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# B2B Electronic Markets: A Conceptual Model for Analyzing the Sources of Business Value

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## ABSTRACT

This paper describes research supporting the development of a conceptual model for understanding the sources of business value of Business-to-Business (B2B) Electronic Markets. Based on six case studies and an analysis of current literature, Aggregation, Matching, and Integration emerged as the three key sources of business value. The framework provides a structured and systematic approach for understanding various B2B Electronic Market models, and helps develop strategies to leverage these sources of business value.

**Keywords:** Electronic Markets, Business-to-Business Electronic Commerce, Business Value of IT

## 1. INTRODUCTION

In the wake of the Dotcom crash in 2000, interest in Business-to-Business (B2B) Electronic Markets have waned. Nevertheless, this should not be interpreted as a failure of the Electronic Market model in gaining traction amongst organizations and industries. On the contrary, Electronic Markets such as ChemConnect, Exostar and TheSeam.com have transacted millions, if not billions of dollars worth of transactions in the post-Dotcom days. In 2002, ChemConnect facilitated \$8.8 billion worth of transactions, penetrating up to 44% of the chemical industry players [1]. As Wise and Morrison argued, whilst the benefits of Electronic Markets are clear, the path to achieving them is anything but [2].

This paper describes the development of the conceptual model, using empirical data from six case studies, and an analysis of existing literature on Electronic Markets. The empirical data and literature analysis suggest *Aggregation*, *Matching*, and *Integration* are the three principal sources of business value associated with Electronic Markets. Aggregation, Matching and Integration are then lined-up against a series of business processes that typically underpins inter-organizational electronic commerce – (i) Information Gathering, (ii) Supplier Contact, (iii) Background Review, (iv) Negotiation, (v) Fulfilment, (vi) Consumption, maintenance and disposal, and (vii) Renewal [3].

## 2. CONCEPTUAL FRAMEWORK

Bakos defines Electronic Markets as Inter-Organizational Systems (IOS) that facilitate participating buyers and sellers to exchange information about prices and product offerings [4]. Many modern web-based Electronic Markets have evolved from intra-organizational database systems, simple electronic

distribution channels and electronic bulletin boards, such as TELCOT [5], ASAP [6, 7], and SABRE [8, 9], into complex Electronic Market systems that support a whole range of products and processes.

Current literature on Electronic Markets concentrates on the types of products and industries which have adopted Electronic Markets [10, 11] and the effects of adoption [9, 12, 13]. Kaplan and Sawhney proposed a framework for categorizing Electronic Markets according to the nature of transactions – spot vs. systematic purchases, and the types of products transacted – direct vs. indirect supplies [13]. Choudhury et al. and Lee evaluated in [10] and [12] respectively, the effects of Electronic Markets on product prices, and found no conclusive evidence to suggest that Electronic Markets lowered the prices of products. The effect of Electronic Markets on inventory levels was also examined in [12]. Again, minimal effects were observed.

Malone et al. regarded Electronic Markets as a structure that governs inter-organizational relationships according to the Transaction Cost Theory [14], asserting that the use of information technology will lead to a shift toward markets from hierarchies. Using a micro-economics approach, Bakos asserts that by reducing the search costs involved in inter-organizational trade, Electronic Markets increase market efficiency [4]. Taking a multi-disciplinary approach, Amit and Zott provided a holistic overview of various theoretical approaches towards the issue of business value of Electronic Business [15]. This study seeks to understand “how” and “why” organizations derive business value through an analysis of the sources of business value. While there are numerous sources of business value, the present study examines the three principal sources which have emerged from the case studies and analysis of literature.

Aggregation, Matching, and Integration have been identified as important in Electronic Markets [13, 16, 17]. The model developed in this study incorporates these three themes, using them to analyze and evaluate the activities supported by Electronic Markets. This study does not intend to test or prove the causality between Electronic Market adoption and the derivation of business value. Instead, it explores contemporary themes in Electronic Markets [2, 18].

