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Predicting the level of B2B e-commerce in industrial organizations

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Abstract

Through the use of business-to-business electronic commerce (B2B e-commerce), leading companies are transforming interorganizational transaction processing, trading, and collaboration into a competitive advantage. The research empirically examines several models with B2B e-commerce overall use as the dependent variable and innovation characteristics, context, channel factors, and organizational structure as the predictor variables. The results demonstrate that compatibility with existing systems, cooperative norms with customers, lateral integration within a firm, technocratic specialization, and decentralization of information technology decisions facilitate B2B e-commerce overall use. In addition, large firms are more likely than small firms to have greater levels of B2B e-commerce and firms are more likely to use B2B e-commerce with customers that use recommendations rather than threats to encourage e-commerce use.

Keywords: Business-to-business; Electronic commerce; Organizational structure; Innovation

1. Introduction

B2B e-commerce has been identified as an emerging trend, with companies planning strategies to capture benefits. It is estimated that worldwide B2B e-commerce transactions will reach $2775 billion in 2004—a growth of over $2500 billion since 2000 (eMarketer, 2001). There are also estimates that by 2004, B2B sales on the Internet will be six times larger than B2C sales (Haig, 2001). E-commerce may become the primary low-cost method for B2B transactions. Buyers and sellers benefit from the productivity and profitability improvements associated with e-commerce (Deeter-Schmelz et al., 2001). With a relatively small investment, companies can achieve remarkable savings: e.g., leaders in e-commerce achieved 41% improvement in cycle time and a 10% reduction in staff and can generate up to a 13:1 ROI by using the full potential of B2B e-commerce (Kearney, 2002). Yet, B2B e-commerce use has proved more difficult than expected. The community is looking for answers on how to proceed. The significance of B2B e-commerce makes it imperative to study it for three reasons: (1) it is becoming a viable alternative to traditional markets; (2) its commercial potential is enormous; and (3) little is known about the factors that influence the nature of firm participation (Grewal, Comer, & Mehta, 2001).

The purpose of the study is to examine firm, context, and innovation characteristics related to B2B e-commerce (Fig. 1 displays the research framework). The hypotheses presented and tested allow a starting place to answer the following research questions: (1) Are B2B e-commerce compatibility with current systems and its perceived cost related to its overall use? (2) Are cooperative norms with customers and customer influence strategies related to overall use? (3) Is a firm's context in terms of size, production technology routineness, demand unpredictability, and process turbulence

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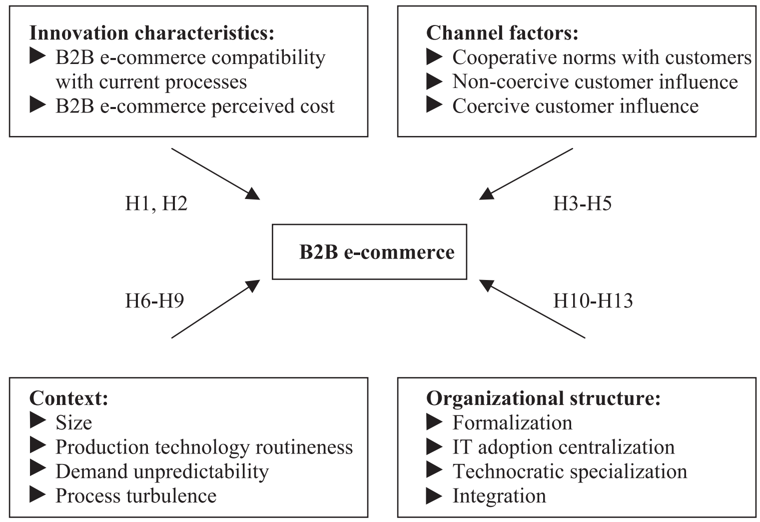

Fig. 1. Research framework and hypotheses.

related to use? and (4) Is organizational structure (i.e., formalization, integration, specialization, and centralization) related to B2B e-commerce use?

The objective of the research is to gain insights into these questions for scholars and practitioners. The findings regarding the relationships among the study's variables will build on theory developed in the area of B2B relationships. Practitioners will benefit from prescriptions for successful use of B2B e-commerce. The next section briefly discusses B2B e-commerce. Hypotheses are then developed detailing the predicted associations between it and innovation characteristics, channel factors, context, and organizational structure. A study of these relationships is described along with the findings. The paper concludes with a discussion of the findings and managerial implications.

2. Business-to-business electronic commerce

Although B2B e-commerce is a popular subject, systematic empirical evidence regarding firm and innovation characteristics that are crucial in its adoption is lacking. Rather, research has focused on a range of other topics including: how the establishment of virtual intermediaries is influencing B2B e-commerce; what firms can do to enhance the successful implementation of the Internet; how the Internet is being used to manage supply chain components; what marketing activities are influenced by the Internet; how to select B2B e-commerce models; what abilities determine participation in electronic markets; how B2B e-commerce influences coordination costs; what issues should be considered before a firm embarks on B2B e-commerce; what firms can do to increase the effectiveness of the World Wide Web as a marketing tool; what structural dimensions result in effective digital markets (e.g., online auctions, bid systems); and how interfirm communications have been influenced by the Internet (e.g., Boyle & Alwitt, 1999; Dou & Chou, 2002; Lynn, Lipp, Akgün, & Cortez, 2002; Wilson & Abel, 2002). Our understanding of B2B e-commerce phenomena is still at a very early stage with additional research needed.

B2B e-commerce is defined as a supply chain innovation that generates cross-firm process integration. It is the use of the World Wide Web to secure the trading of goods, information, and services before, during, and after the sale (Barnes-Vieyra & Claycomb, 2001). It includes electronic data interchange (EDI) and Web- and Internet-based applications. B2B e-commerce has changed the manner in which cross-firm transactions are conducted, resulting in lower costs and improved supply chain management. Online marketplaces widen the spectrum of buyers. By bringing together large numbers of buyers and sellers and by automating transactions, electronic markets give sellers access to new customers, expand the choices available to buyers, and reduce transaction costs. Specifically, B2B e-commerce fosters: choice-flexibility in marketplaces, a wider selection of supply chain partners; speed-faster decision-making, time to market, and transactions; streamlining-increased efficiency and productivity because of less paperwork, elimination of bureaucratic systems, better control of inventory; and response-instant response to unforeseen problems and opportunities (Haig, 2001).

3. Hypotheses

3.1. Innovation characteristics

Innovation is the initiation, adoption, and implementation of new processes or products for the first time by an organization. Innovation theory and research describe the relationship between the attributes of an innovation and the adoption or implementation of that innovation