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ICIS 1996 Proceedings

International Conference on Information Systems (ICIS)

December 1996

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Abstract

In this paper, we provide preliminary findings of an empirical study which supports the hypothesis that electronic markets do not become "disintermediated" as they become facilitated by information technologies. We explore thirteen case studies of companies participating in electronic commerce and find evidence across markets which indicate necessary roles for electronic market intermediaries including matching suppliers and customers, providing trust, and providing interorganizational market information. Two specific examples are explored in greater detail to show the unsuccessful (Bargain Finder) and successful (Agents Inc.) identification of electronic market intermediary roles.

1. INTRODUCTION

The growth of the Internet and the World Wide Web into a medium for market transactions can no longer be ignored by some companies. Web sites are established for many reasons. This includes appealing to customers to form new relationships and communicating with current customers to strengthen current relationships. While the reasons to join the Web are numerous, the decision to go online is the easy one in comparison to determining a business strategy.

Strategy for electronic commerce is partially determined by *how* the company connects to the Internet which in turn will affect how customers interact with them. A business has many ways of connecting to the Internet. They may join an existing online "storefront" (a collection of businesses sharing a Web site – similar to a shopping mall) or they may join the Internet alone by developing and hosting their Web site internally, for example. The mall owner is responsible for the upkeep of the electronic storefront and the business is responsible for the information that resides there. If the business chooses to internally manage their electronic commerce strategy, they have more to manage, but they don't have to share the rewards. While a traditional mall owner is able to provide many "intermediary" services in a physical world, the benefits may be reduced once the relationship moves to an electronic market.

In particular, the intermediary in an electronic market provides very little value associated with the "traditional" roles of intermediaries. However, this does not mean that an intermediary will cease to exist. In fact, we show in this paper that electronic markets demand new tools to develop and facilitate the relationships between suppliers and customers. This evidence indicates that the hypothesis of "disintermediation" that is presented by Gellman (1996) may not be true.

The remainder of this paper is structured as follows. In section two, we define some of the traditional roles of intermediaries. In section three, we explore the defining characteristics of markets which make them "electronic markets." Section four describes the research methodology which is used to analyze the data. Section five presents the thirteen case studies. Section six contains the analysis. In that section, there is an identification of the intermediary roles that are enhanced or eliminated with the "electronification" of the markets. To provide more depth, we explore two specific examples companies, Bargain Finder and Agents Inc., who are electronic market intermediaries, and analyze their success as intermediaries. Finally, section seven provides some preliminary conclusions of this data.

2. ROLES OF INTERMEDIARIES

Organizations and markets do not follow one model. Malone, Yates, and Benjamin (1987) discuss "markets" and "hierarchies" which are designed to provide maximum value. The value can be provided at different parts of the organizational model including firms or individuals that are between customers and suppliers – intermediaries. But, what value to they add?

The roles of intermediaries have never been thoroughly examined in any one piece of literature. Resnick, Zeckhauser, and Avery (1995) define search costs, lack of privacy, incomplete information, contracting risk, and pricing inefficiencies as roles where brokers can add value. Malone, Yates, and Benjamin (1987) define similar roles: reducing coordination costs, problems of asset specificity, and problems of standardization.

We combined these roles with a transaction cost (Coase 1937; Williamson 1975) analysis to speculate a complete set of roles for intermediaries. We identified that intermediaries exist to reduce the information asymmetries by facilitating communication between parties, aggregating groups undergoing a transaction, and matching suppliers and customers. The intermediary may also add value, we hypothesize, by collecting information about transactions which spans multiple firms and can correlate this data to provide useful marketing information. Finally, we believe that intermediaries can reduce opportunism of transacting parties by becoming an agent of trust.

Below is an analysis of these five roles that intermediaries provide to support market transactions for traditional markets. We also contrast the roles to their possible existence in electronic markets. Electronic markets are explored in more detail in section three.

