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EXPLORING ELECTRONIC MARKETPLACE PERFORMANCE: THE 3 PILLARS

Exploration de la performance des places de marché électroniques : Les 3 piliers

Completed Research Paper

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Abstract

The literature on electronic marketplaces has a number of limitations; inconsistencies in defining electronic marketplaces and measuring their performance; a limited amount of empirical research focusing on electronic marketplace performance; and the absence of an electronic marketplace performance model. This study examines 8 electronic marketplaces operating in diverse geographical and product markets. The study reveals the factors that affect electronic marketplace performance, and illustrates how these factors impact performance. Using the concept of fit as a theoretical lens, this study illustrates how electronic marketplaces, through their actions, improved their performance. Finally, the presents a model of electronic marketplace performance.

Keywords: Electronic marketplace, performance model, case study research

Résumé

Cette recherche examine la performance des places de marché électroniques. Nous avons étudié huit places de marché Européennes ayant des degrés de succès variables. Nous examinons la façon dont le niveau de performance des places de marché électroniques est mesuré, et dont les facteurs qui l'influencent sont identifiés. Les conclusions illustrent comment l'adéquation entre ces facteurs peut influencer la performance.

Introduction

In examining the competitive and environmental aspects of Information Systems many IS researchers have based their research on the economic theories of Coase (1937) and Williamson (1975; 1981; 1991; 1999); they thus view market system governance as either hierarchies or markets. This is particularly evident in Malone et al.'s (1987) seminal work on electronic hierarchies and markets; referred to as the electronic markets hypothesis (EMH). Building on the economic theories of Coase (1937) and Williamson (1975; 1981) and given the ability of IT to reduce co-ordination costs, Malone et al. (1987) predicted an increased utilisation of electronic markets at the expense of electronic hierarchies. Researchers such as Clemons and Row (1992), Bakos and Brynjolfsson (1993) and Hess and Kemerer (1994) have criticised the theory, stating that it ignores key aspects of inter-organisational relationships, including how organisations manage risk and the fundamental nature of buyer/seller relationships. Furthermore, there has been limited empirical evidence confirming this hypothesis. Indeed, researchers such as Bakos (1991), Lee and Clark (1996) and Soh et al. (2006) noted the increased number of third-party market makers

which electronically co-ordinated inter-organisational activities. This development may be partially explained by the work of Hayek (1945) on the emergence of intermediaries in the market system. Hayek argued that one of the main issues for parties conducting economic activity is access to market knowledge. Such knowledge does not exist in a concentrated or integrated form but as “dispersed bits of incomplete and frequently contradictory knowledge which all separate individuals possess” Hayek (1945, p.77). Hayek believed that one of the key considerations for firms was the process for obtaining and aggregating such knowledge; a process that could be undertaken by third party merchants (intermediaries). These market intermediaries are referred to as electronic marketplaces in this paper.

The literature reveals disparate and often contradictory perceptions of electronic marketplaces. Furthermore many electronic marketplaces are under-performing (Soh et al., 2006; Son and Benbasat, 2007). Dai and Kauffman (2002) reference a Deloitte research report showing 1,500 electronic marketplaces operational in 2000. However, the failure rate for such ventures was high (cf. Lennstrand et al. 2001) with performance being an important issue for electronic marketplaces. The ongoing trend of a reduced number of marketplaces in existence is reflected in evidence from emarketservices (www.emarketservices.com) in August 2008 which revealed 602 electronic marketplaces operating in various sectors. Consequently, electronic marketplace performance an issue worthy of research (Corsten and Hofstetter, 2001; Soh et al., 2006). However, existing research on electronic marketplace performance is constrained by a number of issues. First, the definitional problems surrounding electronic marketplaces mean that researchers may not be examining the same phenomena. Second, a common understanding of electronic marketplace performance (including a definition) is not evident in the literature. Indeed, terms such as electronic marketplace success (Dai and Kauffman, 2002), and converging stakeholder satisfaction (Ribbers et al., 2002), which are inferred to reflect electronic marketplace performance, are not consistently defined or explained. Third, while some studies (e.g. Kambil and Van Heck, 1998; Dai and Kauffman, 2002) report that particular factors impact upon electronic marketplace performance, these claims are not supported with transparent performance measures.