### 3. METHODOLOGY

The objective of this study is to discover a better means of understanding how organizations benefit from engaging in B2B Electronic Markets and to enable this through a formal framework. Following the method prescribed by Yin [19] and Stake [20], data was collected from six case studies. A qualitative approach was adopted for this study to gain the rich data that emerges from in-depth studies [21]. Semi-structured interviews were conducted with 16 executives who were actively involved in the Electronic Market operations. Outcome from the interviews was matched with the findings from existing literature to form the conceptual model. The following is a summary of the six case studies conducted:

#### Case One

The organization involved is a finance-oriented company<sup>1</sup>. It is a subsidiary of a multinational company located in the US. The organization uses online reverse auctions to source indirect supplies for its various business units. A sample of some of the indirect supplies it has sourced via reverse auctions [22] includes office supplies, accommodation, cleaning and courier services. The organization engages in reverse auctions with the objective of improving the supplier bidding process, increasing competition among the suppliers, and pooling together purchases for its different business units.

#### Case Two

This case involves an organization which set up an Electronic Market that catered for life science supplies. Members of the Electronic Market are able to buy and sell from that market. The sellers are mainly firms producing or retailing chemicals and apparatus, while the buyers are private laboratories and government agencies. At times, organizations that sell on the Electronic Market also buy from it. The organization that owned the Electronic Market had future plans to create new Electronic Markets in other industries.

#### Case Three

This case surrounds an Electronic Market for steel supplies. The steel Electronic Market caters especially for the Asia-Pacific region. The highly segmented steel

supplies industry in this region provided a great opportunity for the Electronic Market to link up with many smaller-sized steel suppliers that are geographically distributed. The Electronic Market for steel provided additional value-adding services, such as insurance, finance, freight and forwarding services to buyers and sellers. The concept was to provide a one-stop service for both buyers and sellers, which are made up of many small and medium businesses, which otherwise would not participate in Electronic Markets.

#### Case Four

The organization represents a branch of a leading computer component manufacturer. It uses an extranet system to coordinate with its distributors. The distributors are able to place their orders on the extranet and check on component availability. The extranet is extremely useful in streamlining the distribution chain in shortening the business cycle time, which is especially important in the computer component industry where obsolescence is costly and minimal inventories are kept. The extranet system allows the component manufacturer to gain access to real-time market information, and adjust its production capacity accordingly.

#### Case Five

This case involves an Electronic Market that was set up by a telecommunications organization for indirect supplies. The electronic market is targeted at its trading partners. It is aimed at creating an online community of organizations which could share each other's contact, increasing business between members of the community. Some of the goods and services which have been traded on the Electronic Market include office supplies, furniture, hotel accommodation and office equipment maintenance services.

#### Case Six

The organization involved represents a major healthcare product supplier. It maintains an online catalogue of healthcare products, such as hospital supplies, diagnosis machineries and equipment. The buyers are made up of hospitals, clinics, laboratories and specialized healthcare providers. This healthcare product supplier maintains close relationship with the major healthcare product manufacturers, and as such, operated as an intermediary between the manufacturers and the buyers. Buyers are able to place orders and check on delivery status electronically. Invoicing and electronic payments have been enabled with selected customers.

### 4. DEVELOPING THE CONCEPTUAL FRAMEWORK

Three steps were involved in the development of the conceptual model.

Step One involved identifying the three main sources of business value. The aim of this first step is to categorize

<sup>1</sup> Names of the companies are omitted at their request because of commercial considerations.

the different sources of business value which are relevant to B2B Electronic Markets. It is important to keep in mind that this study does not intend to test the strength and causality of Electronic Markets adoption and the derivation of business value. The purpose is to suggest the sources of business value based on themes which emerged from the six case studies. The cases were chosen from a variety of Electronic Markets from different industries to avoid the results from being limited to one form of marketplace only.

Step Two involved identifying the business processes facilitated by Electronic Markets. There are several ways for viewing the various business processes involved in a typical business transaction. For the purpose of this study, the Business Procurement Life Cycle model [3] was adopted. The seven stages of the business processes are: (i) Information gathering, (ii) Supplier contact, (iii) Background review, (iv) Negotiation, (v) Fulfilment, (vi) Consumption, maintenance, disposal, and (vii) Renewal. The objective of identifying these seven business process stages is so that the sources of business value can be studied depending on the business process it influences.