2.1 Facilitation

Information transfer between companies is costly, especially when information contains much inarticulable knowledge. In these instances, an intermediary may help the flow of information by coordinating and translating the information that is sent between the supplier and consumer. In an electronic market, many times the supplier and customer will agree to use an interoperable electronic commerce infrastructure (i.e., EDI or the Internet) so the value of a facilitator is reduced. In many ways the communications network, and the standards which lie above it, replace the facilitator role. Therefore, this role would have a tendency to be "disintermediated."

2.2 Aggregation

Instead of a single firm or individual negotiating with a supplier, or a single supplier negotiating with a firm, the intermediary can aggregate the preferences of the combined suppliers or customers to usually benefit one party – the customer. Potential benefits include reducing transaction costs, taking advantage of economies of scale, reducing the ability to price discriminate, and aggregating quantities of goods. As the traditional market moves to an electronic market, the aggregation benefits may still exist. However, since the costs of facilitation are lower, the supplier may try to vertically integrate the functions of an aggregating intermediary. Therefore, it is likely that the role will be less important in electronic markets, not more.

2.3 Matching Suppliers and Customers

The needs of consumers to match with a particular supplier and for a supplier to find an appropriate customer can be accomplished by an intermediary who becomes a focus point for the match. There are many reasons why this intermediary might be better at matching suppliers and customers than if they try to search for a match separately. Some reasons, such as facilitation of communication between parties, relate back to other intermediary roles which are identified in this paper. However, limiting the search space and providing a filtering mechanism are the key reasons why an intermediary is better at matching suppliers and customers than a disintermediated market. For example, in the real estate market, knowledge of what homes are for sale and the ability of a rental agent to filter out possible poor matches is an intermediary role that is still valued.

As there is a movement to electronic markets, the search costs for these markets may reduce to zero, as is suggested by Bakos (1987). Limiting the search space is no longer important since searching a greater space is not costly. The filtering part of a matching intermediary may not go away. In fact, the greater abundance of information on communication infrastructures such as the Internet may increase the need for intermediaries to help match suppliers and customers. The role of Agents Inc., which is discussed in section six, will help give insight into why this may be true.

2.4 Trust

How do a supplier and customer know that the other party will not try to take advantage of their electronic market transactions? An intermediary is there to ensure the transaction is completed and that each side of the transaction, the supplier and customer, will live up to their end of the bargain. Since the intermediary is often paid by one or both parties for a successful transaction, it is the intermediary who has the right incentive to make sure the transaction is completed. In electronic markets, trust may be more difficult since the mechanisms for ensuring trust through information technology are in their embryonic stages and are not ubiquitous. The ability for parties to falsify electronic documents or create fraudulent electronic presence is relatively easy. Because this authentication is currently more difficult, the trust role of an intermediary in an electronic market may increase, not decrease, which is argued by Froomkin (1996). Only when technologies such as digital signatures and the legal system's acceptance of these technologies become adopted may the trust role of an intermediary be reduced.

2.5 Interorganizational Marketing Information

Since an intermediary is privy to information across industries, the intermediary can perform correlation analysis of consumer preferences. An intermediary participates in transactions from multiple vendors, similar to a department store or supermarket which carries goods from multiple vendors, so the intermediary can understand the "communities of interest" which develop. Because they have this information they can be a more effective at matching suppliers and consumers, as is discussed above, but they can also become an organization which supplies marketing information to suppliers. In an electronic market, this marketing information becomes more dynamic and easier to customize, so the intermediary can supply more accurate data. When marketing data is in digital form, manipulating data to understand the behavior of a particular individual or groups of individuals is much easier. Because the intermediary can then provide more valuable marking information, the importance of this electronic market intermediary role will increase.

