McMaster University
MICHAEL G. DEGROOTE SCHOOL OF BUSINESS

RESEARCH AND WORKING PAPER SERIES

BUYER-SUPPLIER RELATIONSHIPS AND THE ADOPTION OF ELECTRONIC MARKETPLACES

By

Shan Wang and **Norm Archer**

Michael G. DeGroote School of Business
McMaster University
Hamilton, Ontario

Working Paper # 459

January, 2003

Buyer-Supplier Relationships and the Adoption of Electronic Marketplaces

Shan Wang
School of Business, McMaster University
Hamilton, ON L8S 4M4 Canada
Wangs7@mcmaster.ca

Norm Archer
School of Business, McMaster University
Hamilton, ON L8S 4M4 Canada
archer@mcmaster.ca

Abstract

Despite the high expectation that researchers and practitioners put on business-to-business electronic marketplaces (EMs), they have not prospered as expected. Relatively high setup and maintenance costs, the need for organizational changes, uncertainty of investment, and transaction risk are among the reasons mentioned most often that deter the adoption of EMs.

This paper argues that buyer-supplier relationships play a significant role in the adoption decision. Although EMs, by acting more than as a market, make both long- and short-term relationships efficient, this efficiency gain does not necessarily lead firms to favor an EM strategy. Certain aspects of incentives also complicate the decision. A framework is provided to identify the elements (industry type, inter-organizational relationship type, and transaction and product attributes) that affect relationships and thus influence the adoption decision. A case study, which compares EM adoption decisions in fragmented and concentrated industries, is presented as a preliminary verification of the framework.

Key words: Adoption, Buyer-Supplier Relationships, Electronic Marketplaces

1. Introduction

Electronic commerce via the Internet has proliferated since 1995. But after the failure of the first wave of dot com businesses in 2000, business-to-business (B2B) electronic commerce became "where the big money will be", and B2B electronic marketplaces (EMs) were believed to have become "the password to success on the World Wide Web" (Berryman and Heck 2001) (All references to EMs in this paper refer to B2B EMs).

Currently, although many EMs have failed, there are numerous EMs active in many value chain steps in almost all industries. For example, in the aerospace and defense industry, *Cordiem* joins airlines and their suppliers in one exchange, *Exostar* is an EM that focuses on the defense industry, and *GE Aircraft Engines* sells its aircraft engines and provides inventory information in its own private marketplace. Other industries in which EMs exist include chemistry, automotive, agriculture, construction, electronics, energy, financial services, healthcare, hospitality and travel, human resources, metal, oil and gas, paper and forest products, etc (Forbes 2002).

EMs have adopted a variety of business models. According to the transaction mode used by these intermediaries, they can be classified as brokers, dealers, auctions, and exchanges (Lucking-Reiley and Spulber 2000). Classified by revenue sources, there are transaction fee-based, subscription fee-based, membership fee-based, or license fee-based EMs (Phillips and Meeker 2000). From the combination of sourcing

methods and products that are transacted in a marketplace, EMs can be classified as MRO hubs, yield managers, exchanges and catalog hubs (Kaplan and Sawhney 2000). From the perspective of EM ownership, they are usually recognized as either independent market makers (public marketplaces) or industry-sponsored EMs (private marketplaces). Due to security and trust considerations, private marketplaces have been in more favor recently over public marketplaces (Young 2002).

However, no matter what business model is used by an EM, and no matter what industry and value chain utilizes an EM, a large number of EMs have failed. Among the 200 B2B sites that Forbes Online has tracked, most have disappeared since 2000. The reasons for their low adoption rate include high physical setup cost, market power of trading partners, and transaction risk (Chircu and Kauffman 2000). We believe that an additional very substantial barrier is due to the impact of EMs on buyer-supplier relationships, influencing management decisions on their adoption. What are the impacts of EMs on buyer-supplier relationships? Will these impacts act against the adoption of EMs or favor the adoption of EMs? What elements affect the adoption of EMs and what corporate considerations enter into the adoption decision? The purpose of this paper is to address these questions.

Our literature review brings out the impact of inter-organizational systems (IOSs) on buyer-supplier relationships. By analyzing commonalities between IOSs and EMs, and the unique characteristics of EMs, we see that EMs make both long- and

short-term relationships efficient. However, these efficiency gains will not necessarily lead to a quick adoption of EMs. We develop a framework that reflects the adoption decision in terms of multiple elements, where buyer-supplier relationships play a key role. Then we use a case comparing EMs in two industries through our framework, to demonstrate the reality of EM adoption decisions.

2. Trends in Buyer-Supplier Relationships and Firm Governance Structure

Although our aim is to analyze the adoption of EMs, we will start the discussion from the inter-organizational systems (IOS) literature because EMs are basically IOSs facilitated by intermediaries. Findings on the impact of IOSs on buyer-supplier relationships can be applied to EMs to a limited extent.

In recent years the information systems literature has experienced an ongoing debate on the impact of inter-organizational systems on buyer-supplier relationships and organizational governance structure. Some have argued that IOSs will favour arm's length short-term relationships (electronic markets), while some empirical works have shown that even open networks (network openness is defined by the extent the network allows easy communication with a new customer, supplier and other entities) will favour long-term relationships (electronic hierarchies and network organizations).

Early researchers argued that IOSs favour market-like relationships between firms since IOSs will reduce transaction costs, and especially coordination costs (Garicano

and Kaplan 2000). Malone and Yates suggested that electronic linkages had three effects: electronic communication effects, electronic brokerage effects, and electronic integration (Malone et al. 1987; Malone et al. 1989). Electronic communication effects refer to the reduction in time and cost of communication; electronic brokerage effects refer to the ability of electronic intermediaries to match buyers and sellers at lower cost, higher quality and speed; and electronic integration refers to integrated business processes. They argued that both electronic communication effects and electronic brokerage effects would favor market-like relationships, and electronic integration will favour hierarchies. Since the former two effects are more significant than electronic integration effects, EMs would lead to a more market-like structure for inter-firm relationships.

Evans and Wurster (1997) predicted the demise of hierarchies, using the notions of "reach and richness". Reach refers to the number of people who are exchanging information. Richness refers to the depth of information itself, defined by bandwidth, customization and interactivity. Traditional markets facilitate reach at the sacrifice of richness, and vice versa for hierarchies. They suggested that electronic markets enabled organizations to extend their reach, often with a negligible sacrifice of richness, which made hierarchies less attractive.

Discrepancies in these predictions of market-like relationships come from three sources. First, the purported shift from electronic hierarchies to electronic markets is

over-simplified and cannot be mapped into the real world. In fact no firms can be said to participate in either pure markets or hierarchies. By blending the components of classic organizational design, Holland and Lockett's work (Holland and Lockett 1997) extended the idea of these pure forms into a mixed mode network structure. Second, the empirical examination of some open network-based IOSs in France and the United States shows evidence that even open networks are typically used to support hierarchical relationships (Steinfield et al. 1995). These authors then suggested that the effect of electronic integration of EMs was greater than electronic communication effects and electronic brokerage effects, favouring hierarchical relationships over market relationships.

