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Business to Business E-Commerce and Inter-Firm Governance

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INTRODUCTION

Electronic data interchange (EDI) and Internet based Business to business (B2B) e-commerce technology are two important inter-organization systems (IOS). Many studies have been done about their significant impact on business operations but little attention has been paid to their effect on the inter-firm governance. Inter-firm relationship has been the research focus in business management and information systems field for a long time. From the perspective of marketing, inter-firm governance is the mechanism which eventually determines inter-firm relationships. This study draws the conclusion that information technology has significant impact on inter-firm governance. Thus, understanding of IT impact on inter-firm governance will provide important insight for understanding the evolution of inter-firm relationship in the future.

This study focuses on the transformation of inter-firm governance after business organizations adopt EDI and Internet based e-commerce technology. In the next section, a brief literature review on the inter-firm governance is conducted. Then, the impact of information technology on inter-firm governance is analyzed. A conceptual model is proposed to show the transformation process. At last, transaction cost theory is adopted to explain the transformation. The article concludes with a summary and future research directions.

INTER-FIRM GOVERNANCES

Governance is a mode of organizing transactions (Williamson and Ouchi, 1981). Palay (1984) defined it as shorthand expression for the institutional framework in which contracts are initiated, negotiated, monitored, adapted and terminated. Heide (1994) classified the governance of inter-firm relationship into three categories.

Market Governance

This concept is identified by transaction cost theory and could be viewed as a synonymous concept of discrete exchange (Goldberg, 1976 and Macneil, 1978) or arm's length inter-firm relationship (Watts *et al.*, 1995).

For contracting parties in market governance, individual transactions are independent of past and future relations and constitute nothing more than the transfer of ownership to a product or service (Goldberg, 1976). When a transaction is finished, the partnership would be over. New relationship will be set up through new bargaining and negotiation.

In this type of relationship, transaction parties have equal bargaining positions. No party is subject to the other's control or dominant influence, and the transaction is treated with fairness, integrity and legality. Grover and Malhotra (2003) describe it as "coordinating materials and service flow between firms through the demand and supply forces, where in true competitive environments the buyer has choices of products and suppliers."

Hierarchy Governance

This category is also identified by transaction cost theory. It is corresponding to vertical integration (Williams', 2002).

To reduce operational cost and avoid supply uncertainty, some powerful companies set up stable relationship and business process integration with their upstream or downstream partners by acquiring their ownership. The possession of ownership engenders an authority structure which provides one contracting party (the core company) with the ability to develop rules, gives instructions and imposes decisions on the other one (Hart, 1990; Simon, 1991). Grover and Malhotra (2003) describe it as: "vertically integrated entities control and direct (product or service) flow at a higher level in the management hierarchy."

Compared with businesses in market governance, contracting parties of vertical integration have completely different relations: their cooperation is based on long term relationship instead of individual transactions; their positions within the relationship are not determined by demand and supply forces but by the ownership structure; their business processes are integrated with each other.

Bilateral Governance

This is a relative new notion. Transaction cost theory fails to identify it. Contracting parties within a bilateral relation jointly develop policies directed toward the achievement of certain goals. The nucleus of bilateral governance includes the following requirements (Bonoma 1976): individual units' utility functions constitute global utility of a system; individual goals are reached in the system through joint achievements; individual units adopt a "unit action" orientation but the system serves as a restraint on individual tendencies; units concern about long term benefit of the system; members use self-control based on their internalized values (Ouchi's, 1979).

For companies in market governance, their relationship is based on individual transaction and their business processes are not integrated with each other. The basis of market governance is price mechanism (Bradach and Eccles, 1989; Maitland, Bryson and Van de Ven, 1985). On the contrary, the basis of both hierarchical and bilateral governance is long term cooperation and business process integration. However, they differ in integration mechanism.

