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FACTORS AFFECTING THE EXTENT OF ELECTRONIC COOPERATION BETWEEN FIRMS: ECONOMIC AND SOCIOLOGICAL PERSPECTIVES

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Abstract

Two prominent trends—more cooperative business partner relationships coupled with rapid advances in computer and communications technology—have given rise to new forms of electronic cooperation through interorganizational systems (IOS). In spite of this emerging electronic cooperation, existing literature is limited in its ability to pinpoint the core set of factors that determine the extent of the electronic cooperation between trading partners. By investigating the use of electronic data interchange (EDI) as the specific form of IOS that enables electronic cooperation, this paper identifies factors influencing the extent of EDI use in a dyadic retailer-supplier relationship. Drawing particularly on transaction cost theory and social exchange theory, we identify five variables (asset specificity, uncertainty, reciprocal investments, trust, and power) that are likely to be important in explaining the level of EDI use between a retailer and its suppliers. These variables are hypothesized to be associated with the extent of EDI use, in terms of volume and diversity, between the trading partners. We will empirically test the research propositions using multiple regression analysis with the data that will be collected from a mail survey of a nationally known retailer’s suppliers.

1. INTRODUCTION

One prominent trend in today’s business environment is the development of more cooperative and long-lasting relationships between firms at adjacent stages in the value chain (Kalwani and Narayandas 1995; Kumar 1996). By changing the nature of their relationships, many companies are seamlessly integrating their operations with external business partners and, in turn, streamlining their processes (Clark and Stoddard 1996; Dyer 1996; Stuart et al. 1998). This emerging trend has not gone unnoticed by researchers. In particular, scholars in information systems (IS) have focused on the role that information technology (IT) has played in moving interorganizational relationships toward more cooperative partnerships (Bakos and Brynjolfsson 1993a; Clemons, Reddi and Row 1993; Clemons and Row 1992). They argue that, with the rapid advances in the computer and communication technologies, interorganizational systems (IOS) have played a central role in enabling companies to establish tighter relationships with their trading partners. For example, “the Boeing company considers suppliers which adopt electronic data interchange (EDI) as being committed to building a long-term trading partner relationship” (Riggins and Mukhopadhyay 1994). Indeed, this new form of tightly coupled trading partner relationship that explicitly leverages information technology capabilities is variously referred to as electronic integration (Kambil and Short 1994; Venkatraman and Zaheer 1990), electronic partnerships (Hart and Saunders 1997), and information partnerships (Konsynski and McFarlan 1990).

Generally, IOS projects inherently carry more risk than traditional internal IT projects because managers have less control over their trading partners’ actions (Riggins and Mukhopadhyay 1999). In fact, the reluctance of smaller partners to become EDI-capable is the most serious concern for many large organizations initiating EDI communities (Iacovou, Benbasat and Dexter...
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Even after EDI has been adopted among many of their trading partners, the importance of trading partners cannot be diminished since the companies then try to exchange more and different kinds of information using EDI than ever before (Kotok 1998). Accordingly, EDI managers are faced with the need to increase the level of EDI use with their trading partners. For example, because many smaller companies have been using EDI in minimal ways simply to meet mandatory adoption policies instituted by their trading partners, functions other than purchasing and billing have not been common until recently.

In this paper, we are particularly concerned with the level of electronic cooperation between a retailer company and its suppliers. This study investigates the use of EDI technology, which is the most common type of electronic communication technology used for interfirm cooperation. More specifically, we examine the factors that influence the extent of suppliers’ EDI use with their retailing customers, given that these suppliers have diverse levels of EDI usage. By building on prior conceptual and empirical studies in transaction cost theory and sociological exchange theory, we identify five variables—asset specificity, uncertainty, reciprocal investments, trust, and power—that are likely to explain the extent of EDI use between a retailer and its suppliers.

2. THEORETICAL BACKGROUNDS AND RESEARCH HYPOTHESIS

2.1 Transaction Cost Theory

The key premise of transaction cost theory, as originally developed by Williamson (1985), is that, given ceteris paribus conditions, firms strive to minimize total costs by choosing the best organization governance structures. Transaction cost theorists propose various determinants of the transaction costs that affect firms’ governance form choices. Viewing the electronic collaboration enabled by interorganizational systems as one element of a new governance decision, we propose that such determinants of the transaction-related costs as asset specificity, uncertainty, and reciprocal investments influence those organizations’ decisions.

In the context of interfirm dyadic relationships, asset specificity can be described as the extent that the value of a firm’s capital is idiosyncratic to the relationship with the other firm. Therefore, the value of transaction-specific assets is significantly lower when employed in alternative uses. Williamson (1979) notes that when the difference between the value of transaction-specific investments used in their intended specialized use and that in alternative uses is large, a supplier is “locked into” the transaction with its current customer to a great degree. Since a supplier’s investments in transaction-specific assets make it costlier to switch to another customer (Bensaou 1997), we can expect that those investments motivate the supplier to preserve its current relationship by cooperating more with its current customer. Because IOS enhance the cooperative climate in supplier-retailer relationships by facilitating more effective communication, we can hypothesize a positive relationship between asset specificity and the extent of EDI use.

Changes in technology and price as a main source of uncertainty may have special relevance for the governance structures of organizations. Organizations faced with increased levels of uncertainty respond with two possibilities. One is to sacrifice customized design features in favor of a more standardized good or service that is more suitable for market governance. The other is to preserve the valued design features and cooperate more with the other party so as to cope with the increased level of uncertainty (Williamson 1979, 1985). Based on the first response, we postulate that the inability of a supplier to predict future contingencies prevents it from coupling closely with its current customers. Accordingly, we propose a negative relationship between uncertainty and EDI use.

