Chapter 10
Designing and Managing ERP Systems for Virtual Enterprise Strategy: A Conceptual Framework for Innovative Strategic Thinking

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ABSTRACT
The business environment today is transforming towards a collaborative context compounded by multi-organizational cooperation and related information system infrastructures. This chapter aims to examine Enterprise Resource Planning (ERP) systems development and emerging practices in the management of multi-organizational enterprises and identify the circumstances under which the so-called ‘ERPIII’ systems fit into the Virtual Enterprise paradigm; and vice versa. An empirical inductive study was conducted using case studies from successful companies in the UK and China. Data were collected through 48 semi-structured interviews and analyzed using the Grounded-Theory based Methodology (GTM) to derive a set of 29 tentative propositions which were then validated via a questionnaire survey to further propose a novel conceptual framework referred to as the ‘Dynamic Enterprise Reference Grid for ERP (DERG-ERP)’; which can be used for innovative decision-making about how ERP information systems and multi-organizational enterprises – particularly the Virtual Enterprise may be co-developed.

INTRODUCTION
Enterprise Resource Planning (ERP) systems have developed extensively over the last decades in response to changing business requirements, technological developments, and new organizational strategies. According to the APICS Dictionary (11th Edition) (Blackstone & Cox, 2005), ERP is defined as a “framework for organizing, defining, and standardizing the business processes necessary to effectively...
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Plan and control an organization so the organization can use its internal knowledge to seek external advantage” (p. 38). This definition also indicates that ERP can be viewed as an information management strategy which enables the integration of various business units through a common system platform; this is echoed by other scholars (Beheshti, 2006; Johnson et al., 2004; Klaus et al., 2000).

It has been noted that most extant research on ERP systems design and management focuses on improvements in ERP functionality within a single unitary organization (Chen, 2001; He, 2004; Michel, 2000). Nevertheless, it is generally acknowledged that manufacturing and service companies today are facing a dynamic turbulent business environment, and therefore, can be encouraged to think differently and move beyond traditional single organizational boundaries whilst becoming involved in multi-organizational collaborations (Hoffmann, 2007; Rayport & Sviokla, 1995). This has stimulated the emergence of a new operations strategy in which competitive advantage is based on the development of relationships with partners (Walters, 2004). This chapter follows this premise and thereby uses the European Commission’s definition of an enterprise to explore how ERP systems can be designed and managed to effect changes in multi-organizational enterprise structures and vice versa; in turn, identify the circumstances under which the Virtual Enterprise paradigm can be realized by using the next generation ERP systems coined in this chapter as ‘ERPIII’. The EC’s definition of an enterprise is, “… an entity including partnerships or associations that can be made up of parts of different companies” (European Commission, 2003). This chapter builds on this definition and does not therefore consider manufacturing and service operations to be single legal entities operating in isolation, but instead embodies the (multi-organizational) enterprise management concepts (European Commission, 2003), where parts of companies work with parts of other companies to deliver complex product and service systems.

Some operations management researchers already realize that multi-organizational enterprises – particularly the Virtual Enterprise strategy cannot be described through simple contractual exchanges; but are better thought of as operational interdependencies based on complex interactive of operations and information technology (IT) (Banker et al., 2010; MacBeth, 2002). Likewise, information systems (IS) researchers suggest that integrated technical solutions – particularly ERP systems, which could make the multi-organizational enterprise management concept a full technical reality, are not far away (Chorafas, 2001). These works emphasize the fact that successful multi-organizational (virtual) enterprise strategy relies on the correct type of ERP information systems being used, as well as highlighting the importance of investigating how an ERP system fits into the multi-organizational operation and structure, in order to properly pursue the Virtual Enterprise strategy.

There is an emerging body of studies beginning to advocate the inter-organizational information systems (IOIS) (Saeed et al., 2011; Vathanophas, 2007). There is however a perennial pressing challenge for alignment between multi-organizational (virtual) enterprise management thinking and ERP systems design, adoption and development; which is imperative to provide a useable decision-making framework for thinking innovatively about co-development of ERP systems and multi-organizational collaboration – particularly the Virtual Enterprise paradigm. Thus this chapter aims to empirically examine ERP systems development and emerging practices in the management of multi-organizational enterprises and identify the circumstances under which the so-called ‘ERPIII’ systems fit into the Virtual Enterprise strategy; and vice versa. This aim is fulfilled by achieving three research objectives:

1. Summarize developing trends in ERP systems;
2. Describe the principles of Virtual Enterprise (VE) paradigm whilst confronting it with the Extended Enterprise (EE) and Vertically Integrated Enterprise (VIE) forms; and
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