Step Three involved identifying the stakeholders. This final step involves identifying the stakeholders, so that the sources of business value can be specified and evaluated from different perspectives. The sources of business value may take on different meanings depending on the role of the stakeholder in the Electronic Market. Ideally, Electronic Markets create win-win situations for buyers and sellers. The parameters identified in Steps One, Two, and Three are then combined into a grid where the business processes are represented by rows, and the sources of business value, as viewed from different stakeholder perspectives, are represented by columns. It should be noted that there are numerous sources of business value that could be considered, and this study is by no means exhaustive in suggesting Aggregation, Matching, and Integration as the main ones. Rather, they appear to be the ones most relevant to B2B electronic markets.

## 5. DISCUSSION

The three significant themes which have emerged from the six case studies suggest their importance in the development of an analytic framework for B2B Electronic Markets. The indirect material procurement Electronic Market in Case Five demonstrated how the organization in question shared its business contacts with its trading partners, including allowing the trading partners to enjoy discounts and superior contractual terms that the organization has already negotiated with its suppliers. The pooling of this resource was used to encourage greater trading volume, creating a win-win situation for all the members of Electronic Market.

Stakeholders with similar interests pool their purchasing

power, resources and expertise via Electronic Markets. Aggregation is not new. It had occurred prior to the availability of Electronic Markets, for example, co-operatives were formed to help their members buy and sell, but with Electronic Markets, aggregation has further encouraged organizations to pool purchasing power, resources and expertise across geographical and temporal barriers. Aggregation is especially beneficial to smaller-sized organizations, which by themselves have too little influence and negotiating power. Aggregation is useful to the bigger organizations as it allows them to share their expertise with their trading partners, creating a closely-knit Electronic Market community.

The second theme which emerged from the six cases was that Electronic Markets enable buyers and sellers to seek out each other with greater ease. Electronic Markets often allow stakeholders to gain access to new market segments. The Electronic Market may also create a whole new market-space, playing the role of an intermediary. In the case of the steel Electronic Market in Case Three, it has opened up what was previously a highly segmented market. In a crowded market-space that has stakeholders with varying IT capabilities, the steel Electronic Market gave them access to the international steel market. The stakeholders were able to gain information about potential trading partners with minimal effort in advertising and tendering. Equipped with the information, buyers and sellers were able to find trading partners that could meet their requirements. This theme suggests that Electronic Markets may improve a market's efficiency, in that they link up sellers with buyers, reducing the effort of both parties in searching for each other.

Apart from enabling organizations to access new trading partners, it was also found that Electronic Markets allow existing trading partners to seek out new opportunities within existing trading relationships. As observed in Case Six, the healthcare product supplier was able to sell more types of products to existing customers. The online catalogue provided rich information on a huge range of products. The online catalogue is also capable of informing buyers of alternative products. If a required item is not available, then the online catalogue suggests the closest substitute. Were it not for such information on alternative products, the customer could have easily taken its business elsewhere.

In the case of the reverse auctions in Case One, it was observed that a bidder for a contract to supply services to the organization in question in a particular city was able to bid simultaneously for similar contracts to supply an organization in another city. Suppliers were able to seek out new business opportunities with existing trading partners via Electronic Markets. This is due to the fact that the reverse auction tendering system allows the organization to gain access to a greater number of bidders with marginal effort. Electronic

Markets enhance information exchange and sharing within a trusted business community, allowing buyers and sellers with specialized requirements and skills to seek out each other. As suggested by the channel manager of the extranet in Case Four, the Electronic Market system enables his organization to micro-market, gaining access to niche markets, to the extent of creating market segments which have only one customer. For sellers, Electronic Markets enable them to sell to buyers of highly customized goods. For buyers, Electronic Markets give them access to a bigger supply base capable of meeting their demand for customized goods. The organization in Case Four benefited from gaining up-to-date market information from its extranet. Customer orders determine the operations of the supplier, resulting in fewer inventories held. As such, the organization was more agile and flexible and could respond to changes in the market quickly.

The third theme which emerged from the cases relates to Electronic Markets enabling organizations to synchronize their business processes, improving coordination and collaboration with trading partners.

