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Buyer-Supplier Relationship and E-Commerce-An overview

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Abstract - Information exchange between the buyer and supplier is an important aspect of supply chain management. Business to Business e-commerce helps firms to share information, maintain relationships, and conduct transactions more efficiently. The choice of e-commerce transactions will influence, and as well as affect, the relationships between exchange parties. In this paper, we examine a collection of diverse studies on EDI and e-marketplace from marketing and information systems literatures. Findings for managers considering choices on e-commerce transaction mechanisms will provide a more consistent understanding of buyer-supplier relationships in the e-commerce context.

Keywords - *e-Marketplace, Governance, Buyer-Supplier Relationship.*

I. INTRODUCTION

There are numerous successful applications that have spurred more interest in the area and fostered the need for further research on methodological issues, algorithms and specialized development platforms. What still remains an open issue, however, is the question how to update/revise/optimize the respective systems when new data becomes available. Dynamic data mining comes into play by offering a coherent suite of technologies for “updating” and enhancing functionality of the existing data mining systems. Such dynamic aspects of systems have become highly relevant to all algorithmic categories of data mining such as, e.g., clustering, classification, association building, deviation detection, and visualization, to name the most representative examples. Soft computing, neural networks, fuzzy logic, and evolutionary computing, in particular form a coherent conceptual and algorithmic platform of design and analysis of intelligent systems offer evident advantages by supporting understanding, modeling, and experimenting in the presence of dynamic aspects of data mining. Evolutionary computing with its inherent adaptation capabilities brings powerful optimization mechanisms for dynamic data mining.

Information about the marketplace such, as consumer tastes, demand patterns, and inventory, is one of the most valuable resources within a supply chain. Information exchange between the buyer and supplier constitutes an important dimension in supply chain management. Advancement in information technology, including telecommunication technology and database management technology, has greatly improved the

exchange of information among firms in terms of the speed and clarity of communication. The primary impact of the Internet and web technology in supply chains has been to ensure that the right person has the right information at the right time

In the business-to-business setting, electronic commerce (e-commerce) is the sharing of business information, maintaining business relationships, and conducting business transactions by digital means over public or private telecommunications networks. E-commerce is associated with forecasting, sales and procurement activities, product development collaboration, production planning, and inventory management. E-commerce can help supply chain management to share knowledge, increase the speed of response, and reduce the costs of servicing a market by improving information exchange between exchange parties (Krishnamurthy 2002).

However, exchange parties taking on any form of e-commerce should consider the implications of e-commerce on the relationships between exchange parties and behavioral characteristics within the exchange relationships (Westland and Clark 1999). Interviews with researchers and senior managers on e-commerce issues indicated that current progress of e-commerce has been hindered by unanticipated technical, organizational, economic and legal challenges that diminish values. We divide e-commerce into two groups according to mechanisms: Electronic Data Interchange (EDI), and electronic marketplace (e-marketplace). While the Internet is sometimes used to refer to transactions other than EDI and e-marketplace transactions, we exclude the Internet as a transaction

mechanism. We define the Internet as an information network on which e-marketplace (or even some EDI) transactions take place. Also, from a relational aspect, Internet transactions can be considered as an extreme form of e-marketplace where the entire Internet is the marketplace.

Electronic Data Interchange (EDI) is a standard for the transmission of business documents, such as invoices, bills, and purchase orders, electronically using an agreed upon standard format. An EDI system allows linked computers to conduct business transactions of operational data in terms of quantity, product type over telecommunications networks such as intra-net or even the Internet. This can be more secure since partners use connections that cannot be accessed by anybody else.

An electronic marketplace (e-marketplace) refers to an electronic trading facility that brings together registered buyers and suppliers for the purpose of providing commercial information and conducting transactions over the Internet. An e-marketplace may be public where there are many known buyers and suppliers with some level of information visibility, or it may be private. Marketplaces can be created by buyers, suppliers or third parties who may or may not be neutral. An e-marketplace depends on a critical mass of participants so that there is a liquid market. By getting access to a wide range of suppliers, a buyer can procure at a significant discount to their usual practices. We use the term e-marketplace transactions to refer to all business to business transaction conducted through some marketplace platforms.

Some research had shown that a collaborative long-term relationship may not be suitable or feasible for all firms. A buyer may also maintain different forms of relationships with different suppliers because of different needs from various functional areas. Thus, the choice of e-commerce transaction mechanisms should also be relational context specific.