Theoretical Grounding

The inconsistencies in defining electronic marketplaces and the inter-organisational processes which they support is evident from an analysis of the literature. Bakos (1991) defines an electronic marketplace as an inter-organisational information system, Schmid and Lindemann (1998) define it as a medium, Dai and Kauffman (2000) as an intermediary, and Bradley and Peters (1997) as a listing. More recently, the concept of an electronic marketplace as an intermediary has emerged (c.f. Dai and Kauffman, 2000; Soh et al., 2006; Fairchild et al., 2007). Nevertheless, a comprehensive definition is illusive. Soh and Markus (2002) build on previous research to operationalise the attributes under five constructs; value proposition, product-market focus, value activities, ownership and market structure. Similarly Dai and Kauffman (2002) classify e-market roles as being basic market functions, management needs and technology adapters. We extend the work of Soh and Markus (2002) to expand the concept of electronic marketplace value activities using the e-market roles identified by Dai and Kauffman (2002). We argue that the value activities performed by electronic marketplaces focus on buyer/supplier needs for management support (business process support, supply chain and project management) and technology (standards, integration and outsourcing), in addition to the basic market functions of aggregation, matching and facilitation. Consequently we derive an operational definition of electronic marketplaces for use in this study as being: “an organisational intermediary that electronically provides value added communication, brokerage and integration services to buyers and sellers of direct and/or indirect products and/or services in specific horizontal or vertical markets by supporting basic market functions, meeting management needs for information and process support, and/or operating the required IS/IT infrastructure”.

The terms electronic marketplace performance and success are referred to by many researchers without being defined in a consistent manner. For example, Dai and Kauffman (2002) argue that the success of an electronic marketplace, which they see as an intermediary, is determined as how well such an entity satisfies buyers/sellers and the potential value which they offer. Yet, Dai and Kauffman (2002) do not provide operational measures of electronic marketplace success. Similar to Dai and Kauffman’s (2002) perspective, Ribbers et al. (2002) report that the success of an electronic marketplace is related to converging stakeholder satisfaction. Yet, Ribbers et al. (2002) do not explain the meaning of converging stakeholder satisfaction, nor how it is measured. This reflects a common issue in the literature with many researchers (Dai and Kauffman, 2002; Soh and Markus, 2002; Ribbers et al., 2002) referring to electronic marketplace performance, yet presenting neither a formal definition of electronic marketplace performance nor how it is measured. A review of the management and finance literature reveals that higher organisational performance implies (i) an organisation is meeting its objectives (Otley, 1999), (ii) revenue growth

(McNair et al., 1990; Norreklit, 1999), (ii) improved customer relationships (Kaplan and Norton, 1996), (iv) improved employee productivity (McNair et al., 1990) and (v) return to its owners (Breasley and Myers, 2004). In applying these concepts to electronic marketplaces, performance is defined for this study as; “how efficient the marketplace is in performing its tasks and meeting its objectives, while continuing to innovate, grow and expand”. In terms of measuring electronic marketplace performance, revenue (Ribbers et al., 1999), liquidity (Kambil and Van Heck, 1998; Weber, 1999) and efficiency (Dai and Kauffman, 2002) have been utilised in previous studies. Yet measures such as liquidity have been criticised by researchers (Kambil and Van Heck, 1998) as being unsuitable for certain types of marketplaces. Furthermore, liquidity has multiple definitions, being defined in terms of critical mass of buyers and sellers (Clark and Lee, 1999; Ribbers et al., 2002), the ease with which a commodity may be converted into cash (Kambil and Van Heck, 1998) and volumes traded (Weber, 1999). Such lack of consensus in the literature complicates the task of building substantive theory on electronic marketplace performance with a comprehensive list of electronic marketplace performance measures not present in the literature. A review of the electronic marketplace literature revealed factors which are believed to affect marketplace performance (table 1). However, an analysis of the literature upon which table 1 is based reveals the type of definitional inconsistencies that prevent us integrating the findings from these studies to develop a comprehensive performance model.