Third, a "move to the middle" hypothesis (Clemons, Reddi et al. 1993), was invoked by the observation that buyers tend to use limited numbers of suppliers in some industries (Helper 1991; Bakos and Brynjolfsson 1993). The move to the middle is a double move: away from the hierarchical and vertically integrated organization to a higher degree of outsourcing, and at the same time away from markets towards a situation involving just a few cooperative partners. They suggested that the prediction of favored market-like relationships focuses too much on the physical/direct transaction cost, and ignores indirect transaction costs. Although reduced search costs, communication costs and a wider range of available choices are all important to firms, new business practices such as Just-In-Time (JIT) and Total Quality Management (TQM) address more the "non-contractible factors" than "contractible factors" (Bakos

and Brynjolfsson 1993). In Bakos and Bryjolfsson's work, contractible factors are identified as price and fit (non-price attributes that can be specified in contracts). Non-contractible factors are those contingencies that cannot be or are not specified in contracts and depend on the cooperation of suppliers when changes in contracts are required. Examples of non-contractible factors include product quality, trust, responsiveness, share of information, and innovation. Buyers rely on suppliers to make specific investments to improve quality, to be responsive to their requirements, to share production and marketing information, and to be innovative in satisfying changing customer tastes. Thus, buyers have to give suppliers incentives such as minimum purchase amounts or lock in contractual business relationships for a fixed period.

In fact, this "move to the middle" (Clemons et al. 1993), or "transaction in the middle"(Williamson 1985) forms another kind of organizational structure — the network organization. Network organizations link two or more organizations together by outsourcing certain non-core activities such as manufacturing, distribution, etc., which often results in tight and strategic relationships among the partners. The formation of such a network can be for a variety of reasons (Gulati 1998; Madhavan et al. 1998), such as efficient access to resources (tangible or intangible assets) that are not available internally, accessing new markets, focusing on core competency, enhancing competitive positioning and market power, increasing responsiveness to changing customer tastes, and risk sharing. There has been a phenomenal growth

in applications of network organizations during the last decade (Gulati and Gargiulo 1999), with the number of U.S. business alliances increasing at the rate of 25% per year during much of the 1990s (Harbison and Pekar 1998).

From this limited literature review, we see that IOSs have had a great impact on buyer-supplier relationships, and the debate is whether IOSs favour markets or hierarchies. The conclusion is somewhat surprising in that neither markets nor hierarchies are favoured, but in fact network organizations are. Even the work of Steinfield, Kraut and Plummer (1995) showed that hierarchies were favored in open networks; but they included network organizations in their definition of hierarchies. Consequently, we believe that the impact of buyer-supplier relationships greatly influences the adoption of EMs. In the next section, we will analyze the characteristics of EMs that are different from the average IOSs, and show that EMs make both long- and short-term relationships efficient.

3. Analysis of Electronic Marketplaces and Buyer-Supplier Relationships

3.1 Definition of Electronic Marketplaces

Basically, an EM is a market where electronic business transactions take place. Some papers explicitly refer to EMs as "electronic exchanges"(Phillips and Meeker 2000). This narrow definition captures the most basic activities of a market: buying and selling. Furthermore, because of support from the IT infrastructure, an EM is more

efficient and transparent than the traditional market (Clemons and Kleindorfer 1992; Brynjolfsson and Smith 1999). The characteristics of such a market are summarized as follows: price is the basic mechanism for coordinating the flow of information and goods. Furthermore, because buying and selling are conducted through an electronic platform, pricing in EMs is more flexible and variable than in traditional markets. For example, dynamic pricing, auctions and reverse auctions can now be used widely (Smith, Bailey et al. 1999).

An EM is a centralized market, linking buyers and sellers through an intermediary and relying on the technical platform that the intermediary provides. The intermediary functions as a central planner that coordinates all selling and buying activities. However, the intermediary has no power over what and how much participants should buy or sell. In this sense, an EM is an IOS with an intermediary in the middle as the base of transactions (In the case of private EMs, the sponsor takes the role of both the intermediary and the buyer or seller). Furthermore a public EM is a special kind of IOS—a multilateral inter-organizational system (IOS), which facilitates inter-firm interaction among multiple buyers and sellers (Bakos 1991; Grewal, Corner et al. 2001). This form of IOS is different from traditional electronic data interchange (EDI), which involves only a bilateral link between two parties. A public EM is also an IOS, in that it involves more participants and there may be no predefined relationship between the participants (Cunningham and Tynan 1993; Choudhury 1997). It extends beyond the bilateral IOS that exists only between two firms and incorporates multiple

buyers, sellers or partners in the system. As a multilateral IOS, an EM tends to have a great impact on the relationships among participants, inducing interdependence among them (lock-in effects) and connecting some participants into a network organization (Clemons and Kleindorfer 1992).

Finally an EM is a value network. Stabell and Fjeldtad (Stabell and Fjeldstad 1998) reconfigured the value of organizations for competitive advantage and classified them as value chains, value shops and value networks. EMs fall into the third group: value networks. In this network, mediators (intermediaries) manage an EM as a club, establishing, monitoring and terminating relationships among members. Buyer-supplier relationships exist between members of the club, but to the mediators they are all customers. The value of an intermediary service is a function of positive network demand side externalities. Mediation activities are performed simultaneously at multiple levels, compared with sequential activities that occur in a manufacturing industry value chain. Standardization facilitates the matching of buyers and sellers and monitoring the execution of orders.

Although it functions basically as a market, an EM extends beyond this narrow definition, and act as both an IOS and a value network. A further study of EM functions will make it clear how an EM acts to make both long- and short-term relationships efficient.

3.2 Functions of Electronic Marketplaces

The roles of intermediaries and the services they provide have received extensive attention. Archer and Gebauer (Archer and Gebauer 2002) gave some examples of market functions such as aggregation, catalog management, protocol/format translation, sourcing solutions and market information. Choudhury and Hartzel (Choudhury and Hartzel 1998) suggest that an EM supports the following functions: identification (identifying a set of potential trading partners), selection (accessing the price and product information and contacting sellers or buyers), and execution (facilitating the transaction). Bailey and Bakos (Bailey and Bakos 1997) grouped functions of intermediaries into aggregation, trust, facilitation, and matching. Bakos (Bakos 1998) provided a slightly different classification: matching buyers and sellers (determining product offering, providing search and price discovery), facilitation of transactions (providing logistics and trust) and institutional infrastructure (dealing with legal and regulatory issues). Since none of the above classifications capture the difficulties of recent efforts of intermediaries to initiate and maintain buyer-supplier relationships, our classification tries to include relationship perspectives, based on these works (see Table 1).