We believe that the choice of transaction mechanisms influences buyers' continuation and the nature of their relationship with their suppliers. The appropriate choice of mechanisms can affect a firm's strategy, procurement decisions, and performance. How should firms choose their mechanisms in e-commerce? How may this choice influence inter-firm relationships and their performances? Numerous and diverse studies on various different aspects on this issue have been done in the past. A summary that integrates findings from these studies will be valuable to managers considering choices on e-commerce transaction mechanisms. By understanding the factors influencing firms' choices on transaction mechanisms and the implications of these mechanisms on inter-firm relationships, managers can

manage their buyer-supplier relationships more effectively.

An extensive review of literature from marketing and information systems show on the nature of the difference between e-commerce transaction mechanisms, including the relational aspect and the influencing factors on the performance of these mechanisms. In general, a buyer's perspective is analyzed and presented. We defines the characteristics of EDI and e-marketplace by summarizing relevant marketing and e-commerce literatures. We identify four categories of characteristics, ease of switching, level of information sharing, governance, and control mechanism. We summarize relevant studies on the internal and external influences on buyers and suppliers in selecting transaction mechanisms and discuss three effects of choosing EDI or e-marketplace.

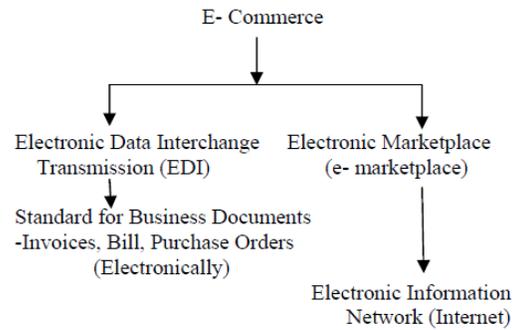
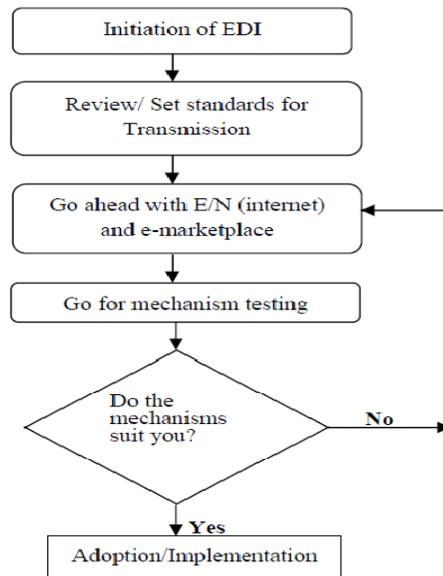


Figure: Classification



Flow chart showing Implementation of E-Commerce in Business

II. CHARACTERISTICS OF EDI AND E-MARKETPLACE

E-commerce has existed for a long time, but mainly in the form through private networks, such as EDI. Advancement of information technology in the last decade has introduced an alternative of e-commerce transaction, e-marketplace, through the Internet. Numerous studies on EDI help us understand its benefits and challenges. However, earlier studies before popularisation of the e-marketplace focus mainly on information technology in general or EDI specifically. Recent studies focusing on e-marketplaces often do not include EDI or so there is little direct comparison from e-commerce literatures on both transaction mechanisms.

The role of EDI in forming the network enterprise, grouping of small and medium-sized subcontractors, suppliers, and distributors around a large pivot firm. Some researchers investigated the nature of firm participation in B2B e-marketplaces. The nature of participation is defined by organizational motivation, such a drive to efficiency, and ability, such as organizational learning and information technology capability. They concluded that both motivation and ability are important in determining the nature of participation; however, the level of influence of motivation and ability varies with the nature of participation (Grewal, Comer et al. 2001) and examined the implications of electronic shopping for consumers, retailers, and manufacturers. They assume that near-term technological developments will offer consumers unparalleled opportunities to locate and compare product offerings. They examine the advantages of e-marketplace, locate and compare product offerings, as a function of typical consumer goals and the nature of products and services being sought. They found industry structures influence the competition among retailers, competition among manufacturers, and retailer-manufacturer relationships. While these studies did not specifically discuss the effect of different transaction mechanisms, their findings support the argument that the choice of e-commerce transaction mechanisms may be relational specific to context.

III. REDUCTION OF TRANSACTION COST

In general, e-commerce, including both EDI and e-marketplace, can help reduce transaction cost by reducing the cost, delay and errors when the clerical processing of orders is automated electronically. EDI further helps firms to improve efficiency of operation through reducing the cost of communicating with counterparts regarding transaction details.