Factors	EM Literature	Performance	Limitations
Marketplace Process Design	Kambil and Van Heck, 1998; Dai and Kauffman, 2002	Illustrate how providing processes for sellers positively impacts upon the performance of sellers by reducing uncertainty for them and positively impacting on prices received.	Only deals with performance from sellers’ perspective. Impact of the provision of specific processes on a marketplace’s performance unknown.
Information Technology	Bakos, 1991; Soh and Markus, 2002	Enables buyers to search out for alternatives and choose the supplier that provides the best value/price tradeoff (Bakos, 1991). Enables suppliers to customise their offering, thereby increasing their return.	Studies do not discuss the impact which IT has on electronic marketplace performance.
Market Power and Competition	Kambil and Van Heck, 1998	Infer that a number of factors impact upon the competitiveness of the electronic marketplace in the environment: a party’s ability to switch between IOS; the markets % share of the overall market; alternatives.	The impact which market power and competition have on the performance of electronic marketplaces has not been illustrated using empirical data.
Ownership	Kambil and Van Heck, 1998	Link between ownership and access to marketplace illustrated, with certain parties barred from using the marketplace by the owners.	Lack of empirical evidence on the association between ownership & electronic marketplace performance
Trading culture	Kambil and Van Heck, 1998	Impacts upon performance reflected in number of parties and volumes traded.	Only illustrated in the case of the Dutch flower auctions.
Buying into the vision	Lennstrand et al, 2001	Impacts upon the success of the marketplace.	Success not defined. Empirical evidence not provided.

Table 1: Electronic Marketplace Characteristics

Research Approach

The objective of this study is to develop an electronic marketplace performance model. Four research questions were formulated:

- (i) How do marketplaces measure their performance?
- (ii) What factors impact upon marketplace performance?
- (iii) How do these factors impact upon marketplace performance?

(iv) Is the fit between factors useful in explaining electronic marketplace performance?

Marshall and Rossman (1989) argue that there is a need for research to focus on 'discovery' and 'theory building', and be 'exploratory' in nature, when the state of knowledge in a field is at an early stage of investigation, as here. Case studies can be used to provide rich description of a phenomenon and serve to capture the reality and richness of organisational behaviour in detail, and are thus suitable for exploratory research (Galliers, 1992; Darke et al., 1998). Benbesat et al. (1987) note that multiple case studies can strengthen research findings and help allay many of the problems documented in relation to individual case studies. Indeed, Eisenhardt (1989) comments that multiple cases are a powerful means to create theory as they permit replication and extension among individual cases. Indeed, the multiple case study technique facilitates greater theoretical insights arising from methodological rigour and multiple case comparative logic (Eisenhardt, 1989).

Eight electronic marketplaces (table 2) were selected for this study using the directory of electronic marketplaces provided by emarketservices (www.emarketservices.com). Case selection was purposeful on the basis of performance. In order to facilitate replicability and generalisation, a number of cases were chosen in similar product areas and sectors. Five of the marketplaces studied; BTTransact, IBX, Eutilia, Nordpool and Proceedo were rated by emarketservices as being among the top 20 marketplaces worldwide. Of the top 20, 5 of these marketplaces were selected based on access to data and changes in performance over time. The other electronic marketplaces studied, Globalcoal, Dealcotton and Comdaq, were selected to add diversity. We thus adopt Pettigrew's (1989) philosophy that such cases may provide insights which the other electronic marketplaces may not, and are useful in building theory. Data gathering took place using semi-structured interviews and document analysis. Interviews were held with senior management and other personnel responsible for policy formulation. In total, 31 people were interviewed with 103 hours of interviews taking place.

