



# The Strategic Implications of E-Network Integration and Transformation Paths for Synchronizing Supply Chains

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## ABSTRACT

*Streamlining information flows across the physical supply chain is crucial for successful supply chain management. This study examines different structures of e-networks (i.e., virtual supply chains linked via electronic information and communication technologies) and their maximum capabilities to gain e-network benefits. Further, this research explores four levels of e-network integration based on a 2x2 e-network technology and transaction integration matrix. Of the four levels, an e-network with high e-technology/high e-transaction integration appears to be most desirable for the companies that aspire to achieve the maximum benefits from their IT investments. Finally, this study identifies three alternative transformation paths toward a powerful high e-technology/high e-transaction integration network and discusses strategic implications of selecting those paths, in terms of e-network structures, availability of financial and technical resources, supply chain members' collaborative planning, e-security mechanisms, and supply chain size.*

*Keywords: e-network; information systems; supply chain management; technology-transaction integration; transformation strategies*

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## INTRODUCTION

As competition in the marketplace has increasingly intensified during the past decade, the strategic significance of close collaboration among supply chain members

has dramatically increased. This advanced importance of collaborative chain activities is primarily attributable to the change of competitive scenes from a firm vs. a firm to a supply chain vs. a supply chain (Li, Rao,

Ragu-Nathan, & Ragu-Nathan, 2005). A supply chain can be defined as encompassing all activities associated with the flow and transformation of goods from the raw material stage through to the end user, as well as the associated information flows (Handfield & Nicholas, 1999).

As this definition implies, a high level of information sharing and collaboration among chain members is an important prerequisite to achieving high performance of the entire supply chain (Li, Ragu-Nathan, Ragu-Nathan, & Rao, 2006; Monczka, Peterson, & Handfield, 1998; Sahin & Robinson, 2005). Many researchers have emphasized this crucial role of inter-organizational information transactions in supply chain management (SCM). They consistently argue that streamlining information flows across the entire chain is one of the critical success factors for gaining maximum SCM benefits, such as lowering product costs, reducing product development cycle time, and increasing responsiveness to customers' changing preferences (e.g., Christiaanse & Kumar, 2000; Cooper & Tracey, 2005; van Hoek, 2001).

However, in reality, lack of information sharing due to inadequate information systems and lack of trust among chain members appear to be serious obstacles to obtaining such SCM benefits (Cooper & Tracey, 2005; Wisner & Tan, 2000). Therefore, to survive in today's fierce competition between supply chains in global markets, the effective use of newly emerged information technologies has already become an important concern for managers who aspire to use an SCM approach as a strategic competitive weapon (Chopra, 2003; Elmuti, 2002). Those information technologies include the Internet, intranet, extranet, wireless technologies

like radio frequency identification (RFID), and information integration systems such as enterprise resource planning (ERP), product lifecycle management (PLM), supply chain planning (SCP), supply chain execution (SCE), customer relationship management (CRM), supplier relationship management (SRM), and business process management (BPM).

However, despite the prominent importance of information systems and their integration across the supply chain, most of the previous studies have addressed this issue in the context of a dyadic relationship (e.g., a buyer and a supplier), rather than from the vantage point of an entire supply chain with multiple layers (e.g., a buyer, a buyer's buyer, and a supplier, a supplier's supplier) (Christiaanse & Kumar, 2000). More specifically, relatively little research has addressed such an important issue as "what types of, and in what way, electronic chains (e-networks) should be adopted and implemented to support all the intra- and inter-organizational activities across the supply chain, where the e-network refers to a non-physical, virtual supply chain linked by electronic information and communication technologies?"

Therefore, this study aims at expanding the body of knowledge on e-networks established in the physical supply chain by addressing the following five questions:

1. What types of e-networks exist in practice and what are their key characteristics?
2. What potential benefits can be obtained by an effective e-network management?
3. What measurement schemes can be employed to assess and categorize the various levels of e-network integration?

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