However, EDI participants have relatively higher transaction specific assets compared to that of e-

marketplace participants. This is because EDI systems require its participants to retain technicians handling information systems, to invest in new or additional hardware or software, and sometime to modify operating procedures. This investment therefore becomes a switching cost for participants, since the investment is lost when a firm discontinues its relationship with EDI creator. The implementation process can be complicated. Firms often cited the implementation problem as a barrier to participate in EDI (Brenner and Hamm 1996). However, successful EDI participants develop their buyer-supplier relationships during the implementation process as they learn to understand the requirements of their exchange partners (Fearon and Philip 1998). Thus, the transaction specific assets and learning curve occurred during the process of implementing EDI contributes to maintaining existing inter-firm relationships. Unique information and service exchanging through EDI are a great value to exchange parties. However, such exchanges require idiosyncratic changes for exchange parties, and the changes increase cost of switching to a competitor. Higher switching costs by EDI participants cause the difficulty of joining the EDI by unaffiliated parties; by establishing enduring patterns of repeat trading, networks restrict access. Network such as EDI dictates the adoption of a particular technology, so it is more difficult for unaffiliated parties to join the network (Powell 1990). Opportunities are thus foreclosed to newcomers, either intentionally or more subtly through such barriers as unwritten rules or informal codes of conduct.

E-marketplace transactions are usually conducted via Internet. So the investments on information technology (i.e. transaction specific assets) to participate in an e-marketplace is relatively little among participants compared to participants of EDI. E-marketplace also reduces searching costs by assisting firms to find exchange partners in a market setting and making price and product comparisons. Participants of an e-marketplace can replace current exchange partners easily because of the low switching costs and the openness of the e-marketplace due to low transaction specific assets and ease of finding new partners (Grewal, Comer et al. 2001). Thus, the relationship between exchange parties can be limited to a single transaction and the buyer-supplier relationship is unstable.

Level of Information Sharing

EDI enables exchange parties to share product and operational information such as price and delivery date frequently. Overtime, such information sharing over EDI can help exchange parties to understand their partners. Powell found that exchange parties trust information that comes from partners they know well.

Thus, EDI creates a structure generating reliable information.

Sharing reliable information between buyers and suppliers can dramatically reduce indirect costs such as inventory levels and direct costs such as order entry or receipt throughout the entire industry value chain. In this case, frequent updates on market demand for a specific product can help suppliers to manage the volume of supplying parts, which reduce inventory of the buyers.

While it is equally important to share reliable information among e-marketplace participants information sharing activities among participants of e-marketplace occurs at a different level from that of EDI participants. E-marketplace participants typically share information sufficiently to define the contractual agreements (Kaplan and Sawhney 2000). But ease of switching of exchange partners cautions participants to share information that may be considered sensitive, such as real time demand or performance data (Chen and Meixell 2003). The nature of discrete exchange also does not motivate participants to share information frequently to enable a better understanding of the partners for future exchanges.

Governance

EDI generates bilateral governance between exchange parties. Bilateral governance is based on the process of mutual adjustment to take care of uncertain environments. According to social exchange theory, a party's dependence on its partner leads to the partner's power in the dyadic relationship with its partner. Thus, power is the degree to which one party can influence another party to undertake an action. Since EDI participants depend on the EDI network creator, the network creator has a power over the participants. On the other hand, since it is more difficult for previously unaffiliated parties to join an existing network, the creator depends on participants. As the relationship with the sponsor moves from periphery to core of the participant's business, the relationship becomes more significant to the participant. Thus, it becomes more difficult for a potential competitor to displace the network creator (Johnston and Vitale 1988). Thus, interdependence between network creator and participants increases, as the exchange goes on. Both parties' symmetric and high interdependence lead to bilateral governance.

Bilateral governance possesses strength of reducing governance costs such as monitoring costs. Monitoring is checking the quality of products, delivery schedule or on-time delivery. The economization of monitoring costs could be due to the EDI's characteristic of ample information exchange. Information technology can improve the generation and evaluation of alternatives, so

exchange parties can economize on monitoring costs (Bakos and Treacy 1986; Powell 1990).

Discrete transactions and unstable relationships are the unique characteristics of market governance. Participants of e-marketplace are less likely to depend on their partners, so they rarely have a motivation to follow their partners' request (Axelrod 1984). Thus, the e-marketplace provides little foundation upon which a power structure develops and an exchange party has little control over the activities of a partner (Noordewier, John et al. 1990).

On the other hand, the low switching cost of e-marketplace does create competition among the suppliers, or among the buyers. Together with the open characteristics of an e-marketplace, buyers can find low cost producers and suppliers can find the best offers easily.