***** Table 1 about here *****

a). Aggregation

Intermediaries aggregate multiple buyers and suppliers in one place to reduce search costs of trading partners. In this way, the marketplace can achieve economies of scale and scope, reduce information asymmetries, and increase the bargaining power of

buyers and suppliers. Intermediaries also aggregate product offerings and provide buyers with product features.

b). Market Matching

Intermediaries have better knowledge about market demand and supply, and can use this knowledge to help buyers and suppliers to locate appropriate trading partners. Intermediaries can also offer price discovery mechanisms such as dynamic pricing. Compared with aggregation, a market maker plays a more active role in market-matching functionality.

c). Collaboration

Any activities beyond aggregation and market matching are called collaborations. There are two layers of collaboration: transaction automation and relationship automation (Phillips and Meeker 2000). Transaction automation services include catalog management, logistics, settlement, trust (credit system), dispute resolution, and regulatory policies such as rules and regulations, monitoring, and enforcement. However, a good EM should not only automate transactions but should also support many of the relationship dimensions resulting from interactions between businesses. There are many possible collaboration opportunities: "*almost every business process between business partners can be improved or completely restructured by taking it online.... Many functions are naturally shared business processes. Other functions are highly specialized and not strategic to the core business and can be outsourced to*

an e-hub"(Phillips and Meeker 2000). For example, the calculation of tariffs and duties is complex and common to all industries. Intermediaries can provide such services. Other examples of collaboration opportunities may be contract management, project management, and document management. The detailed design of these functions depends on specific industries (Phillips and Meeker 2000).

From this analysis we see that an EM can be more than just a simple market to perform aggregating and match-making functions; it can be extended to include collaborations. Researchers call this advanced EM a "hub", or an "e-hub" (Kaplan and Sawhney 2000) (Phillips and Meeker 2000), or "collaboration commerce" (Phillips and Meeker 2000). In this sense, an EM is more like a kind of business model than a market where ad hoc buying and selling occur. Since collaboration is the key to the success of network organization, some network organizations utilize EMs as facilitators in their networks. And some new network organizations are formed when organizations collaborate through EMs.

3.3 Electronic Marketplaces and The Buyer-Supplier Relationship

Since our focus is mainly on buyer-supplier relationships, we will transform governance structures we examined in the literature review into relationships in our analysis. In the market governance structure, after each transaction, trading parties are free of future obligations, and a short-term relationship exists between buyers and suppliers. In a network structure, the promise of long-term relationships is what

encourages partnerships and trust. In hierarchies, buyers and suppliers either transact within one unit of the organization, or transact through a well-defined hierarchical relationship. Both involve long-term relationships and controls that are not present in networks or markets. To explain the linkage between EMs and buyer-supplier relationships, we have developed a model that shows how EMs make both short-term and long-term relationships efficient through different mechanisms (see Figure 1).

***** Figure 1 about here *****

There is little doubt that an EM supports a more efficient market, as well as efficient short-term relationships. Except for lower costs of search and communication, the following value-added intermediary services facilitate an efficient market: aggregating more buyers and sellers, match-making, and transaction level collaboration. Because of improved market transparency, price signals can convey more and accurate information. Dynamic pricing is also possible in EMs. Short-term relationships, a natural characteristic of market governance structure, are more efficient and robust in an EM environment since the opportunistic behaviors inherent in short-term relationships are curbed by more accurate price signals.

EMs make long-term relationships efficient through their collaboration functionalities. First, an EM, as an IT infrastructure, can help to make both hierarchy and network operations efficient. For example, the electronic communication and electronic integration effect can structure and streamline communications along the hierarchies and among the network members. It can also help them with information gathering

and sharing. For example, some sites provide services and software to help firms manage human resources online (e.g. Authoria.com, Brassring.com). Enterprise resource planning (ERP) software can facilitate efficient firm operation and help to integrate and structure internal communications. Some other systems (e.g. Bea system, i2 technology and Agile software) that specialize in supply chain management often require clients to change and integrate their internal business processes to obtain maximum benefit from their systems. This reconfiguration of business processes will also make internal communication and hierarchical processes more efficient and transparent. Second, since EMs are intermediaries among trading partners, they can provide a more professional service at lower cost, achieved by economy of scale and scope. Their cost savings and efficiency gains come from four sources: a) Trading partners need not build their own proprietary networks, b) The number of communication links is reduced from 2^n (direct links between every two members) to $2n$ (communication through an intermediary), c) Efficiency gains come from centralized expertise that individual firms do not own, d) No matter whether long-term relationships are in the form of a network or in hierarchy, when the participants are exposed to the EM environment, they are under more competitive pressure. In order to survive and maintain their positions, trading partners have to innovate, improve on quality, and reduce costs. EMs can therefore help prevent long-term relationships from becoming too cozy and improve network health.

4. Corporate Strategy

4.1 The Adoption of Electronic Marketplaces

Although we could conclude from the above analysis that EMs will make both long- and short-term relationships efficient, this does not mean that firms will adopt EMs immediately. Their speed of adoption is affected by multiple factors. First, physical setup and maintenance cost may still be very high for most small and medium sized firms (SMEs). There may be great uncertainty about the potential return on investment (small transaction volumes normally can not justify the relatively high investment). Even if a company is convinced by the potential benefit of adopting an EM strategy, it may not be able to afford the setup and subsequent maintenance, training and organizational change costs. Second, EMs are still technologically immature. Transaction risks such as concerns about online information security and privacy tend to constrain company adoption decisions. Third, most people are naturally averse to change, unless there are overwhelming reasons to do so. While all these three barriers are important aspects of adoption decisions, our focus in this paper is on buyer-supplier relationships, and these barriers will serve as control factors in a forthcoming field study related to this paper.

Since most business-to-business transactions are conducted within business relationships, a firm's decision to adopt an EM strategy has to consider the impact of the decision on these relationships. We will analyze possible adoption strategies in three categories: short-term relationships (maintaining these relationships),

pre-determined long-term relationships (moving existing stable offline long-term relationships online), and online developed long-term relationships (beginning with a short-term relationship strategy and developing long-term relationships over time). Table 2 provides an overview of the adoption of EMs when firms take different inter-organization strategies.

***** Table 2 about here *****

Transaction cost theory is one of the most widely used theories for examining business-to-business relationships. This theory suggests that firms will choose whatever governance structure will minimize transaction cost, holding production cost constant. We will use this theme to compare online and offline governance structure and to derive an optimal firm choice. Transaction cost can be divided into two parts, coordination cost and incentive cost. Coordination cost is the cost of coordinating economic activities. In the market, it is the cost of searching, negotiating, signing and safeguarding contracts. In hierarchies, it is bureaucratic cost and the cost of organizing production. Incentive cost is caused by information asymmetry (distortion and selective disclosure) and imperfect commitment (associated with transaction specific investment). The following examines a firm's decision on the adoption of EMs, from the transaction cost perspective.

4.1.1. Short-term Relationships

The EM is favored if a firm only wants to maintain short-term relationships with its buyers or sellers. In short-term relationships, firms pay attention mainly to price, and

care less about relationships and long-term commitment. Firms can be informed of the existence of more potential traders and have a better match with their needs. Pricing is more efficient online, which will definitely benefit buyers. Sellers may be afraid of reduced online price and fierce competition, but they can gain from sharing a larger pie and strategic pricing. Markets are always characterized by high-powered incentive (Williamson 1991), where buyers and sellers have to either compete for survival or exit. The enhanced online competition conveys a sense of enhanced high-powered incentives. Opportunism is curbed by an increased number of traders and increased data transparency.