3. ELECTRONIC MARKETS

An electronic market is where a supplier and a customer undergo an exchange of goods or services for money and where the information exchange between these parties is partially or fully automated by information technology. Malone, Yates, and Benjamin (1987, 1989) discuss further the attributes of markets which make them an "electronic market." While these authors provide a firm understanding of market characteristics, many implementations of electronic markets have since evolved which warrant a new empirical investigation of electronic markets. In particular, the growth of electronic data interchange (EDI) to conduct business-to-business transactions and the growth of the Internet for business-to-consumers have provided new areas of research within the context of electronic markets. EDI and the Internet have very different origins, but the boundary between them seems to be blurring lately.

EDI (Electronic Data Interchange) originated in the 1960s. Its intended purpose was to replace paper communication with electronic communication. This would increase the speed of communication and ease the record keeping (there is no need to print out an invoice from one computer system and then re-type the same information by the other party). Since then, EDI has grown to provide transaction standards for a wide range of electronic markets. Today, the growth rate of EDI is approximately 45% per year with more than 90% of the Fortune 1000 companies using EDI standards (Kalakota and Whinston 1996, pp. 334). While most EDI transactions are sent over value added networks (VANs), there is a growing number of people who send EDI-based transactions over an even more impressively growing computer network, the Internet.

The Internet also started in the 1960s with the ARPAnet and has grown to support electronic markets even faster than EDI.[1] As Clark (1988) points out, the design philosophy of the Internet was not to reduce the transaction costs or support electronic markets, but to provide a robust heterogeneous distributed computing environment for applications that may not yet be developed. Only in the past few years has the Internet been transformed to improve security and "privatize" the infrastructure. Both of these developments have enabled electronic commerce applications. Aside from the EDI transactions, the Internet provides a host of applications, including electronic mail and the World Wide Web, that support electronic markets.

While electronic markets consist of more than just EDI and the Internet, we believe they provide a good subset to analyze with empirical data since they are two of the most ubiquitous information infrastructures which already support electronic commerce.

4. RESEARCH METHODOLOGY

The data we collect comes from fourteen electronic markets. We collected this data through interviews and surveys. We examined the data from each electronic market with respect to these roles in a manner consistent with the emergent perspective of Markus and Robey (1988). In their work, Markus and Robey define three different ways in which organizational change can result from the introduction of information technology: technological imperative, organizational imperative, and the emergent perspective. The emergent perspective defines organizational change resulting from the purposes, setting the process of adopting information technology and, therefore, affecting the roles intermediaries play.

The theory behind our analysis is based on transaction cost economics theory of the firm (Coase 1937; Williamson 1975). We chose this methodology since defining the firm boundaries will help us determine the distinct players in a transaction. Firms that can absorb the intermediary in the electronic market become disintermediated while those that cannot remain intermediated. Transaction cost economics has been used before as a methodology to determine information technology and organizational structure specifically with respect to incomplete contract theory (Brynjolfsson 1994).

The difficulty in using transaction cost economics is determining all sources of transaction costs which affect the organizational structure. We surveyed the literature to determine that Williamson's use of asset specificity and Demsetz' (1968) characterization on the cost of transactions provide useful insights. Based on these prior works, we determined that electronic market transaction costs result from information asymmetries between a customer and supplier and opportunism resulting from incomplete contracts.

The analysis from our empirical data on electronic markets is then used to determine if intermediaries provide any value to customers by reducing the transaction costs. They may reduce the transaction costs by taking the role of facilitation, aggregation, matching suppliers and customers, trust, and marketing.

5. INTRODUCTION TO THE CASES

We now explore the thirteen case studies. While we cannot disclose the names of the thirteen companies that comprise this study due to the proprietary nature of the information, we present aggregated empirical data in the five categories that follow. The number of companies that are included in this study follows the section titles in parentheses.

5.1 Retail – Business to Business (2)

This category includes firms who buy products of low asset specificity – they are goods which have multiple suppliers and multiple customers. The amount of information necessary to describe these products is fairly limited since there is considerable

[1]While it is difficult to find one common metric to compare the two infrastructures, the number of companies, on average, that are adding new Web sites to the Internet is approximately 73 per day (Treese 1996)!

knowledge by the customer and supplier so there is fairly high standardization. This category of retail is different than retail to consumers since the customer is not a single person; rather they are a business themselves. This distinction is necessary since the nature of the relationship changes. A business may have larger quantities exchanged at greater frequency and develop a longer relationship with the supplier. Furthermore, the transaction is more likely to rely on technologies such as electronic data interchange (EDI) since they are highly standardized transactions that are anticipated.