Control

Buckley and Casson suggested that the sharing of information often leads to the emergence of common values (Buckley and Casson 1988). Thus, the repeated information exchange via EDI becomes a routine procedure in which exchange parties develop common values or relational norms. Since EDI extend the relationship into the future, the expectation of future exchange stimulates exchange parties to observe norms developed by the repeated relationship.

Relational norms constitute relevant behavior that socially prescribes an exchange parties' behavior. A shared set of implicit norms developed between exchange parties regulates the activities of the parties. Thus, relational norms provide order to ambiguous situations. Relational norms direct exchange parties to keep a certain level of limitation with which they may search for alternative ways to achieve their goals. Since relational norms prescribe appropriate behavior, they act as a control mechanism for exchange parties. A degree of self control is achieved by relational norms.

EDI networks enable participants to share information frequently. Each party learns and understands the internal and external environments of the other through repeated transactions. This enables the development of relational norms among participants that produce voluntary efforts for mutual benefits between them. Thus, they produce better coordination and stability in the relationship.

Relation norms developed by EDI are another cause for exchange parties to be less likely to depend on monitoring. Thus, the exchange parties self control to achieve mutual benefits. One example of this self control is the parties' mutual adjustment in a changing

environment by showing flexible behavior (Heide 1994).

While there is market governance in an e-marketplace, if exchange parties do not expect future exchange, the motivation of suppliers to control product quality or on-time delivery is low. Thus, exchange parties in an e-marketplace cannot rely on partner's self control. In order to enforce contractual agreements, exchange parties emphasize reactive measurements on monitoring outputs and behaviors. These can only be assessed after the transaction is completed, such as monitoring product quality or on-time delivery when a product is delivered to the buyer. So e-marketplace buyers can suffer from high monitoring costs to prevent opportunistic behaviour.

IV. FACTORS INFLUENCING

4.1 Environmental Uncertainty

Environmental uncertainty is defined as the extent that uncertainty decreases as an industry matures; the benefits that accrue to integration presumably decline. Exchange parties can feel uncertain when they do not have enough information for achieving their goals. Thus, an information exchange between parties is a better way to deal with uncertain problems. Uncertainty increases the need for reliable information consistently over time. Exchange parties therefore possess a need to share information under the conditions of uncertainty (Powell 1990). Next, we define three sources of uncertainties, environmental dynamism, technology uncertainty, and environmental diversity.

Environment dynamism (consumer demand uncertainty) is defined as the frequency of change in consumer demand for a manufacturer's product. Information exchanges between a buyer and its supplier about changes in customer tastes or sudden infections help them to quickly bring the appropriate product to the market and adjust product features to meet market demand (Krishnbamurthy 2002). Thus, EDI helps exchange parties to reduce uncertainty in consumer demand. In addition to the information exchange, the relational norm should guide the supplier to a flexible response towards the buyer's request. For instance, when demand on a buyer's product soars, the suppliers with EDI can actively respond to the surge of demand from the buyer. Thus, though EDI cannot directly reduce consumer demand uncertainty, the relational norm developed through EDI is likely to buffer the uncertainty.

Technological uncertainty is defined as the degree at which focal product features and technologies are changing (H. Technological uncertainty motivates a buyer to increase search efforts to obtain new

information. High degrees of technology uncertainty can create huge information needs.

Network forms of organization are more likely to proliferate to the extent that exchange parties need information to innovate. EDI may allow buyers and suppliers to share information on changes in product features and technology more quickly. However, current forms of EDI and an e-marketplace are not designed for product development process. Thus, neither of them will help participants in the case of high technological uncertainty.

Environmental Diversity is defined as the extent of dissimilarity between different environmental factors that buyers face. Exchange parties facing a diverse environment have to deal with more diverse resource requirements, which increases their information needs. A party with greater information requirements develops mechanisms to deal with the information, such as an increasing capacity to handle the information. Close and frequent interaction between parties who are related to the required information increases information-processing capacity. Since EDI enables close and frequent interaction between parties, environmental diversity leads to the development of the EDI system. On the other hand, relying on the e-marketplace cannot solve the problem of obtaining the information in time. Thus, as environmental diversity increase, exchange parties are less likely to depend on the e-marketplace.

4.2. Environmental Concentration

Environmental concentration is defined as the extent to which a buyer perceives that resources are controlled by few suppliers and provide most of its resources to many manufacturers. Due to the high cost and complexity of EDI implementations, suppliers have little motivation to participate in EDI when environmental concentration is high.

E-marketplace can only provide a limited advantage in help searching for the lowest cost supplier if there are only a few suppliers supplying a unique product. Thus, buyers will rely less on the e-marketplace when environmental concentration is high.

