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Abstract

The use of Internet, EDI, and IOS between a firm and its partners has given rise to new form of interfirm relationship, called electronic cooperation. However, existing literature is limited the consequences of organizational context and/or behavioral/cultural factors on electronic cooperation. Drawing on IT infrastructure capability framework, transaction cost economics, and information processing theory, this study identifies three IOSI capabilities- technological, structural, and informational IOSI capability- that are considered to be important in explaining electronic cooperation. These three IOSI capabilities are hypothesized to be associated with the level of tightly coupled interfirm relationships. We will empirically test the research hypotheses with the data that will be collected from companies in the manufacturing and retailing industries.

Introduction

The use of Internet, electronic data exchange (EDI), and interorganizational information systems (IOS) is now becoming an increasingly common way of doing business among organizations. Moreover, there are increasing numbers of studies that view these technologies as an IT infrastructure (Broadbent, et al., 1999; Keen, 1991). IT infrastructure provides organizations shared IT services that facilitate information exchange necessary for establishing and supporting interfirm relationships (Broadbent, et al., 1999; Keen, 1991). Due to its contributions on interfirm relationships, such IT infrastructure is described as an interorganizational information systems infrastructure (IOSI) (Bensaou and Venkatraman, 1995). In this study, IOSI is defined as a set of IT resources shared among organizations, which provides shared IT services and supports information processing and information exchange across organizations (Broadbent, et al, 1999; Keen, 1991).

Studies in both organization and information systems (IS) areas found that there has recently been a move to cooperation between organizations and IOSI has been a significant driving force behind this trend (Bakos and Brynjofsson, 1993; Clemons, et al., 1993; Bakos and Nault, 1997). This IOSI-guided cooperation is called electronic cooperation (Bensaou, 1997; Son, et al., 1999). Electronic cooperation is defined as a tightly coupled interorganizational relationship achieved by IT (Zaheer and Venkatraman, 1994).

In IS literature, there are several studies explaining the phenomenon of electronic cooperation. While these studies give us a better understanding on electronic cooperation, they have ignored the technological characteristics of IOSI. Thus, in this study, we are concerned with the contribution of IOSI capability (such as information processing capability, network connectivity, and sharedness of data and applications) that support faster and more efficient transmission of information between the linked firms, on electronic cooperation.

Theoretical Background

In developing research constructs and relationships between constructs, Broadbent, et al.'s (1996; 1999) IT infrastructure capability framework is combined with transaction costs economics and information processing theory. In the framework, they identify IT capabilities as consisting of three dimensions: IT services, reach, and range. IT services refer to IT functionality provided IT infrastructure. Reach is described as the locations an organization can link through IT infrastructure. Finally, IT infrastructure defines the range or richness (Evans and Wurster, 1997) of information that can be shared at each level of reach.

Both transaction costs economics and information processing theory are most widely used in IS area, especially in explaining the impacts of IT across organizational boundaries. Zaheer and Venkatraman (1994) argue that the transaction cost perspective that has served as a dominant theoretical anchor in understanding the nature of interfirm cooperation. Information processing view of organizations sees information exchange as a central phenomenon in organizations, and has contributed greatly to the understanding of information exchange behaviors that affect the development and quality of interfirm relationships (Mohr and Sohi, 1996).

By combining these three theoretical perspectives, we identifies three IOSI capabilities: technological, structural, and informational capability. These three IOSI capabilities are viewed as having a greater contribution on increasing information capabilities and thus increase the cooperation among organizations.

Research Model and Hypotheses

Electronic cooperation will be determined by the following IOSI capabilities: technological, structural, and informational capability. The Figure 1 depicts the relationships between IOSI capabilities and electronic cooperation.