5.2 Retail – Business to Consumers (2)

Similar to the retail business described above, this transaction involves goods that have low asset specificity and fairly high standardization. However, this category of companies market directly to consumers who are purchasing from their household budget. The channels of communication are not EDI-based and often use the benefits of Internet-based applications.

5.3 Automotive – Business to Business (2)

Five out of the total thirteen studies, perhaps a disproportionate number, were based in the automotive industry. The subtleties of the automotive industry, which has a higher degree of asset specificity (some car parts can only fit on one model of a car), were reason enough for us to separate these companies into their own category. Relative to the retail sector, the set of possible firms to transact with is smaller (either as a customer or a supplier) and there are longer-term relationships. This subsection of the automotive category explores the electronic market of businesses as both suppliers and customers, not an individual. The communication is primarily EDI-based.

5.4 Automotive – Business to Consumers (3)

Similar to the previous category, the companies we explore are in the automotive sector, which has relatively high standardization but higher asset specificity than the retail markets. In this sub-category, the firms investigated here cater to an individual and not to businesses. Because of this distinction, the relationships are not as long-lived or as complex as is the case with business-to-business. Also, the repetition of the transactions is lower than in the business-to-business case.

5.5 Information Goods – Business to Customers (4)

In the final category, the paper explores four firms that do not sell durable goods. Rather, they sell information. This is an important category to consider when exploring electronic commerce since information technology enables communication and manipulation of the goods, changing the good's characteristics.

6. ANALYSIS

The importance of the roles with respect to the empirical research is summarized in Table 1. A "+" indicates an increasing role for intermediaries as they move from a traditional market to an electronic market. A "-" indicates a decreasing role and a "+/-" indicates that the increasing and decreasing characteristics of the role may not change.

Facilitation benefits of having an intermediary are reduced across all electronic markets since the common, interoperable standards have been defined (whether it is the Web or EDI, for example). The communication channels have been standardized in an electronic market even though they may travel via many different media (such as electronic mail, telephone conversations, or video conferencing). Once the path to connect the supplier and customer has been established, discussion and information transfer occurs without the information being filtered through an intermediary.

Table 1. Roles of Intermediaries for Market Categories

	Facilitation	Aggregation	Matching	Trust	Marketing
Retail, Business to Business	-	-	-	+	+
Retail, Business to Consumers	-	-	+	+	+
Automotive, Business to Business	-	-	-	+	+/-
Automotive, Business to Consumers	-	-	+	+	+
Information Goods, Business to Consumers	-	-	+	+	+

Aggregation benefits are reduced across all markets because firms can coordinate the aggregation and do not need an intermediary to do this. The retail and automotive companies explored in the study, in particular, did not use an intermediary. While there was non-linear pricing of these goods, a customer was able to receive a better price by working with the supplier directly and avoiding the costly "middleman" charges which would negate the economies of scale benefit. The fifth category, information goods, saw very little aggregation so there was no need for disintermediation.

Matching suppliers and customers becomes more important in the business-to-consumer markets, but less important in the business-to-business markets. Since a large percentage of the business-to-business transactions were with firms that had worked together before, there was no need to seek out someone new. However, the insignificant repetition of transactions with the business-to-consumer categories indicated that there is a real need for an intermediary who has a knowledge of potential matches to reduce the search space of a consumer.