EDI, INTERNET BASED E-COMMERCE SYSTEM, AND THEIR IMPACTS

EDI has been widely adopted both in public and private sectors. Its users could be classified into two distinct types: initiators and adopters. The term "initiators" refers to EDI-initiating organizations. Initiators invest heavy resources to develop EDI applications and promote it to their trading partners. The term "followers" refers to those organizations which adopt and join the initiator's EDI network.

EDI provides an integration approach to shorten lead-time and reduce management cost. It enables trading partners to rationalize their operations. Combined with business process reengineering (BPR), it enables adopters to reduce both inventory levels and stock-outs (Lee *et al*., 1999). At the same time, the basis of EDI-based integration is no longer ownership but information sharing. Thus, compared with authority parties involved in hierarchical governance, adoption initiators of EDI could avoid heavy ownership burden without sacrificing the operation efficiency.

The relationship between initiators and followers is essentially different from that within vertical integration. Within vertical integration, all activities of peripheral units should encircle the benefit of the core unit. They are not independent and their own interest is in the secondary position. On the contrary, although EDI adoption followers' positions are weak compared with their initiators, they are independent and their primary concerns are their own interests. The reason they decide to enter initiators' EDI system is that they believed that they can achieve the business goals through the cooperation with initiators. The utility of whole EDI system is based on independent utilities of both initiators and followers. From the definition of bilateral governance, it is easy to say that the relationship governance between EDI adoption initiators and followers is bilateral rather than hierarchy compared with the relationship within vertical integration.

Internet-Based B2B E-Commerce Technology

The Internet-based E-commerce systems offer many benefits that EDI can not deliver. Two major ones are low construction cost and wide coverage. Internet technology urges the birth of e-marketplace. E-marketplace is an Internet-based virtual marketplace where organizations sell and buy products and services. For inter-firm governance, e-market is a relationship mechanism rather than just a virtual space. It has wide influences on different inter-firm governance.

Businesses with traditional market inter-firm governance suffer from high searching cost and lack of information transparence. They also bear relative high transaction cost. E-marketplace provides them with a good opportunity to overcome this problem. E-marketplace is an efficient communication platform. Because of the apparent advantages of Internet, customers are capable to obtain any information and finish simple transaction at low cost. It would become much easier for companies to find their best business partners.

For companies with hierarchical inter-firm relationship or those adopting EDI system, e-marketplace also provides all benefits EDI could offer and at the same time avoids EDI's disadvantages. E-marketplace lowers the doorsill of technology adoption. It helps to increase market liquidity. Thus, both preponderant party and weak party would have more choices. The potential commitment aroused by heavy investment on system infrastructure would be released. It means that transaction parties become more independent than before. At the same time, facing keener competition, weak parties will be more motivated to raise system implementation level and thus improve cooperation quality.

On the other hand, Internet also brings changes to supply chain system. Adopters do not need to construct or use VAN any more. Information and business documents could be transferred through Internet. There is no heavy investment for system adoption and upgrade.

IT Impact at Micro Levels

Heide (1994) proposed several evaluation standards for inter-firm governance based on three dimensions: relationship initiation, relationship maintenance and relationship termination. Relationship initiation is about the evaluation of potential business partners, initial negotiations, and preliminary adaptation attempts (Dwyer, Schurr, and Oh 1987). Relationship maintenance involves role specification, planning, adjustments, monitoring procedures, incentive system and means of enforcement. In the following section, these standards are used to show how information system influences inter-firm governance.

Relationship Initiation

Market governance does not require an initiation process (Butler, 1983). Hierarchical and bilateral relationships need initiation but the processes are different. Bilateral governance involves more stringent initiation process.

Both EDI adopters and Internet based e-commerce technology users need relationship initiation. In both situations, the transaction parties are independent to each other. Their relationship is based on cooperation rather than coerce from one party to the other party. Thus, besides skill and qualifications, subjective attitude and value orientation are also important for the future relationship.