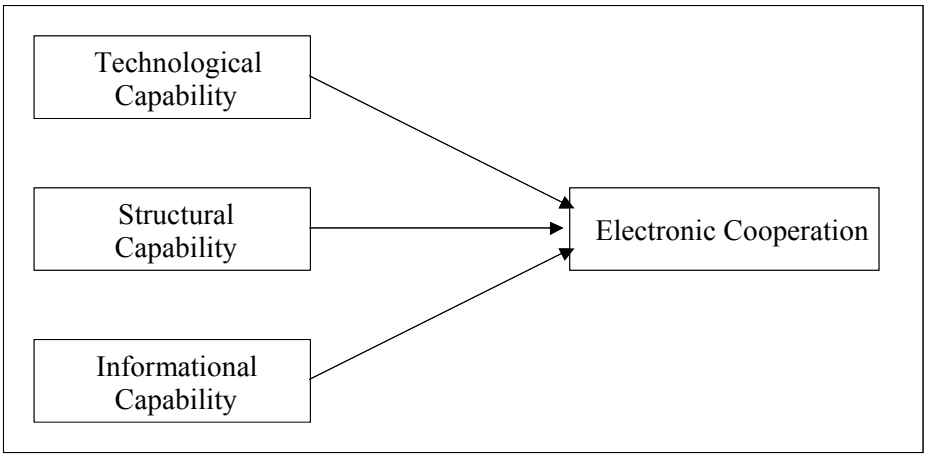

Figure 1. Research Model

Technological Capability

Technological capability represents shared IT functionality for facilitating interfirm coordination. Organizations share various technological functionality provided by IOSI for information exchange. For example, when a retailer wishes to offer EDI-based ordering systems to buyers so that they can order directly, the retailer needs to share IT functionality for EDI connections with buyers, such as network protocols, transaction sets for document exchange, and standards for IT applications for processing transactions data (Riggins, et al., 1994). However, every IOSI does not provide the same level of technological capability. For example, when companies use Value Added Network (VAN; i.e., common IOSI) or Private Proprietary Network (PPN; i.e., proprietary IOSI) for EDI applications, the VAN is likely to provide more extensive technological capability than the PPN. It also requires the organizations' business processes and human skills to be customized to exploit the IOSI's technological capability. As such, IOSI that provides higher levels of technological customization and extensiveness will increase electronic cooperation between organizations.

H_1: Technological capability of IOSI is positively related to electronic cooperation.

Structural Capability

Structural capability refers to IOSI's ability to support a variety of interfirm interaction patterns between the participating organizations. In general, structural capability involves the governing mechanisms that characterize an interfirm relationships (Van de Ven and Ferry, 1980) by determining variety of interaction patterns between organizations, such as multiplicity, depth, breadth, formalization and centralization of interaction. These patterns direct the flow of information and capture the complex and dynamic information exchange (Mohr and Speckman, 1994). These patterns provide different capacity for interfirm information exchange and coordination (Galbraith, 1977; Tushman and Nadler, 1978), which determine the nature and scope of electronic linkages between organizations. In organization studies, the structure of interfirm interactions have been widely studied as important factors that influence interfirm relationships (Van de Van and Ferry, 1980; Vijayasarathy and Robey, 1997) and as direct correspondence to the nature of electronic cooperation (Choudhury, 1997).

H_2: Structural capability of IOSI is positively related to electronic cooperation.

Informational Capability

Information capability of IOSI refers to richness of interactions between organizations in that it determines the diversity of information exchange and the quality of information exchange. IOSI that enables organizations to handle a number of distinctive information types (e,g, a variety of data types and business transaction formats), helps them to manage diversified information issues that occurred in exchanging a broad range of information with their partners. Without IOSI's support for diversity of information exchange, organizations will confront internal information conversion issues, which can complicate and overwhelm their business transaction processes. In addition, when interactions between organizations involve highly embedded organizational and technical resources and capabilities, interfirm relationships require high quality of information exchange (i.e., accuracy, timeliness, adequacy, and credibility of information exchange activities) (Nohria and Eccles, 1992). Poor quality of information exchange often causes incomplete and inaccurate interactions and leads to feeling of frustration (Daft and Lengel, 1986). Poor quality of information exchange leads organizations to be reluctant to contact their partners.

H_3: Informational capability of IOSI is positively related to electronic cooperation.

Expected Contribution

Many organizations are increasingly adopting IOSI to establish closer relationships with their partners. In using IOSI, organizations need to consider the capability of IOSI they are using. By providing an understanding about the influence of IOSI capability beyond the organizational boundaries, this study will provide researchers guidelines about the role of IOSI on electronic cooperation and add additional empirical evidence in the context of technological aspects of IOSI that has not been studied by researchers.

References

References available upon request from the authors.