4.1.2. Predetermined Long-term Relationships

If a firm wishes to maintain predetermined long-term relationships, it cares about both relationships and prices. Theoretically EMs, since they involve IOS and value networks, make long-term relationships efficient. But this is only from the coordination cost perspective. The adoption of EMs is not as simple as moving every interaction between firms online. EMs also have negative effects on predetermined long-term relationships by changing the environment, and require incentives to make a commitment.

Traditionally, a long-term relationship is a way to avoid market governance structure, but EMs are markets by nature, which create negative effects in long-term relationships by threatening trust. By moving long-term relationships online, the

power balance in long-term relationships may be lost in this more competitive environment. For example, easier searches, more alternative products, more buyers and suppliers, and lower switching costs may threaten the stability of long-term relationships. Information about suppliers is also more transparent and visible to buyers, and suppliers may fear that buyers will behave opportunistically against them (Grewal, Corner et al. 2001). The behavior of buyers entering EMs signals their trading partners that buyers can access more suppliers potentially, threatening the original hierarchy or network relationship, and supplier incentives to make transaction-specific investments will be reduced.

Buyers may not want to exercise their buying power over suppliers, considering the importance of their long-term relationships. Supplier reluctance to go online due to the fear of lower margins and more competition will be alleviated if buyers do not express a desire to exercise this power. For business partners with long-term relationships, the adoption of EMs is a negotiated decision based on the agreement of all parties, which is hard to achieve. Thus long-term relationships will not necessarily favor an immediate adoption of EMs, unless: a) there is pressure from the more powerful partner, such as the threat of dissolving the long-term relationship if they do not go online, or b) there are enough incentives from buyers or suppliers. E.g., buyers may not choose to dissolve long-term relationships and may even assist in helping their business partners make the transition. Otherwise, the partners may choose to maintain their existing ways of doing business.

4.1.3. Online Developed Long-term Relationships

Firms may also enter EMs with short-term relationships and end up with long-term relationships with their new trading partners. Since these long-term relationships are based on the acceptance of EMs by both trading parties, they should turn out to be the most efficient because of the competitive environment in which they are created.

4.2 Elements Affecting Corporate Adoption of Electronic Marketplaces

A firm's strategy for adopting an EM is determined by multiple factors. Four elements that underly buyer-supplier relationships and inter-organizational strategies are identified in Figure 2. These elements, by affecting inter-organizational strategies, play an important role in a firm's decision on EM adoption.

***** Figure 2 about here *****

4.2.1. Industry Attributes

An industry can be described by many attributes such as market complexity, dynamics, uncertainty, degree of concentration, and dominance (Choudhury and Hartzel 1998). In our analysis, we use the degree of concentration in the industry. This allows industries to be classified as either fragmented or concentrated.

a) Fragmented Industries

It is commonly said that a fragmented market is more suitable for EMs (Phillips and Meeker 2000). First, the percentage of cost saving is greater in a fragmented industry than in a concentrated industry. In a fragmented industry, search cost is high due to

the large number of firms and dispersed information. For small firms the transaction cost, including the cost for searching, negotiation and fulfillment, is large relative to trading volumes (lower economies of scale). EMs can appeal to small firms in a fragmented market by bringing many buyers and suppliers together, thus reducing the time and cost of searching, bypassing barriers caused by distance, and improving transaction efficiency. Two of the basic functions of EMs, aggregation and market matching, can benefit fragmented industries much more than concentrated industries. Second, fragmented firms tend to have weaker management than firms in concentrated industries, which provides many business opportunities for electronic intermediaries. In a fragmented industry, there are often fewer predetermined long-term relationships, or the intention for maintaining a long-term relationship is low. In these cases, firms joining EMs have only the expectation of entering short-term relationships.

However, there may be a drawback for companies in fragmented industries to join EMs. In fragmented industries, firms tend to have less technological and financial resources. Particularly if a company doesn't already participate with its partners by using computers and IOS, the setup and maintenance cost may be unaffordable.

b). Concentrated Industries

In a concentrated market, there are usually traditions of long-term relationships. If dominant firms determine that relationships are very important to them, they will

consider reduced incentives for trading partners that wish to make relationship-specific investments upon joining EMs. On the other hand, dominant firms are usually advanced in technology. The cost of building or participating in EMs may be low for them. Some already have good in-house information system infrastructures, and employees are more familiar with computer systems. Once dominant firms confirm the benefit of EMs, they may join and try to persuade others to join, due to network effects (the more firms participate, the more it benefits all members). Because of the dominance of certain firms, their partners will be forced to join the EMs to which the dominant firms belong, in order to continue their relationships. In this way, a concentrated industry can transfer predetermined long-term relationships into an EM more quickly than is likely in a fragmented marketplace.

***Proposition 1**: A fragmented industry is more suitable than a concentrated industry for EMs. However, setup costs are a major drawback, leading to slow adoption speed. A concentrated industry will have a faster adoption speed because of the influence of dominant firms who are advanced in technology and financial support.*

4.2.2. Relationship Attributes

There are many relationship dimensions. Some examples are: dependency vs. autonomy, opportunism vs. trust, the degree of centrality and integration of transactions, information complexity, and defection risk. Another dimension is power,

which decides the value actually retained by firms, so it is of great importance in evaluating buyer-supplier relationships. We will assume three classifications of power relationships between firms: dominance power (buyer dominance power and supplier dominance power), interdependence (shared value) and independence (buying power) (Cox, Sanderson et al. 2001).

Interdependent parties always maintain a long-term relationship and act to gain maximum mutual benefit. Their adoption of EMs is a negotiated decision. In this case, cost falling below a threshold is not the only criteria for adoption. Partners will act according to the stability and incentives of long-term relationships.

Parties with power of any kind (dominance power and buying power) have a tendency to join EMs if they are not concerned about long-term buyer-supplier relationships. This is because they can benefit from markets (access to more suppliers and buyers, more alternatives, lower prices, services from intermediaries, etc.) with less worry that they will lose buyers and/or suppliers. This explains why industry-sponsored exchanges are proliferating. However, if a company has long-term relationships with its suppliers, this may pose restrictions. They are less likely to care about price, and more about quality and other factors such as trust, responsiveness, sharing of information, and innovation. These are non-contractible factors and cannot be achieved by one firm on its own. In this case, if buyers decide that non-contractible factors are important, they will try to maintain long-term relationships with several

strategic suppliers, in order to give suppliers incentives to make investments in these factors. Then the buyer and seller relationship typically evolves into interdependence, with a resulting power balance. Moving online then becomes a negotiated decision with the partner.