Role Specification

Role specification describes the manner in which decisions and functions are assigned to the parties in a relationship (Gill and Stern, 1969). In market governance, roles are related to discrete transactions (Kaufmann and Stern, 1988). In hierarchical governance, roles are specified by one party to others through an authority. In bilateral governance, role specification is more complex and more integrated with the exchange partners (Heide, 1994).

For EDI adopters, roles need to be specified for a long-term relationship. Initiators take advantage of their dominating positions and control the role specification. Thus, at this index, EDI adopters are more likely in hierarchical governance.

Internet technology users' role specification is also for long-term. Compared with EDI adopters, they own more independence to each other. The role specification is done mainly through negotiation and cooperation.

Planning

Inter-firm planning is the process by which future contingencies and consequential duties and responsibilities in a relationship have been made explicitly (Macaulay, 1963). Under market governance, over time planning is implicitly deemed not to exist. The planning process in a hierarchical relationship is centralized and formalized contingency plans are developed (Cyert and March, 1963). Planning with bilateral governance is a decentralized activity and exhibits significantly lower levels of specificity and completeness. It is more like aids or frames of reference rather than strict specifications of duties.

EDI initiators' positions in planning are very strong. They make the plan. The followers usually have no choice but to accept it. For the EDI adopters, the planning process is centralized. EDI adopters are more likely in hierarchical governance at this index.

For Internet technology users, no party has the capability to determine the planning process of the others. The planning process is relatively decentralized.

Adjustment processes

For market governance, the need for making ongoing adjustment is somewhat limited by default. Changes could easily incur transaction cancellation. Hierarchical governance explicitly provides the ability to make changes by designing specific devices through which changes are to be made. Adjustments under bilateral governance are mutual processes (Thompson, 1967). Both sides are prepared to show flexibility and negotiate adjustment when the environment changes.

Basically, almost all EDI followers are strictly limited by the initiators to make any adjustment to the transaction. Thus, EDI adopters are more likely in hierarchical governance at this index.

Internet technology users attempt to preserve a long-term relationship through changing environment. Thus, they usually need to experience significant adjustment. Because there is no relation dominator, adjustment can only be made through a mutual adaptive process. Without good cooperation and negotiation, no adjustment will be successful with them.

Monitoring Procedures

Monitoring could be accomplished either externally by measuring output and behavior or internally by aligning the incentives of decision makers to lower the necessity of performance measurement (Eisenhardt, 1985). Market and hierarchical governance are based on external measurement but their focuses are respectively on measuring output and behavior (Anderson and Oliver, 1987). Bilateral governance finishes measurement through socialization processes that promote internal self-control.

For EDI adopters, dominators mainly depend on the external index to measure the followers' performance. Sometime, especially when followers can not meet the requirements, dominators need to watch the working status of EDI system, which is the carrier of the relationship with EDI, before they make the final evaluation of the followers. How to improve the cooperation is an important concern for EDI initiators.

Among Internet technology users, there is no relationship dominator. Transaction parties depend more on socialization process to improve cooperation efficiency. Temporary performance fluctuation is not their primary concern.

Incentive System

For market governance, incentives are inherently short term in nature and are tied directly to the completion of a transaction (John and Weitz, 1989). For hierarchical governance, incentives are long term and based on observed behavior (Anderson and Oliver, 1987). For bilateral governance, incentives are less contingent on specific performance but more dependent on system-relevant attitudes and overt behavior (Ouchi, 1979). It is based on the displayed commitment and overt compliance to the system.

EDI adopters and Internet technology users share some characteristics here. The first reason for both to enter a relationship is the pursuit for a series of transactions in a long term. Their decision to stay in or leave the relationship also depends on its long term performance and transaction parties' attitudes.

