

Utilizing e-business technologies in supply chains: The impact of firm characteristics and teams

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Abstract

This paper presents findings from an exploratory study that analyzes the drivers and outcomes of e-business technology use in the supply chain. Using a combination of case studies and survey data from a diverse sample of industries, the research examines how industry context, firm characteristics and firm-level strategic resources, such as purchasing teams, influence the exploitation of e-business technologies and the relationship between e-business technology use and firm performance. Based on a synthesis of related literatures from transaction cost economics and the relational view of the supply chain, a two-dimensional framework for e-business technology is proposed with transactional and relational dimensions. However, empirical analysis indicated that transactional technologies can be further subdivided into two factors: dyadic cooperation and price determination. Significant differences were found between the two dimensions in terms of their overall levels of adoption, with dyadic coordination being the most widely adopted. In addition, the development of strategic resources expanded, in particular internal and customer teams, the use of e-business technologies expanded. Purchasing organizational structure and firm size also were positively related to the adoption of transactional e-business technologies. Finally, of particular importance to practitioners, e-business technologies targeted at reducing dyadic coordination costs lead to improved financial performance.

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1. Introduction

There has been substantial managerial interest in opportunities to use e-business technologies in the supply chain to create competitive advantage. The literature suggests that the potential benefits of e-business technologies include lower prices from suppliers, improved speed and flexibility, lower transaction costs, higher customer service levels and reduced investments

in supply chain inventories (Neef, 2001; Essig and Arnold, 2001; Deeter-Schmelz et al., 2001). However, our understanding of how and where firms use e-business technologies, and the direct benefits that they provide, is still limited. As firms weigh opportunities to invest in new supply chain technologies and make the accompanying changes to their organizations, supply base and business processes, an improved understanding of where opportunities exist to better utilize e-business technologies is required.

This paper examines how firm-level strategic resources, such as purchasing teams, influence the exploitation of e-business technologies and the relationship between e-business technology use and firm

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performance. Underpinning this research is literature in transaction cost economics, the resource based view and the relational view. Collectively, the paper offers three primary contributions. First, an important objective is to develop a better understanding of the relationships between different, but related forms of e-business technologies. In doing so, two general dimensions are identified and empirically validated using data from four case studies and a sample of 284 large North American firms. This data also provides the basis for assessing the level of use of e-business technology in supply chain management.

Second, the research seeks to establish the relationship between the use of e-business technologies and its enablers, including related strategic resources such as purchasing teams. Research in the management information systems literature recognizes the importance of using cross-functional teams as part of successful implementation and assimilation of new information technologies (Robey et al., 2002), and purchasing teams represent a common approach to managing activities within the supply chain to achieve internal and external integration (Ellram and Pearson, 1993; Trent and Monczka, 1994; Giunipero and Vogt, 1997). This path of inquiry suggests that merely investing in e-business technologies is not sufficient to provide competitive advantage; instead, it is the capabilities to effectively implement e-business technologies within the supply chain that is more important. Consequently, the successful adoption of e-business technologies might be expected to leverage the team-based boundary spanning capabilities provided by purchasing teams.

Finally, a number of industry- and firm-level characteristics that affect the rate of technological change can also influence supply chain relationships, and thus, opportunities to use e-business technologies. Moreover, it is not clear what the competitive implications are for financial performance. To date, much of the research related to the benefits of e-business technology in supply chain management tends to be anecdotal, consisting of case studies. While that research has been useful in framing the potential opportunities, this research undertakes a broader assessment of firm financial performance related to the use of e-business in the supply chain.

Drawing from the transaction cost economics, the resource based view and the relational view literature, the following section defines the constructs and hypothesized relationships that underlie relationships between the proposed drivers, e-business technology use and financial performance. Next, the survey methodology and construct measurement are detailed.

Finally, the results and discussion are presented, along with implications for both future research and managerial practice.

2. Theoretical development

Two theoretical perspectives have become well-established as foundational for research that integrates supply chain management and e-business technologies: transaction cost economics (TCE) (e.g., Williamson, 1991) and the relational view (e.g., Dyer and Singh, 1998). These perspectives provide the basis for a framework that identifies two generic forms of e-business technology: transactional and relational technologies. These two forms, in turn, suggest a number of implications for how and why each might be adopted and resulting performance outcomes. In addition, a third perspective, the resource-based view of the firm (RBV) (Barney, 1991), offers a theoretical rationale for why some attempts to implement e-business technologies have not delivered competitive advantages. Firm-level strategic resources, such as purchasing teams, are likely necessary to both implement and unlock the competitive potential of e-business technologies. Teams are an instrumental aspect of organizational learning (Hult et al., 2003).

2.1. Purchasing teams

A team is a group brought together to achieve a shared goal, is independent and bound and stable over time, and has the authority to manage its own work and internal processes (Alderfer, 1977; Hackman, 1990). Teams attempt to capture the benefits of cross-functional skills and orientation, and represent an accepted method for managing projects and activities in a wide variety of areas, such as quality, information systems, new product development and cost reduction initiatives. The formation and management of teams continues to present complex challenges, indicating that effective implementation is a strategic resource, possibly linked to organizational learning (Hult et al., 2003), social complexity and team-based skills, i.e., the team is greater than the sum of its members (Coff, 1999; Lewis, 2003).

The reasons for these challenges are multifold. Purchasing teams combine skills and resources of several stakeholders, which can span across multiple functions or subunits, to facilitate the timely completion of a supply management goal that will benefit the organization, such as supplier selection, standardization of purchases, reduced total cost of ownership, improved supplier quality or reduction of cycle times (Ellram and

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