Reciprocal investments refer to transaction-specific investments by one party (A) in an exchange relationship that the other party (B) can consider as safeguarding its investments in transaction-specific assets. The reciprocal investments made by the party (A) can serve to counterbalance the transaction-specific investments made by the other party (B) in the exchange relationship. In addition, they are viewed as a party’s credible commitment to the relationship—reciprocal investments signal that the party desires that the exchange relationship continue into the future (Zaheer and Venkatraman 1995). The commitment is considered even more credible when a party makes the investments to fewer number of partners (Bakos and Brynjolfsson 1993b). Specifically, in the case of electronic coordination through EDI between a retailer and its suppliers, EDI incentives from the retailer, such as hardware/software support, training, and subsidies, can serve as reciprocal investments that counterbalance the suppliers’ investments in using EDI with the retailer. These incentives would make the suppliers believe that their commitment to the use of EDI with the retailer is necessary to promote electronic cooperation between them. We can expect a positive relationship between reciprocal investments and EDI use.
2.2 Social Exchange Theory

Social exchange theory suggests that the resultant outcome of a participant’s behavior is dependent upon the responsive behavior by the other participant(s) within the exchange relationship (Anderson and Narus 1984). Although social exchange theory was originally proposed in the context of interpersonal relationships, many of its propositions have been well-suited in analyzing interorganizational exchange relationships. Variables such as dependence, power, commitment, trust, and conflict derived from the theory have been widely examined in empirical studies analyzing the interorganizational exchange relationships. In the context of EDI, a theoretical framework by Hart and Saunders (1997) suggests that trust and power play an important role in EDI adoption and use.

Trust is described as “the firm’s belief that another company will perform actions that will result in positive outcomes for the firm, as well as not take unexpected actions that would result in negative outcomes for the firm” (Anderson and Narus 1984, 1990). In general, the theoretical literature on trust implies that the main outcome of trust is to provide one party with an optimistic anticipation of the behavior of another party in an interorganizational relationship (Hart and Saunders 1997). Particularly in the context of EDI, it is suggested that trustworthy business partners are able to increase the level of EDI use of their business partners (Emmelheinz 1993; Hart and Saunders 1997). Based on this, we propose a positive relationship between trust and EDI use in a dyadic interorganizational relationship.

Power is defined as “the ability of one party (A) to get another party (B) to undertake an activity that B would not normally do” (Anderson and Weitz 1989). Firms frequently exercise their power over other firms to solicit compliance. Given that the success of electronic cooperation depends on the extent of their trading partners’ IOS use, a number of companies with a dominant market share exercise their bargaining power to influence IOS-related decisions of their trading partners. Iacovou, Benbasat and Dexter (1995) provide empirical evidence that the imposition from trading partners is one of the most critical EDI adoption factors for small-sized trading partners. However, Hart and Saunders (1998) found that firms’ use of EDI, especially in terms of diversity, is negatively associated with power exercised by their major customer. In spite of the inconclusive research findings, we anticipate a positive relationship between the power exercised and EDI use, in terms of both volume and diversity.

Massetti and Zmud (1996) propose four dimensions to measure EDI usage in organizations: volume, diversity, breadth, and depth. This study adopts volume and diversity of EDI usage as surrogate measures for capturing certain aspects of electronic cooperation between trading partners. Especially in an interfirm dyadic relationship, we define EDI volume as the proportion of EDI transactions to total number of transactions exchanged between two trading partners and EDI diversity as the number of distinct EDI transaction sets exchanged between them. Hence, the dependent variables in our research model are EDI volume and diversity exchanged between a retailer and its suppliers.

We add the size of suppliers as a control variable in our research model, given that larger suppliers are more capable of exchanging trading documents via EDI with their customers. We explicitly hypothesize that the research model will have more explanatory power by including the size of the suppliers as a control variable.

Based on the research hypotheses described above, we develop a research model of determinants, as shown in Figure 1, of the extent of EDI use between a retailer and its suppliers.

3. RESEARCH METHODOLOGY

The research methodology employed in this study for testing the research propositions is a survey, based on the administration of a mail questionnaire to key informants within suppliers of a nationally known retailer. We developed the measures based on existing scales proven to be reliable and valid measures in previous empirical studies. Having considered the nature of the variables in this study that can not be precisely answered by a single key informant in each supplier company, we divided the questionnaire into two parts so as to be completed by two individuals: an EDI manager and a sales manager (or a marketing manager). The instrument was carefully reviewed by the retailer and is undergoing a pilot testing with a small number (n = 10) of suppliers. On completion of the pilot testing, the questionnaire will be sent out to about 600 suppliers of the retailer that will become the sampling frame of this study. We anticipate a relatively high response rate from this survey, as we are collaborating with a major retailing customer of the companies within the sample. The research hypotheses will be subsequently tested with the data using multiple regression analysis.
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4. EXPECTED CONTRIBUTIONS

The main managerial implication of this study is to provide insight into certain relational factors that will lead suppliers to have a higher level of electronic coordination with their retailing customers. We believe that the findings of this study would enable retailers to design more effective strategies to increase the level of electronic coordination with their suppliers. This study also intends to contribute to the IOS research stream by providing well-grounded theories in the study of electronic interfirm coordination and adding additional empirical evidence in the context of retailing that has not been well studied by researchers.

5. DESCRIPTION OF CONFERENCE PRESENTATION

What we plan to present in the conference can be outlined as follows:

- Research objective, theoretical background, research model, and methodology
- Results of preliminary data analysis
- Managerial implications of the study
- Contributions to the IOS research stream
- Limitations of the study and future research directions

6. REFERENCES