Our data indicated that trust becomes a more important role for intermediaries in electronic markets since the intermediary has incentive to ensure a successful transaction. The intermediary may also establish longer term relationships with the supplier or customer since the intermediary may participate in other transactions. In the business-to-business cases, trust has been provided by the network provider, usually an EDI/value added network. The VAN provider ensures the willingness of organizations to participate in trustworthy transactions by screening the companies as they connect to the infrastructure. Part of this screening process includes a high fixed cost to join the infrastructure. Also, VANs have integrated security since the network provider can guarantee the security of the transmission, either because they own the network themselves, or they have agreements with the networks they interconnect with. The Internet electronic markets analyzed showed that security is still a problem. Since messages sometimes get routed through networks unknown to the message originator, network security is less certain. Only with developments and diffusion of technology such as public key encryption will the Internet become more secure. This is still an important role for an intermediary and many companies are currently trying to become the trust intermediary, by providing services such as a trusted key server, which will promote Internet electronic commerce.

Marketing becomes more important in the markets where there is lower asset specificity since higher asset specificity markets filter the set of possible information to those with whom you previously conducted transactions. That is why the retail market of business-to-business showed an increasing role of marketing for intermediaries while the automotive market did not. However, in the consumer market where there is less repetition in transactions, people can switch to a different supplier so marketing is very important. As will be clear late in this section, companies such as Agents Inc. can use marketing information across goods to become an effective electronic market intermediary.

To achieve a greater level of detail in the empirical analysis, the paper investigates two companies that have defined different strategies for a market intermediary in the same industry, music. This analysis helps support the claim that the electronic intermediaries are important to provide some services, while they are not useful at filling other "traditional" intermediary roles. Therefore, electronic market intermediaries with a proper strategy will provide benefits for all parties, including themselves, while a poor identification of intermediary roles leads to a strategy failure.

The first intermediary explored, Bargain Finder (http://bf.cstar.ac.com/bf/), has not aligned the incentives of customers and suppliers in the compact disc (CD) market to participate in its intermediation. Bargain Finder, developed by Andersen Consulting, provides an intermediary search for the many CD stores on the World Wide Web. By inputting the title and artist

of the CD the customer would like to purchase, Bargain Finder dispatches a price query to the different Web stores to help the customer compare prices. Since Bargain Finder only provides users with the cost, they are promoting a Bertrand competition game, since all companies are competing on price. At the time of this writing, the author searched for a popular CD which is easily available in a retail store. Of the eight stores Bargain Finder searched, only two reported back the price. The price Bargain Finders reported back from the two stores was the exact same (as would be expected from a Bertrand competition model) for the CD although they had different shipping options and prices. The remaining six stores prevented the Bargain Finder agent from searching their database by blocking the agent.

The second electronic market intermediary, Agents Inc. (http://www.agentsinc.com), has better identified its role as an intermediary according to our analysis. With their flagship product, Firefly, Agents Inc. started as a matching intermediary. Firefly creates a community of users who have similar tastes in music. They understand what community a user belongs to by asking them to rate the types of music they are familiar with and try to find others who have similar tastes. Since music has so many inarticulable qualities, this proves to be an effective method for finding people with similar interests. Once their community of interest has been identified, a user can ask Firefly to recommend other music that s/he is not aware of, but may like. Firefly is able to construct possible new matches from the information given by others in the same community of interest. This "collaborative filter" is a powerful way for an intermediary to provide value to all users.

However, this is only one of Agent Inc.'s intermediary roles – they also perform an important marketing role to advertisers on the Agents Inc. World Wide Web page. Since advertisers are looking to appeal to a specific type of customer, Agents Inc. is able to infer consumer types based upon people's music preferences. For example, a person who enjoys pop music may be younger, so they would be a more appropriate audience for video games, while a different person who listens to music from the 1950s may be more appropriate for a luxury car. Certainly there are some generalizations made, but Agents Inc. is looking to complement its Firefly project with other marketing information to provide a inter-organizational and inter-market communities of interest.

The success of Agents Inc. and the moderate failure of Bargain Finder indicates that there may be better and worse roles for an electronic market intermediary. The "customer information state" of the Web user who seeks help from the intermediary, summarized in Table 2, is quite different for these two cases.