The data was analysed using open, axial and selective coding techniques (Strauss and Corbin, 1990; Urquhart, 2001), as exemplified by the research of Orlikowski, (1993) and Urquhart (1997). This approach facilitates the development of substantive theory and can be utilised in conjunction with existing theory (Strauss and Corbin, 1990). This approach necessitates the researchers to be immersed in the data (Glaser and Strauss, 1967) and to draw on existing theoretical knowledge (Corbin and Strauss, 1990; Urquhart, 1997). It thus encourages the researcher to be flexible and creative (Sarker et al., 2000) while imposing systematic coding procedures (Strauss and Corbin, 1990). The first step (open coding) involved the data being examined 'line by line' to ascertain the main ideas. These were then grouped by meaningful headings to reveal categories and sub-categories/properties. The next step (axial coding) is the process of determining hypotheses about the relationships between a category and its subcategories e.g. conditions, context, action/interaction strategies and consequences. The focus then turned to the data to assess the validity of these hypothesised relationships. Relational and variational sampling (cf. Strauss and Corbin, 1990) was used to select data for this analysis. This process continued in an iterative manner and resulted in the modification of categories and relationships. Finally, Selective Coding was undertaken to identify the relationships between categories (constructs) using hypothesised conditions, context, strategies and consequences. Discriminate sampling (cf. Strauss and Corbin, 1990) was used to select data to examine strong and weak connections between categories. Furthermore, venting (cf. Goetz and LeCompte, 1984) was used as results and interpretations were formally discussed with marketplace representatives.

Organisation	Product / sector	Interviewees	Value Proposition
BTTransact (5 Employees)	Indirect goods in telecoms	Senior Manager , Manager	Centrally hosted service. Request for quote and once off on-line auctions. Catalogue creation and content management solution.
Comdaq (4 Employees)	Commodities; coffee, sugar, cocoa etc	Chairman, Director	Key value proposition is supplying software. Operates a number of electronic markets in various commodity sectors.
DealCotton (7 Employees)	Cotton	President / CEO, Head of Business Development, Chief Financial Officer, Director CIS (Eastern Europe) operations, Chief communications Officer, 4 Marketplace Participants	Automation of the cotton trading process. Unbiased 'neutral' entity in cotton trading.
Eutilia (20 Employees)	Indirect goods for utility sector	System Delivery Programme manager, Chief commercial officer, Auction manager, Business analyst	Facilitates the introduction of increased levels of competition and transparency to the European utilities market.
Globalcoal (8 Employees)	Coal	Chief Executive Officer, Chief Operations Officer, Chief Technology Officer	Operates a physical ¹ and financial market ² for trading coal.
IBX (80 Employees)	Indirect goods for multinationals in Nordic region	Chief Communications Director , CEO	To automate and simplify procurement for buying organisations.
Nordpool (50 Employees)	Electricity	President/CEO, President Of Nordpool Clearing, Head of Financial Markets, Senior Manager (Head of Research and Analysis), Communications Officer, Communications Director	Operates a physical and financial market for trading electricity in the Nordic region. It also offers clearing services.
Procedo (20 Employees)	Indirect goods for mid-sized Nordic companies	Chief Executive Officer, Vice President, Project Manager	Facilitate organisations in procuring indirect goods. Procedo supports the following elements of the supply chain: product search, requisition, approval, ordering and electronic invoicing.

Table 2: Overview of Marketplaces studied

¹ Electronic marketplaces may operate one or more electronic markets. Physical contracts are traded on an electronic marketplaces physical market. A physical contract is a product whose value arises from the owner's right to sell as well as the right to use the product (e.g. coal, electricity).

² A financial contract's owner has the right to buy or sell an underlying instrument (i.e. futures, forwards, swaps) at a certain date in the future. Such contracts are traded on a marketplaces financial market.