Proposition 2: *If the relationship between two parties is interdependent, the adoption of EMs is a negotiated decision. If buying power or dominant power exists, a firm's adoption of an EM is affected by parties who have such power.*

4.2.3 Transaction Attributes

Transaction dimensions are described by transaction uncertainty, transaction-specific investment, and transaction frequency.

a). Transaction Uncertainty

Uncertainty refers to "environmental uncertainties, when these become so enormous that they cannot all be considered, presumably exceeding the data processing capabilities of the parties" (Williamson 1975). Due to the bounded rationality of human beings, not all aspects of complex transaction can be forecasted and written into contracts, which leaves room for possible future opportunistic haggling. When uncertainty is large enough to justify a special governance structure, a long-term relationship with suppliers is almost always built to reduce transaction cost. In this case, moving online is a negotiated decision.

We should notice that uncertainty is a problem because of human limited ability to reduce uncertainty (bounded rationality). In some cases, long-term relationships are not available and EMs can help alleviate human bounded rationality, which can speed the movement of relevant products online. For example, huge fixed-cost assets that cannot be liquidated or acquired on short notice such as utilities, manpower or manufacturing capacity, can be acquired or sold through EMs. This is because an EM can give global access to potential suppliers or buyers.

b). Transaction-Specific Investments

If transaction-specific investments are needed, parties to the transaction have to maintain long-term relationships for two reasons: to maintain incentives for the investment and to deter opportunistic behavior caused by the high switching costs of transaction-specific investments. However, the infrastructure needed for joining EMs typically involves general-purpose investments.

c). Transaction Frequency

High transaction frequencies will result in high transaction costs, including searching and negotiation. If there is a need for frequent transactions, long-term relationships are preferred by both parties, since this is better suited to reduce the cost of frequent search and negotiation, thus reducing transaction costs and deriving volume discounts.

The foregoing discussion of transactions and their attributes is summarized in Table 3.

***** Table 3 about here *****

The discussion of this section leads to the following proposition.

***Proposition 3**: Despite the high uncertainty of transactions, a firm will prefer EMs when EMs can reduce bounded rationality greatly. If a firm faces high uncertainty, which can only be resolved by becoming involved in a long-term relationship, or there are high transaction-specific investments and high transaction frequency, the resulting need for long-term relationships may not necessarily lead to an immediate adoption of an EM.*

4.2.4 Product and Service Attributes

a). Product and Service Standardization

Standardized products are more suitable for market transactions, making it easier to structure the communication of product information. Thus purchasing online can be done just by looking at a sample, instead of inspecting every differentiated product. Standardized products are currently more actively available in EMs but there is also a potential benefit for differentiated products. Because of the value-added catalog services normally provided by EMs, differentiated products benefit more from going online, since EMs provide better matching and more alternatives.

b). Complexity of Product Description

Less product description complexity is more suitable for EM trading since this makes it easier to communicate to customers searching for information on products. At the

same time, electronic markets allow more complex products to be traded online through value-added catalog services, provided that they adhere to industry standards. A multiple attribute auction provides an example. In traditional auctions, only prices of single items can be considered due to the complexity of computing the winning bids. However, an online multiple attribute auction can include many product attributes such as quantity and different quality specifications. Winning bids are calculated according to the utilities of the different bid packages (Bichler, 2001). This allows for more complex trades using auctions.

c). Core and Non-core Products and Services

For core products, buyers always want to ensure a stable but qualified supply from suppliers, giving buyers a strong tendency to maintain long-term relationships with their suppliers. In this case, the adoption of EMs is a negotiated decision between buyers and suppliers. For non-core products, it may either be not possible or not necessary to build long-term relationships. EMs are good places to acquire non-core products since the transaction frequency is low and the market is small. It should also be easier to find trading partners in EMs, compared with traditional channels.

***Proposition 4**: Both highly standardized products and services and non-core products are suitable for EMs. Products with less complex descriptions will be favored in EM trading.*

This completes the discussion of our framework and the derivation of related propositions. The discussion can be summarized as follows: First, the interaction between adoption of EMs and buyer-supplier relationships was reviewed. The conclusion was reached that EMs will make both long- and short-term relationships more efficient. Second, long-term relationships pose the biggest problem to business in making actual adoption decisions in favour of EMs. Third, four attributes underlying buyer-supplier relationships were studied. Finally, propositions 1 to 4 represent conclusions derived from these analyses. The EM adoption strategies of firms are related to the attributes we discussed through buyer-supplier relationship linkages.

5. Case Study: Construction Industry vs. Automobile Industry

5.1 Introduction

Two industries, the construction industry and the automobile industry, were chosen for a preliminary examination of the framework (Figure 2), because of their different industry characteristics. The framework indicates a delayed adoption of EMs in both industries, which has also been observed in reality. But the reasons underlying the delays are different.

A common characteristic of both industries is that both involve large numbers of participants in delivering the final value. The construction industry involves clients, engineers, architects, general contractors, subcontractors and suppliers, while to

assemble a finished car, 14,000-15,000 parts are required, from a number of suppliers. The difference is the way the task is organized. In the construction industry, the tasks are project-oriented and multiple agents are simultaneously involved. In the automotive industry, the suppliers are sequentially involved.

There are numerous EMs in both industries, with varying levels of services. Some only provide transaction related information, some offer bidding, e-procurement, and exchanges, and some offer collaboration functionalities. In the construction industry, a special kind of collaboration is offered: a central, task specific database can connect all the parties involved. Some examples of industrial EMs include Buzzsaw, Citadon and Bricsnet in the construction industry and Covisint, GM's TradeXchange and Ford's AutoXchange in the automotive industries. Despite a great deal of hype when originally introduced, EMs in these industries have not been as prosperous as expected. For example, Covisint started with the goal of building an industry standard, encouraged by suppliers, and now faces supplier reluctance to participate. In effect, suppliers tend to believe that the automobile manufacturers are using EMs to behave opportunistically against them. The reasons underlying the delay in EM adoption in these industries are analyzed within the framework in Table 4.

***** Table 4 about here *****

5.2 Framework Application

5.2.1 Industry Attributes

The construction industry is one of the most fragmented industries. In the UK, 93.2%

of firms in this industry employ fewer than 7 workers. These firms also employ 37.7% of all employees (Dainty, Briscoe et al. 2001). A similar situation exists in most other countries such as the OECD, Hong Kong (Wong and Fung 1999) and the U.S.

Fragmented industries such as construction can benefit greatly from reduced searching cost and better matching of trading partners. There are few pre-determined relationships in this industry, which simplifies the adoption decision. However, an industry full of small and medium sized firms is in an adverse financial situation. Small firms, especially subcontractors and suppliers, don't have enough money to invest in the infrastructure necessary for using electronic markets, including software, hardware, Internet access, training (constrained by labor intensive construction work) and aligned business process. There are no dominant firms with the market power to force small companies to make the necessary infrastructure investments. The pace of adopting EMs is therefore slow.

The automobile industry is one of the most concentrated industries in the world. In the American market, the Big Three (Ford, General Motors and DaimlerChrysler) take most of the market share (the historical norm is 60-70% (Joachim and Moozakis 2001)). Globally, there is a trend towards further concentration of manufacturers, due to globalization of the market and excess capacity in the industry. For instance, DaimlerChrysler was a German-US merger and their alliance with Mitsubishi covers three continents. The first tier suppliers are also increasingly concentrated, with highly oligopolistic structures in the global markets for key parts such as seats.