Complexity of Product Features

Complexity of product features refers to the amount of information needed to specify the attributes of a product to allow buyers to make a selection. Bakos found that, in the market characterized by heterogeneous product offerings, buyer search costs can result in substantial inefficiencies (Bakos 1997). In general, an information network system provides the buyer with advantages of getting all the necessary information timely. When a product is not unique and easily described in standardized terms (commoditized

products), buyers are likely to rely on electronic markets. Powell argues that exchange parties are more likely to obtain commoditized resources through short-term market transactions (Powell 1990). Thus, buyers who need commoditized products can take full advantage of the market competition of e-marketplace since standardized product features allow easy comparison among suppliers in an e-marketplace.

Information Technology Capability

Information technology capability is the degree to which exchange parties can carry out e-commerce. EDI requires participants to possess a high level of information technology and the capability of maintaining such technology. Thus, when exchange parties already have a high level of technology capability, they are more likely to rely on EDI to take advantage of such capability.

Participating in an e-marketplace requires little transaction specific investment and maintenance cost. Thus, exchange parties with low IT capacity are more likely to rely on the e-marketplace.

V. CHOICE OF TRANSACTION MECHANISM

The effects of EDI and e-marketplace mechanisms on firms given the characteristics of the two transaction mechanisms and the influencing factors are discussed

Opportunism and Penalty

Opportunistic behaviours arise when an exchange partner has the opportunity to promote self-interest at the expense of its counterpart. Powell stated that exchange parties' desire for continuing relationships is likely to discourage opportunistic behaviour. In the context of e-commerce transactions, examples of opportunistic behaviors are poor quality products from a supplier, or refusal of payment by a buyer after receiving payments. Since opportunism from a partner will result in undesirable outcomes for its counterpart, engaging in opportunistic behaviours will likely terminate the current business relationship. Thus, the more information exchange between exchange parties, the less opportunistic behaviour parties engaged in. There is also less likelihood promoting self-interest in the event of termination of the EDI relationship because of the transaction specific assets participants invested in. Thus, the high level of transaction specific investments involved in EDI should reduce opportunistic behaviours from participants.

E-marketplace participants have less information sharing activities and little transaction specific investment. Thus, there are more opportunities and fewer penalties when one engages in opportunism.

While contractual agreements should deter opportunism to a degree, this is true for e-marketplace as well as EDI.

VI. LONG TERM ORIENTATION

Long-Term Orientation is the tendency of exchange parties to gain benefits in the long run. Since EDI requires a significant amount of transaction specific investments such as hiring technical personnel for managing information technology and installing facilities such as computer and software, EDI participants need to recover the investment. Since it takes time to recover these investments, exchange parties need to maintain long-term, locked-in relations with their partners. E-marketplace requires little transaction specific investments from participants. Thus, exchange parties risk little switching cost when they discontinue relationships with their current partners. They can replace the current partner whenever they find a good partner who offers a better deal. Thus, parties engaging in an e-marketplace transaction do not necessarily imply a future trading relationship. Participants therefore have short-term orientation in the relationship with their partner.

Environmental Uncertainty

E-marketplace offers little benefits when firms face high environment uncertainty because of the limited information exchange among participants. The main benefit of e-marketplace is rooted in the ease of switching. From the operational perspective, we conclude that firms should choose e-marketplace mechanisms as long as it satisfies the minimum requirements of information sharing to specify procurement requirements. Procurement requirements include product and demand specifications, such as product type and quantity. As long as this is satisfied, firms can enjoy the low upfront investment to benefit from e-marketplace with the ease of switching in the future. Since firms should be able to identify procurement requirements with ease, it should be relatively easy to identify opportunities for using the e-marketplace to save cost.

VII. CONCLUSION

The matter of strategic consideration is more complex because firms have to consider future trends. Procurement requirements become more complex as environmental uncertainties or product complexity increase. When these requirements become more complex, the structure of information exchange in an e-marketplace can quickly be overloaded. So procurement via e-marketplace becomes infeasible or problematic. In these situations, EDI transactions will perform better than e-marketplace transactions. It is easier for firms to assess current procurement requirements than to foresee

future changes in environment uncertainties. Choosing e-marketplace transactions to satisfy current needs is a safer decision. On the other hand, firms may make a strategic choice to use EDI transactions if firms foresee significant increases in environmental uncertainties or product complexity. In this situation, firms should commit to EDI transactions long before these phenomenon's take place in order to establish the relational norms. In the future, advancement in information technology may reduce the cost of deploying and maintaining information networks that enable the sharing of rich and reliable information more frequently.

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