door policy. This has resulted in larger and more complex networks of R&D, manufacturing and service operations, and supply chains, all of which address the increasing desire for investment in China (Martinsons, 2000). At the firm level, these developments have increased the

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requirements for a sophisticated IT infrastructure. Today, China is the third largest market for information technology (IT), after the United States and Japan. Within the Asia-Pacific region, China's IT-services revenue is expected to top $43.9 billion in 2008, as China surpasses South Korea to become one of the three largest IT-services markets in the region along with Japan and Australia (Quan et al., 2005).

These developments have placed tremendous pressure on firms in China to improve their operational performance based on new IT-systems. One class of such systems is Enterprise Resource Planning (ERP) that seeks to synchronize the planning of processes across all functions within an organization. Many organizations in China have invested billions of dollars in ERP systems (Martinsons, 2004). However, previous studies on ERP implementations focused mainly on large companies in Europe or the United States, and very few focused on enterprises in developing nations such as China and Taiwan (He, 2004; Tsai et al., 2005; Reimers, 2003). As developing countries may face different challenges from those faced by developed countries, there is a gap in the ERP literature that needs more research attention.

The present study aims to narrow the above gap in the ERP literature by presenting results of an empirical study of ERP implementation in China and Taiwan. The context of these two regions offers the potential for new insights for several reasons. First, the results should complement findings from developed economies in North America and Europe. Second, as firms in China and Taiwan are usually much smaller than those in Europe and North America, the present study identifies the characteristics of ERP implementation projects in small and medium-sized enterprises (SMEs). Third, the comparison between China and Taiwan offers an interesting contrast since while both economies share the same culture (Hofstede, 2001) they differ in their stage of economic development.

2. ERP implementation as team effort

As indicated by prior research, many ERP implementation cases in China fail to meet their project deadline because of poor schedule estimates and uncertainty about the ERP implementation timeframe (Martin, 1998). In addition to the above weakness in implementing ERP systems, two major ERP challenges to SMEs in China contain weaknesses in both IT infrastructure and IT human resources (Liu and Zhou, 2001). However, SEMs in Taiwan face different obstacles in ERP implementation. According to Tsai et al. (2005), the three most important obstacles were: difficulties in transition to new systems, unavailability of skilled people, and high turnover of key project persons.

Because of the increasingly important role that of ERP plays in organizations, a substantial amount of the IS literature has focused on issues related to ERP implementation. Extant research has addressed both the software engineering and the user acceptance dimension. The *software engineering* dimension addresses the challenges of creating a cost-effective ERP code basis that is reliable, easy to modify, and easy to upgrade to new hardware platforms (e.g. Sprott, 2000). The *user-acceptance* dimension is based on system users' evaluations regarding, for example, relevance, usefulness, ease of use, satisfaction with outcomes, and ability to exchange information with other participants (e.g. Boudreau, 2003).

However, ERP system implementations that take into account only the principles from consider the above two dimensions do not always guarantee successful organizational outcomes. Although ERP systems may be perceived as well-built systems from a software-engineering perspective, ERP systems do not, in themselves, lead to a satisfactory organizational outcome without effective teamwork in ERP project teams. For example, when no incentives are available to encourage team members to input their individual knowledge into the implementation process, errors related to business processes may be presented in the ERP system. In other words, successful ERP implementations require good teamwork. Today, more than ever, work is performed in groups and teams. Organizations increasingly rely on team-based arrangements, such as project teams, task forces, quality circles, autonomous work groups, and cross-functional teams to gain competitive advantage and to improve employees' experience of work (Guzzo and Shea, 1992). The general characterization of work teams also applies to ERP project teams which—in an analogy to definitions of teams in the teamwork literature (Janicik and Bartel, 2003, p.125)—can be defined as an interdependent collection of individuals whose primary function is to perform a complex task requiring a specific output (a functioning and useful ERP system) by some deadline after which they disband. Clearly, the importance of teamwork in ERP implementation has not been addressed by the