The concentration on both auto manufacturers and first-tier suppliers has had a

significant impact on the adoption of EMs in the auto industry. Auto firms, especially big carmakers, continue to make large-scale capital investments in technology in order to organize production and conduct research on new models, and these investments have continued for many years. They are highly advanced in information infrastructure, and 70% of the supply chain linkages between auto manufacturers and suppliers are through EDI (Electronic Data Interchange). If it is confirmed that EMs are superior to EDI, it should be very easy to make the switch to EMs. Dominant power of the buyers can speed up the adoption by putting suppliers under pressure to conform. The outcome should be a quick adoption of EMs. Some published articles also predict this: "the automotive industry is moving its entire supply chain online at a faster rate than many other industries" (Hannon 2002), attributing this quick adoption to Covisint, a start-up initially funded by the Big Three auto makers.

5.2.2 Relationship Attributes

In the construction industry, independent relationships are dominant. Cost is still the major focus for construction projects, and tendering and bidding remain the most commonly used method of procurement. There are incentives to build long-term relationships in this industry, but the incentives are frequently and easily destroyed by misunderstanding, bad coordination, and goal conflict. EMs that focus on collaboration could help alleviate these problems by building long-term relationships in the construction industry, which would contribute to a more healthy, online environment.

Although the automotive industry is dominated by a few manufacturers, it is marked by interdependent relationships. After lean production was introduced by Japanese carmakers into North America, relationships between auto manufacturers and first-tier suppliers evolved from "exit relationships" to "voice relationships" that emphase collaboration between suppliers and buyers (Volpato and Stocchetti 2001). Auto manufacturers began to use a more limited number of suppliers and aimed at building close and stable relationships with them. Auto manufacturers provide technology

support for suppliers, communicate frequently with them about product design and inventory changes, and if problems with relationships appear, they try to solve the problems instead of just walking away from them. As a result, suppliers know the requirements and management style of auto manufacturers well, are willing to make transaction-specific investments, and are able to cooperate with auto manufacturers to react quickly to market demand. JIT (Just-In-Time) inventory management, quick responses to demand fluctuations and TQM (Total Quality Management) are all driving forces for "voice relationships". In the case of these "voice relationships", a firm's decision about EM adoption is constrained by its trading partner's choice.

5.2.3. Transaction Attributes

a) *Transaction uncertainty*: Intermediate to high transaction uncertainty is observed in the construction industry since the availability of construction contracts is unpredictable, and fieldwork scheduling is also uncertain. However, the likelihood of long-term relationships is low so EMs are a favored choice. Transaction uncertainty in the automotive industry is also high, especially with the unpredictable changes of customer taste and technology. Fortunately long-term relationships between suppliers and buyers help to manage these uncertainties. But these relationships may require complicated, negotiated decisions on the adoption of EMs.

b) *Transaction specific investment*: transaction specific investment in the construction industry is minimal, and even if there are some special requirements, contractors can outsource it to subcontractors who have the required skills. In the automotive industry, transaction specific investment is high and some vendors supply only one buyer. A long-term commitment in the later case is desirable, complicating the adoption of EMs.

c). *Transaction frequency*: since a transaction in the construction industry is defined as a project, the transaction frequency is low. But automotive parts supply may demand several deliveries a week, making the transaction frequency in this industry very high. Long-term contracts are used to solve this problem.

5.2.4 Product Attributes

a). *Product standardization*: Construction projects are highly customized, but construction materials are standardized. Since the frequency of construction projects is low, a special governance structure for each project is not justified. If a construction firm needs only to choose between online and offline markets, than EMs will be favored. Parts in the automotive industry are standardized and pose no problem in the adoption of EMs.

b). *Complexity of product description:* Although both construction projects and automobiles are complex to describe, online content management can help alleviate this problem.

c). *Core versus non-core products:* It is the practice of the automotive industry for core products to be delivered by trading partners who have long-term relationships, so non-core products typically can be supplied by companies with no such relationships. The latter are easily handled online. In the construction industry, public contracts are normally tendered, so long term relationships are signified by companies that appear on the approved vendor list. Private clients are less likely to let contracts through tender, but project quality from previous experience and long-term relationships with

suppliers also has an influence on contract awards.

6. Conclusions and Future Research

Using our framework we found delayed adoption of EMs in both the construction and automobile industries. However, reasons for the delay are different (See Table 4). EM adoption delay in the construction industry is due to its fragmented nature, while delay in the automobile industry is caused by interdependent relationships between the auto manufacturers and suppliers, especially when first-tier suppliers are involved. The construction industry is fragmented, marked by numerous small firms. They are weak in technology and financial support, and there is no market power to force them to join EMs. And this delay of adoption is despite the fact that lower transaction frequency, problematic long-term relationships, and relatively standardized parts should favor EMs. In the automobile industry, firms are more advanced in technology but still face the forces of market power. Their necessity of long-term relationships and special transaction attributes make the adoption of an EM a negotiated decision.

There are some additional research opportunities. For example, an EM's impact on bounded rationality is also an interesting research question. Several published papers have mentioned that EMs will help solve the problem of bounded human rationality, but there has been no systematic research on this topic. Another question is why EMs should benefit a fragmented industry more than a concentrated industry. The biggest

benefit appears to be cost savings, including both physical and opportunity costs. The potential cost saving is greater in the construction industry than in the automobile industry. Empirical work on potential cost savings in the automobile industry is available, but more research is needed on the construction industry. Finally, empirical tests can be completed to verify the framework developed in this paper, which is now underway, using case studies and surveys.

References

Archer, N. and J. Gebauer (2002). B2B Applications to Support Business Transactions: Overview and Management Consideration. Business-to-Business Electronic Commerce: Challenges and Solutions. M. Warkentin: Idea Group Publishing. **Chapter II:** 19-44.

Bailey, J. P. and Y. Bakos (1997). An Exploratory Study of the Emerging Role of Electronic Intermediaries. *International Journal of Electronic Commerce* **1**(3): 7-20.Spring.

Bakos, J. Y. (1991). A Strategic Analysis of Electronic Marketplaces. *MIS Quarterly* **15** (September): 295-310

Bakos, Y. (1998). The Emerging Role of Electronic Marketplaces on the Internet. *Communications of the ACM* **41**(8): 35-42

Berryman, K. and S. Heck (2001). Is the Third Time the Charm for B2B? *The McKinsey Quarterly* (2)

Bichler, M. (2001). The Future of EMarkets : Multi-dimensional Market Mechanisms. Cambridge, New York: Cambridge University Press.

Brynjolfsson, E. and M. D. Smith (1999). Frictionless Commerce? A Comparison of Internet and Conventional Retailers. *MIT Sloan School of Management Working Paper*.May.

Chircu, A. M. and R. J. Kauffman (2000). Limits to Value in Electronic Commerce-Related IT Investments. *Journal of Management Information Systems* **17**(2): 59-80

Choudhury, V. (1997). Strategic Choice in the Development of Inter-organization Information System. *Information Systems Research* **8**(1): 1-24.March.