Analysis

This section provides details of how electronic marketplaces measure their performance as well as the factors which impact upon electronic marketplace performance. Three categories of factors that impact upon electronic marketplace performance are revealed:

- (i) market factors: those outside the direct control of marketplace management
- (ii) marketplace design factors: operational and strategic characteristics of the marketplaces, and
- (iii) ownership factors: issues relating to investors and governance.

We found that 26 measures are used by the marketplaces studied to measure their performance; which can be broadly classified as financial, customer and innovation & growth measures. Further analysis revealed just 10 financial and customer measures (table 3) were both widely used and relevant in the context of marketplace design, market and ownership factors. The 2 key performance measures for all marketplaces are revenue and profitability. Analysis revealed that all other financial and customer measures impact upon these 2 key performance indicators.

	F: Financial C: Customer	BTTtransact	Comdaq	Dealcotton	Eutilia	Globalcoal	IBX	Nordpool	Procedo
F	Revenue: Revenue (turnover) of the electronic marketplace in a specified financial year.	x	x	x	x	x	x	x	x
F	Profitability: Trading profit/loss by an electronic marketplace for a specified year.	x	x	x	x	x	x	x	x
F	Overheads: Operational Costs encountered by a marketplace for a financial year	x	x	x	x	x	x	x	x
C	Buyers: Number of buyers contracted to the marketplace	x	x	x	x	x	x	x	x
C	Suppliers: Number of suppliers contracted to the marketplace	x	x	x	x	x	x	x	x
C	Speculators: Number of speculators operating on an electronic marketplaces (Commodities marketplaces operating financial markets only)					x		x	
C	Percentage of market (market share): Percentage share of the market.	x					x		x
C	Volumes: Volumes of a specified good traded through a marketplace			x		x		x	
C	Transactions: The number of transactions on a marketplace.		x		x		x	x	x
C	Tenders: Marketplace's success rate at obtaining published tenders (Indirect goods marketplaces only)						x		x

Table 3: Overview of Performance Measures used by Electronic Marketplaces

Marketplace Design

Our analysis revealed six electronic marketplace design factors: product offering, personnel, bias, participant characteristics, revenue model and cost structure. This section illustrates that each of these factors impact upon a broad range of performance measures (table 4).

We found that launching innovative products impact upon adoption levels amongst buyers & suppliers, volumes traded and revenues. This was illustrated in the Globalcoal, Procedo and Nordpool cases, with marketplaces finding that when they introduced new products, it impacted upon their performance. For example, Globalcoal decided in 2002 to generate greater participation from Japanese and Asian players through the creation of an accurate Asian (NEWC) index. This resulted in increased volumes on Globalcoal's financial market with 1.135m tonnes of Swap Newcastle (NEWC) products traded in 2004. The impact of marketplaces' personnel on performance is reflected in adoption levels (supplier & buyer numbers) and marketplace revenues. For example, Comdaq operate numerous commodity markets e.g. sugar, coffee, metals etc. Comdaq's best performing market has been Metal.

Factor	BTTtransact	Comdaq	Dealcotton	Eutilia	Globalcoal	IBX	Nordpool	Procedo
Cost Structure: Operational costs a marketplace faces	Revenues Profitability Overheads	Revenues Overheads Profitability	Revenues Overheads Profitability	Revenues Overheads Profitability	Revenues Profitability Overheads	Revenues Profitability Overheads	Revenues Profitability Overheads	Revenues Profitability Overheads
Bias: Product offerings are designed in favor of a specific group of participants.	Suppliers & Buyer s	NA ³	NA	NA	NA	Suppliers & Buyers	NA	Suppliers & Buyers
Personnel: Background and expertise of marketplace personnel	Buyers	Supplier s & Buyers Revenues	Suppliers & Buyers Revenues	Suppliers & Buyers	Suppliers & Buyers Revenues	Buyers Revenues	Suppliers & Buyers Revenues	Buyers Revenues
Revenue Model: Mechanisms used by an electronic marketplace to obtain money	Suppliers & Buyers Volumes Transactions	No impact	Volumes Revenues	Suppliers & Buyer s	No impact	Buyers Transactions	No impact	Suppliers & Buyers Volumes Revenues Transactions
Participant Characteristics: Size & type of the buyers/suppliers /speculators which adopt a marketplace	Transactions Revenues	Suppliers & Buyers	Suppliers & Buyers Volumes Revenues	Transactions Buyers Revenues	Volumes Suppliers & Buyers. Speculators	Transactions Buyers Revenues	Volumes Suppliers & Buyers Speculators Revenues	Transactions Buyers Revenues
Product Offering: Goods/services which an electronic marketplace offers	NA	NA	NA	NA	Vol. Traded	NA	Volumes Suppliers & Buyers	Revenues