Means of Enforcement

For market governance, enforcement is external to a given relationship through maintenance of competition (Walker and Weber, 1984) or offsetting investments in other relationships (Heide and John, 1988). Hierarchical enforcement is through legitimate authority based on employment relations or contractual arrangements. Bilateral governance focuses on the ongoing relationship itself: having established common values and taking the expectation of future interaction as incentives. Enforcement of hierarchical governance is by means of direct control. Those of market and bilateral governances rely on different incentive structure.

The primary adoption reason for EDI followers is initiators' pressure. Heide and John (1988) found that business parties having made specific investment tended to combine themselves closely to their partners to safeguard their investments. There is little common value between initiators and followers. Even now, the followers still have the right to withdraw from the relationship when they do not see any interests from it. Thus, at this index, EDI adopters are somewhere between hierarchical point and bilateral point.

Internet technology users depend on incentives but not legitimate authority or external enforcement. Actually, there is not authority on e-marketplace. Transaction parties' relationships are mainly based on common values and future benefit. There is almost no relationship enforcement on the transaction parties.

Table 1. Impact of EDI and B2B e-commerce

	Marketing	Hierarchy	Bilateral
Relationship Initiation	No initiation process.	Based on selective entry processes.	Based on selective entry processes. Even more stringent than hierarchy governance.
			EDI and E-commerce adopter
Role specification	Related discrete transactions and are defined only in terms of minimum level of duties required to complete the exchange.	Roles are specified by one party to others through an authority.	not only complex or multidimensional but also more integrated with the exchange partners.
		EDI adopter	*E-commerce adopter*
Planning	Focuses on discrete transactions. No over time planning.	Centralized and formalized contingency plans, specifying categories of environmental events and corresponding procedures and contractual.	Decentralized and significantly lower levels of specificity and completeness. Be more like aids or frames of reference rather than strict specifications of duties.
		EDI adopter	*E-commerce adopter*
Adjustment processes	Limited need for making ongoing adjustment. Changes could easily incur transaction cancellation.	Designing specific devices through which changes are to be made.	Mutual adjustment. Both sides are prepared to show flexibility and negotiate adjustment when the environment changes.
		EDI adopter	*E-commerce adopter*
Monitoring Procedures	Based on the use of external measurement procedures	Based on the use of external measurement procedures.	Through socialization processes that promote internal self-control.
			EDI adoption, E-commerce adopter
Incentive System	Incentives are short term in nature and are tied directly to the completion of a transaction.	Incentives are long term and based on observed behavior.	Incentives depend on system-relevant attitudes and overt behavior.
			EDI adopter, E-commerce adopter
Enforcement	External to a given relationship. Through the use of legal system, maintenance of competition or offsetting investments in other relationships.	Through legitimate authority based on employment relations or contractual arrangements.	Having established common values and taking the expectation of future interaction as incentives.
		EDI adopter	*E-commerce adopter*
Relationship Termination	Every transaction constitutes a completed event. When a transaction is over, it means that the inter-firm relationship based on that transaction is over.	Included in the inter-firm contract or, relationship duration need not be clarified but one party is capable of renegotiating or terminating the relationship.	Entirely open-ended relationships with infinite or foreseeable termination points.
		EDI adopter	*E-commerce adopter*

Relationship Termination

For market governance, when a transaction is over, the inter-firm relationship based on that transaction is over. For hierarchical governance, relationship commencement and termination usually are included into the inter-firm contract (Dwyer, Schurr and Oh, 1987) or, relationship duration need not be clarified but one party is capable of renegotiating or terminating the relationship (Brickley and Dark, 1987). Bilateral governance has entirely open-ended relationships with infinite or foreseeable termination points (Macneil, 1978).

EDI initiators have the capability to renegotiate or terminate the relationship when they need while some time followers can not renegotiate at their will. For Internet technology users, there is infinite terminations point. Duration of a relationship is decided by business partners' evaluation on their relationships and future benefit expectation.