Choudhury, V. and K. S. Hartzel (1998). Uses and Consequences of Electronic Markets: An Empirical Investigation in the Aircraft Parts Industry. *MIS Quarterly* **22**(4): 471-503.December.

Clemons, E. K. and P. R. Kleindorfer (1992). An Economic Analysis of Interorganizational Information Technology. *Decision Support Systems* **8**: 431-446

Cox, A., J. Sanderson, et al. (2001). Supply Chains and Power Regimes: Toward an Analytic Framework for Management Networks of Buyer and Supplier Relationships. *Journal of Supply Chain Management* **37**(2): 28-35

Cunningham, C. and C. Tynan (1993). Electronic Trading, Interorganizational Systems and the Nature of Buyer-Seller Relationships: The Need for a Network Perspective. *International Journal of Electronic Commerce* **13**: 3-28

Dainty, A. R. J., G. H. Briscoe, et al. (2001). New Perspectives on Construction Supply Chain Integration. *Supply Chain Management: An International Journal* **6**(4): 163-173

Forbes. *Best of the Web—B2B* Directories. www.forbes/com/bow/b2b/main.jhtml accessed in 2002

Grewal, R., J. M. Corner, et al. (2001). An Investigation into the Antecedents of Organizational Participation in Business-to-Business Electronic Markets. *Journal of Marketing* **65**(3): 17-33

Joachim, D. and C. Moozakis (2001). Can Covisint Find its Way? *Internetweek.* September 17. http://www.internetweek.com/newslead01/lead091701.htm

Kaplan, S. and M. Sawhney (2000). E-hubs: The New B2B Marketplaces. *Harvard Business Review* **78**: 97.May-June.

Lucking-Reiley, D. and D. F. Spulber (2000). Business-to-Business Electronic Commerce, eCommerce Research Forum Working Papers.

Phillips, C. and M. Meeker (2000). The B2B Internet Report: Collaborative Commerce. *Morgan Stanley Dean Witter Research*.April.

Smith, M. D., J. Bailey, et al. (1999). Understanding Digital Markets: Review and

Assessment. *MIT Sloan School of Management Working paper*

Volpato, G. and A. Stocchetti (2001). Managing Information Flows in Supplier-Customer Relationships: Issues, Methods and Emerging Problems. *International Motor Vehicle Program (IMVP) at MIT Working Paper* http://imvp.mit.edu/papers/0001/volp-stocl.pdf

Williamson, O. E. (1975). Markets and Hierarchies: Analysis and Antitrust Implications. New York: The Free Press.

Williamson, O. E. (1991). The logic of Economic Organization. The Nature of the Firm: Origins, Evolution, and Development. O. E. Williamson and S. G. Winter. New York: Oxford University Press.

Wong, A. and P. Fung (1999). Total Quality Management in the Construction Industry in Hong Kong: A Supply Chain Management Perspective. *Total Quality Management* **10**(2): 199-208

Young, E. (2002). Web Marketplaces that Really Work. *Fortune* **144**(10): 78-86

Tables and Figures

Table 1 Functions of Electronic Intermediaries

Functions	Examples
Aggregation	1. Aggregating multiple buyers and suppliers 2. Providing product catalogues
Match-making	1. Matching buyers and suppliers 2. Price discovery; dynamic pricing such as auctions and reverse auctions
Collaboration (Transaction level)	1. Catalog management 2. Settlement and logistics 3. Trust (credit system), dispute resolution, and regulatory policies such as rules and regulations 4. Monitoring and enforcement
Collaboration (Relationship level)	1. Contract management 2. Project management 3. Document management 4. Calculation of tariffs and duties 5. Protocol/Format translation

Table 2 Inter-organizational Strategies and the Adoption of Electronic Marketplaces

Relationship Type	Coordination Cost	Incentive Cost	Net Effect
Short-term	Reduced coordination cost • Search • Match making • Transaction level collaboration	Reduced incentive cost • Reduced information asymmetry • Enhanced high powered incentive	Favour EMs
Predetermined Long-term	Reduced coordination cost • Relationship level collaboration	Uncertainty about incentives • Negative signaling and increased suspicion of opportunism	Uncertainty about the adoption of EMs • A negotiated decision • Compared with public EMs, private EMs are less suspicious of opportunism.
Online determined long-term	Reduced coordination cost • Search • Match making • Transaction and relationship level collaboration	Aligned incentives • Pursue maximum common interest in online environment	Favour EMs

Table 3 Transaction Attributes and the Adoption of EMs

Transaction Attributes	Conditions	Corporate Strategies
Uncertainty	High	Long-term (negotiated decision)*
	Low	Favor EMs
Transaction-specific investment	High	Long-term (negotiated decision)
	Low	Favor EMs
Transaction frequency	High	Long-term (negotiated decision)
	Low	Favor EMs

* With some exceptions such as the case when long-term relationships are not available and EMs can reduce bounded rationality greatly.

Table 4 Case Summary and Comparison

Attributes	Construction Industry	Automobile Industry
Industry	Fragmented	Concentrated
Relationships	Independent	Interdependent
Transactions	• Intermediate to high uncertainty of transaction and the availability of long-term relationships is low • Low transaction-specific investment • Low to intermediate transaction frequency	• High transaction uncertainty, which can be circumvented by long-term relationships • Needs for transaction-specific investments are intermediate to high • Transaction frequency is high
Products and Services	• Construction projects are highly customized, and projects are hard to describe. • Subcontractor services are relatively standardized • Construction supplies are standardized, and easy to describe.	• Most auto parts are standardized • Intermediate complexity of product description • Core products are procured through long-term relationships
Net Outcome	Delayed adoption: the main barrier is within-industry attributes	Delayed adoption: the main barrier is within-relationship attributes and transaction attributes