Table 2. Customer Information State when Searching for Music

	What the customer knows	What the customer wants to find out
Bargain Finder	What item (artist and title) that they wish to buy	Where can they buy the item for the lowest price
Firefly	What artists they like to listen to	What other artists they may like to listen to

The relative success of Firefly when compared to Bargain Finder may be explained by looking at the incentives for participation. Both Bargain Finder and Firefly try to answer questions that customers have, but why would the suppliers be willing to share information with the intermediary? In the case of Firefly, it is fairly clear that exposing people to new music can expand the market and increase sales. With Bargain Finder, there is a disincentive for the supplier to disclose price information since they will then compete on a price-only basis.

Bargain Finder and Agents Inc. demonstrate that intermediaries can play a role in an electronic market. However, providing value to both sides of the market is essential to avoid incentive compatibility problems. The Bargain Finder roles of aggregation and facilitation do not prove to meet this task. However, the interorganizational marketing information and matching intermediary roles that Agents Inc. performs has been successful.

7. CONCLUSION

While it may be true that the some traditional roles of intermediaries may be removed when information technology facilitates communication between a customer and a supplier, there will not be a total elimination of an intermediary. In particular, in the markets that are based upon information technology, the electronic markets, intermediaries have increasingly important roles. These roles include ensuring trust, matching suppliers and customers, and providing interorganizational marketing information.

The differences in markets also affects the role of intermediaries. In markets where there is low asset specificity, such as retail, there are greater possible matches so a matching intermediary is more important. Conversely, markets with higher asset specificity, as in the automotive industry, have a limited set of suppliers and customers that may be appropriate for a match so the matching intermediary may not provide much value. There is also a difference in the business-to-business and business-to-consumer markets. While businesses have high repetition and strong relationships, consumers are more willing to express dissatisfaction through "exit" and not "voice" (Hirschman 1970). In the former case, it is important for the market players to have better ad hoc communication than the Internet enables. In the later case, an intermediary may help reduce the search space and introduce users to their community of interest for peer recommendations. Finally, information intermediaries can now tailor their products based upon the customer needs and supplier's marketing wishes.

While more research is needed to determine the quantitative benefit of an intermediary in some markets, it is clear that reduction of transaction costs may not be the proper metric. As in the work of Brynjolfsson and Hitt (1996) on the "productivity paradox," the metrics that would quantify a transaction cost may come from an older market paradigm. The newer paradigm of customized goods, reduced delivery time, and greater customer satisfaction is more difficult to measure but, as the roles of an electronic commerce intermediary may indicate, most important.

The Bargain Finder and Agents Inc. examples support the hypothesis of the changing roles of intermediaries as they emerge in the electronic markets. Agents Inc. has clearly identified roles which increase the benefits to all parties and take advantage of information that it has across consumer communities and supplier organizations. Bargain Finder may only promote competition on price since it performs roles of aggregation and facilitation which become less important in an electronic market. Neither Bargain Finder nor Agents Inc. has successfully addressed the role of providing trust, but it is clear from the differences in EDI and the Internet that a trust intermediary is important.

Finally, electronic markets growth that has been artificially separated into EDI-based and Web/Internet-based commerce no longer seems appropriate. As interoperability between networks, user communities, and standards becomes more accepted, there may be heterogeneous information technologies that provide complementary, not competing, applications.

8. ACKNOWLEDGMENTS

The author wishes to thank the students of the electronic commerce class, "Electronic Commerce/Marketing and the Internet; 15.967," at the Sloan School of Management at MIT. Their findings and insights have helped shape this paper. Their work can be found via the Web: http://ccs.mit.edu/15967/. Thanks also to Erik Brynjolfsson, whose contributions greatly enhanced the material in this paper, and David Clark and Lee McKnight, whose ideas contributed to the conclusions of this paper. I also want to thank Thomas Lee and Gill Cable-Murphy who greatly enhanced the readability of the paper.

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