This idea of coordination and collaboration between organizations is not entirely new either. The Supply Chain Management concept describes how members of a supply chain share inventory and logistical data. In the Electronic Markets era, however, Integration relates to the synchronization of inter-organizational processes

that occur at the pre-transaction and the post-transaction stages. Electronic Markets can be used at the product development and design. Manufacturers can collaborate with suppliers via Electronic Markets to jointly develop products, while constantly receiving feedback from customers. The information shared among organizations may include those used for project management, product testing, and customer feedback and market research.

In Case Three, the steel Electronic Market provided facilities for insurance, finance, freight, and forwarding facilities to buyers and sellers. The Electronic Market is not limited to providing order-processing and invoicing facilities. Integration was demonstrated in Case One, where that organization used the Electronic Market to integrate its tendering and bidding processes. Although reverse auctions were mostly used for sourcing new supplies, the organization involved has even used reverse auctions to tender out contracts for the maintenance and disposal of computers and peripherals.

This illustrated how Electronic Markets integrate business processes at the post-transaction stages. Electronic Markets, it appears then, can function beyond supporting order-processing, invoicing, and logistics-related business processes. Table 1 below summarizes Aggregation, Matching, and Integration, as the emerging themes from the six case studies.

Table 1: Summary of case studies and emerging themes

Case Study	<i>AGGREGATION</i>	<i>MATCHING</i>	<i>INTEGRATION</i>
<b>Finance Organization Reverse Auctions</b>	Aggregating demand (pooling of purchases)	Electronic bidding for price discovery and determination	Integrating tendering & bidding processes
<b>Life science Electronic Market</b>	Aggregating demand and supply	Accessing new market segments, accessing new trading partners	Integrating tendering & bidding processes
<b>Steel Electronic Market</b>	Aggregating demand and supply	Accessing segmented market, accessing geographically distributed trading partners	Integrating freight, forwarding, insurance, payments
<b>Electronic Distribution Channel</b>	Little evidence	Sharing of time-critical market information	Integrating inventory management
<b>Indirect Supplies Electronic Market</b>	Aggregating demand and supply	Accessing new trading partners, leveraging existing trading partners for new sales opportunities	Little evidence
<b>Healthcare Products Online Catalogue</b>	Aggregating supply	Acting as an intermediary, allowing customers to access many trading partners	Integrating order-placing, invoicing, logistical processes

Data gleaned from the six case studies indicates that a particular source of business value influences different organizations at different business process stages. A possible explanation is that these Electronic Markets had different objectives, for example, the reverse auctions in Case One was a complementary procurement channel, whereas the life science Electronic Market in Case Two represented a new platform that brings together buyers and sellers within a market segment. At different stages of implementation

of Electronic Markets, the emphasis on the source of business value may vary also, e.g. new Electronic Markets concentrate on Aggregation, whereas established Electronic Markets concentrate on Integration.

## 6. CONCLUSION

The B2B Electronic Markets arena is still evolving. Economic rationalization brought about a survival of the

fittest scenario for Electronic Markets. Successful ones like ChemConnect and Exostar are gaining momentum while unsuccessful ones like Chemdex have faltered. A lot remains to be understood about the strategies underpinning successful Electronic Markets. While past research concentrated on the impact of information technology on business processes such as negotiation and fulfilment, this study demonstrated a framework that emphasizes how B2B Electronic Markets influence business processes such as information gathering, supplier contact, and consumption, maintenance and disposal. This is important as the benefits of Electronic Markets are not restricted to price and cost reductions. Inevitably those outcomes are a function of business process and any value generated in business process optimization.

The adoption of the proposed model for analyzing Electronic Markets-related problems or analysis of Electronic Market strategy by businesses will aid identification of value and formulate strategies based on real exemplars. Contributions of this study to an understanding of B2B Electronic Markets include that it: presents a structured way of understanding the benefits of Electronic Markets; helps identify future areas of opportunity; enables the analyst or business manager to view the business value from different stakeholder perspectives; enables researchers and practitioners to analyze and formulate strategies for Electronic Markets; provides propositions for future research; and enables the use of the model to analyze published cases of Electronic Markets.

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