Figure 1. Efficiencies in Electronic Marketplaces

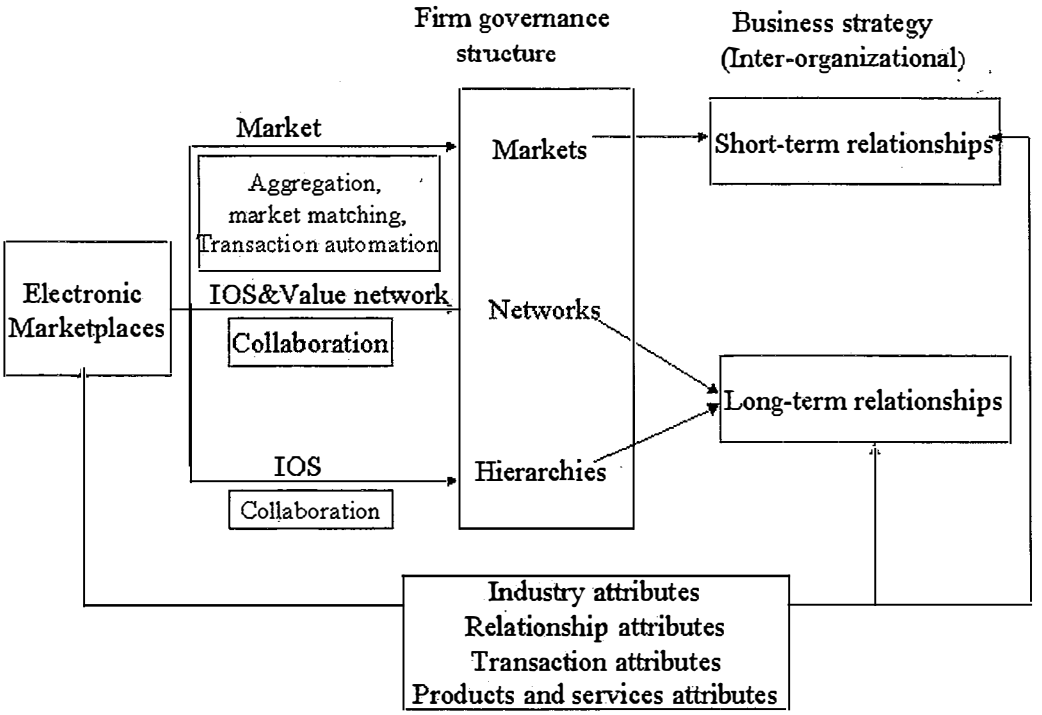
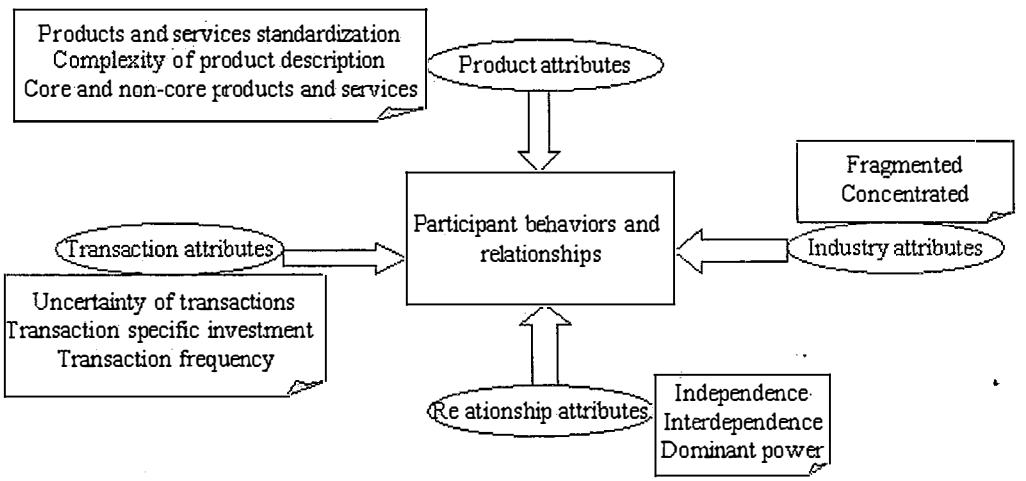


Figure 2. Strategies for Electronic Marketplace Adoption



Michael G. DeGroote School of Business
McMaster University

WORKING PAPERS - RECENT RELEASES

431. Parbudyal Singh and Harish C. Jain, "Strike Replacements in the United States, Canada and Mexico: A Review of the Law and Empirical Research", February, 1999.

432. John W. Medcof and Jeremy Boyko, "Reinforcing, Revising and Reconciling Attributions in the Employment Interview", March, 1999.

433. Norm Archer, "World Wide Web Business Catalogs in Business-to-Business Procurement", March, 1999.

434. Diwakar Gupta and Saifallah Benjaafar, "Make-to-order, Make-to-stock, or Delay Product Differentiation? - A Common Framework for Modeling and Analysis", April, 1999.

435. Harish C. Jain, Parbudyal Singh and Carol Agocs, "Recruitment, Selection and Promotion of Visible Minorities and Aboriginals in Selected Canadian Police Services", April, 1999.

436. Harish C. Jain and Angus Bowmaker-Falconer, "Employment Equity/Affirmative Action Codes of Practice and Best Practices in USA, Britain, Canada and Other Selected Countries", May, 1999.

437. Diwakar Gupta, Yavuz Günalay, and Mandyam M. Srinivasan, "On the Relationship Between Preventive Maintenance and Manufacturing System Performance", June, 1999.

438. Jinliang Cheng, George Steiner, and Paul Stephenson, "A Fast Algorithm to Minimize Makespan for the Two-Machine Flow-Shop Problem with Release Times", June, 1999.

439. Jinliang Cheng, George Steiner, and Paul Stephenson, "A Fast Algorithm to Minimize Maximum Lateness for the Two-Machine Flow-Shop Problem with Release Times, June, 1999.

440. Norm Archer and Yufei Yuan, "Electronic Commerce and the Business-to-Business Customer Relationship Life Cycle", August, 1999.

441. Halit Üster and Robert F. Love, "Calculation of Confidence Intervals for Estimated Distances", August, 1999.

442. George O. Wesolowsky, "Detecting Excessive Similarity in Answers on Multiple Choice Exams", October, 1999.

443. Naresh C. Agarwal, "Mandatory Retirement and the Canadian Human Rights Act", November, 1999.

444. Susan Sproule and Norm Archer, "Software Agents in Electronic Commerce", March, 2000.

445. Milena Head and Yufei Yuan, "Privacy Protection in Electronic Commerce – a Theoretical Framework", June, 2000.

446. Susan Sproule and Norm Archer, "Knowledgeable Agents for Search and Choice Support in E-commerce: A Decision Support Systems Approach", July, 2000.

447. Norm Archer and Judith Gebauer, "Managing in the Context of the New Electronic Marketplace", August, 2000.

448. Norm Archer and Yufei Yuan, "Business-to-Business E-commerce and Customer Relationship Management: Trends and Issues", August, 2000.

449. Janet Romaine and I.U. Zeytinoglu, "Are Women Managers Really More Participative? Some Conflicting Evidence from a Field Study", September, 2000.

450. Norm Archer, "The New Economy: Some Issues and Impacts of Electronic Commerce", January 2001.

451. Norm Archer, Milena Head, and Yufei Yuan, "Matching Customer Expectations and Perceptions in e-Commerce", February 2001.

452. Xiaoqing Li and Ali R. Montazemi, "A Methodology for the Assessment of Buddy-Agents", March 2001.

453. Yufei Yuan, T.P. Liang, and Jason J. Zhang, "Using Agent Technology to Support Supply Chain Management: Potentials and Challenges", October 2001.

454. Jason J. Zhang, Yufei Yuan, and Norm Archer, "Driving Forces for M-commerce Success", December 2001.

455. Alexander Serenko and Brian Detlor, "Agent Toolkits: A General Overview of the Market and an Assessment of Instructor Satisfaction with Utilizing Toolkits in the Classroom", July 2002.

456. Norm Archer and Shan Wang, "Knowledge Management in Network Organizations", July 2002.

457. Milena M. Head, Khaled Hassanein, and Edward Cho, "Online Trust Through Humanized Website Design: Research Model and Empirical Study", September 2002.

458. Ali Reza Montazemi, "Effectiveness of Video Enhancement on e-Learning", October 2002.