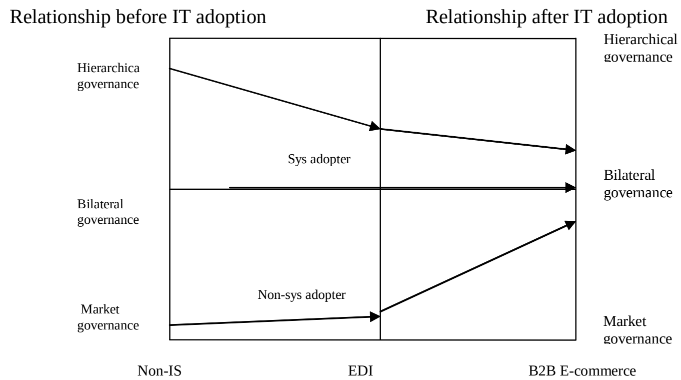
In summary, EDI adopters are more likely in the mode of bilateral governance in the areas of initiation and incentive. However, they tend to be in hierarchical governance in the areas of role specification, planning, adjustment, monitoring, enforcement, and termination. Internet based e-commerce users exhibit more characteristics of bilateral governance in almost all aspects. It means that Internet based e-commerce technology is more powerful than EDI in transforming inter-firm relationship from market governance or hierarchical governance to bilateral governance (see Table 1).

A MODEL FOR INTER-FIRM RELATIONSHIPS TRANSFORMATION

A model to illustrate and predict the inter-firm governance transformation is proposed below (Figure 1). Several observations can be made based on the above analyses:

1. Information technologies are changing inter-firm relationships.
2. The general transformation trend is that the traditional hierarchical or market governances are converging into bilateral governance due to the adoption of EDI and Internet based B2B e-commerce technology.
3. Different initial inter-firm relationships experience different transformation path. For example, some market relationships are being transformed by B2B e-commerce into bilateral relationships, while some bilateral relationships remain unchanged after the e-commerce adoption.
4. Internet based B2B e-commerce technology plays a more significant role than EDI does in the transformation process.

Figure 1. A Model for inter-firm governance transformation



The transaction cost theory can be extended to explain the transformation process.

Clemons et al., (1993) defined transaction cost as the sum of coordination costs and transactions risk. Usually, low transaction costs favor market relationship. High transaction costs favor hierarchical relationship (Grover & Malhotra, 2003).

Within this study, Clemons' transaction cost is taken as *direct transaction cost*. Correspondingly, total transaction cost is the sum of *direct transaction cost* (as defined above) and *alternative cost*. *Alternative cost* refers to the cost for the reduction of direct transaction cost. It is assumed that all firms seek to reduce *total transaction cost*. For example, the reason why some firms choose vertical integration is that their potential direct transaction costs are over the sum of ownership burden (alternative cost) and actual direct transaction cost. For firms running in arm lengths' relationship, the situation is opposite.

For traditional inter-firm relationship, it is difficult to find out which specific conditions favor bilateral governance (Grover & Malhotra, 2003). That is why traditional transaction cost theory doesn't identify bilateral governance. However, with B2B e-commerce, bilateral governance becomes popular. The primary advantage of bilateral governance is the concurrence of high integration and business parties' independence. It means less coordination cost, less transaction risk, and less alternative cost.

Compared with EDI, Internet based B2B e-commerce technology has brought down both infrastructure cost and coordination cost for business to business transactions. This is why B2B e-commerce technology favors bilateral governance more than EDI does.

CONCLUSION

The adoption of EDI and Internet based B2B e-commerce technology is transforming inter-firm relationships — from traditional market governance and hierarchical governance to bilateral relationships. A model is proposed to show the transformation process. The impact of the technologies is examined in terms of relationship initiation, role specification, planning, monitoring, and incentive systems. The implications of the changing inter-firm relationships include adjustments in a firm's planning and management processes. In some cases, business process re-engineering may be required to accommodate the changing inter-firm relationships. Future research in this area includes case studies and surveys to validate above theoretical analysis.

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References are available upon request.

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