



## ERP application in China: An overview

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### ABSTRACT

Enterprise resource planning (ERP) systems are among the most important enablers for business intelligence and planning functionality in supply chains. We provide an overview of ERP research and its development and implementation in China. We describe the current market, challenges and future trends for ERP software in China. Cases are provided where ERP implementations have been used to enhance supply chain management of major companies. One of the (not unexpected) findings is that not only analytical data concepts play an important role in successful ERP implementations in China but also cultural and language aspects.

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### 1. Introduction

An enterprise resource planning (ERP) system is a highly integrated enterprise information system to manage all aspects of the business operations of an enterprise (especially regarding transactional data) including production, purchasing, engineering design, manufacturing, sales, marketing, distribution, accounting and customer service, etc. Once ERP systems are successfully implemented, significant benefits such as improved customer service, better production scheduling, and reduced manufacturing costs can be gained. However, the successful implementation rate can be accounted for as still quite low and many firms that have gained some benefits from ERP systems have yet to exploit the full potential benefits in their organizations.

Comprehensive studies related to the economical evaluation of information systems in general and those of ERP systems in particular still seem to be in their infancy to date. More specifically, if one cares about specific cultural and language barriers (including not even language differences but also considerations regarding

character sets different from those used in most Western countries as they can be found, e.g., in Greece or China) related studies need to investigate additional aspects not yet included in general ERP adoption and innovation diffusion models.

One of the major concerns in today's globalization is the transformation of countries like India or China. 'More than any other country, China is being transformed by its application of IT, from a poor and isolated society to a major force in the global economy.' (Martinsons, 2005, p. 46). What makes China a somewhat special case is the great variety of ownership structures including state-owned, foreign-invested, and privately held companies. That is, the role of ownership can be studied in relatively greater depth there than elsewhere (Reimers, 2003).

In this paper we focus on ERP system applications in China. While some studies exist in this respect, they seem to be completely isolated and even expressing contradictory results at places. Therefore, we provide an expository survey on existing literatures and studies related to ERP applications in China. That is, specific studies with a China focus related to various systems including materials requirements planning (mrp)-based and ERP systems from the literature are put into perspective. Moreover, this is moderately interleaved with some reasoning based on an empirical analysis conducted

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by the authors based on an online survey investigating some 25 enterprises which are currently or were implementing ERP systems in China. The outcomes of this paper may provide a more comprehensive picture of current ERP implementations in China especially regarding the provided references and facilitate organizations to respective literatures and to avoid obstacles for future adoption.

In the next section we discuss some general adoption issues before considering the specific case of China in Section 3. These parts are interleaved with a wealth of references supporting our statements. Implications are discussed in Section 4, and Section 5 provides some final remarks.

## 2. ERP system adoption: general issues

ERP systems are rated among the most important information systems towards achieving competitive advantage especially for manufacturing firms. As IT and supply chain management (SCM) continue to improve and modeling applications expand, it is expected that more and more companies implement various systems including those that interest us here. ERP systems may be regarded as those information systems enabling to manage a company's transactional data on a continuous, real-time basis, i.e., standardizing data and information systems for order entry, financial accounting, purchasing, and many other functions, not only within a single location of a firm but also across multiple facilities and business units.

The most prominent basics of ERP utilize ideas from mrp and its successor, manufacturing resource planning (MRP II). Here net requirements of raw materials and intermediate products to be manufactured or ordered from vendors to meet demand for finished products are calculated (mrp). Moreover, capacity considerations are taken into account (MRP II). See, e.g., Simchi-Levi et al. (2002) and Voß and Woodruff (2006). SCM became a major management issue in recent decades. The ability to instantaneously exchange information together with increased computational power has enabled the use of sophisticated optimization software, although one has to admit that appropriate planning functionality has not yet come to its full extent despite the mouthwatering advertisements of most SCM software vendors. Nevertheless, ERP systems and the availability of transactional data are at the core of enabling SCM while supply chain planning and integration remain a critical issue.

Introducing information systems and especially ERP systems is closely related to organizational change. Taking the view of a company, say, a manufacturing firm, introducing an ERP system refers to innovation, change (management) and reshaping through the use of IT. (One might argue that ERP system modeling should follow the business processes of a company, but this is often not the case, e.g., as companies use ERP system adoption also for business process re-engineering, BPR.) That is, an interesting topic related to innovation management is the question how to justify ERP system adoption

and related investments. The discussion of these issues is very widespread in the scientific literature; see, e.g., Oliver and Romm (2002), Hwang (2005), Biehl (2007) and the references therein for a very small selection. Besides some general discussion, specific surveys and case studies are provided in many references including those mentioned and beyond. For instance, the importance of proper project management is stressed by Ferratt et al. (2006) based on a study of about 70 ERP system implementations. Most importantly, one may conclude that critical success factors (CSF) for implementing ERP systems are somewhat in line with those of other types of information systems.

Special interest in ERP system adoption accounts for certain cultural backgrounds, language specifics, and alike, especially when it comes to supply chain integration. That is, especially language barriers and certain historical paths in shaping companies may greatly influence the way of ERP system adoption. Specific studies are available for several countries, such as Canada (Kumar et al., 2002), Greece (Poulymenakou and Borotis, 2005; Kostopoulos et al., 2004) (those two studies seem to be independent from each other), just to mention some, and China (see the next section). Applying appropriate customization measures as a response to related cultural misalignments may be useful.

## 3. Current studies with a China focus

Most empirical studies in the literature conduct a survey on a limited sample with a specific focus, e.g., a certain industry or a specific region/country. As mentioned above, China takes a somewhat special role as different ownership structures can be found side-by-side. This includes state-owned enterprises (SOE), foreign-invested enterprises, and privately held companies. Moreover, larger companies as well as major internationally operating companies may be distinguished from small and medium sized companies (SME). That is, the role of size and ownership can be studied in relatively greater depth there than elsewhere (Reimers, 2003). Another topic which makes China an interesting source is the rapid change also with respect to modern forms of corporate governance (Voß and Xia, 2006). Furthermore, we highlight Guanxi, which may be seen as a corporate culture with strong emphasis on the relationships between business partners for achieving mutual benefits, an issue that is especially relevant in supply chain management (Lee and Humphreys, 2007), but may be adopted to general enterprise software, too (Marble and Lu, 2007).

### 3.1. ERP implementation and development in China

ERP system application can be followed back for more than two decades with many national programs in China supporting IT developments. Earlier research and development programs like, e.g., the 863 Program on computer integrated manufacturing (CIM) systems, was launched in March 1986. It strongly supported research, development and application of mrp/MRP II based systems, ERP and

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