Table 4: Marketplace Design Factors impact on Electronic Marketplace performance

Analysis suggests that one of the key reasons for this is the knowledge of Comdaq Metals’ employees. Comdaq Metals is operated by personnel who are experts in metals trading. All personnel come from a trading/brokering

³ NA: Not Applicable

background and therefore have an in-depth knowledge of, and contacts within, the metals industry. The President of Comdaq Metal stated that “coming from a trading background enables us to put our trades through Comdaq metals online system”. In contrast, the personnel that operate Comdaq’s other markets are technology experts. However, they do not have the knowledge of, or contacts within, the various commodities sectors that they are targeting. Indeed, evidence suggests that this lack of market knowledge is one of the reasons for Comdaq’s relatively poor performance.

Bias impacted upon the performance of those electronic marketplaces that operate in indirect goods, as reflected in the adoption levels (number of buyers & suppliers) of BTTransact, IBX and Proceedo. These electronic marketplaces (all involved in indirect goods) were buyer biased, and experienced a lot of adoption resistance by suppliers. According to IBX’s Communications Manager “suppliers are forced into it, [the marketplace]; there are no immediate benefits because they must wait for critical mass. Suppliers that have invested in their own web shops and now have to invest in buyers web shops have been disappointed. Such resistance has impacted upon the quality of catalogues made available to buyers as they haven’t invested enough time and money in quality catalogues”. Management in BTTransact, IBX and Proceedo have found that this has had an impact on buyer adoption levels as buyers look at the number and types of suppliers when deciding on an electronic marketplace.

The characteristics of the participants which adopt an electronic marketplace impact on its performance. For example, the increase in Proceedo’s revenues between 2000 and 2001 may largely be attributed to the fact that SAS, a large blue chip organisation which operates in the Nordic region, joined. Similarly, in IBX, the fact that large blue chip organisations utilise IBX explains its large revenues in 2001. BTTransact purposely target large multinational organisations as management believes that the contribution to revenues is much greater than having numerous smaller organisations.

The revenue model adopted affected adoption levels (buyers & suppliers), the number of transactions and volumes traded in BTTransact, Dealcotton, Eutilia, IBX, and Proceedo. The key aspects of deciding on a revenue model is: (i) who pays? (buyer and/or sellers), and (ii) are revenues based on a subscription (fixed timeframe) or transaction (per transaction cost) basis? The most successful revenue model is a subscription based model as buyers and participants are aware in advance of the financial cost of using the marketplace. The revenue model adopted by those studied has evolved over time in an effort to improve performance. For instance, Proceedo initially adopted a transaction based model, charging buyers only. However, it had to be abandoned as the immaturity of the electronic marketplace concept resulted in low numbers of transactions. The CEO revealed that Proceedo “couldn’t wait for our customers to increase their transactions so that we could get revenues”. This revenue model also made it much more difficult for Proceedo to get buyers to adopt the marketplace. The subscription based model introduced later consists of a fixed term contract for a pre-negotiated amount. The average contract for customers is around 200,000 SEK a year for a three to four year period. Proceedo’s President believes that the subscription model is critical to Proceedo’s ongoing performance as “marketplaces are a relatively new concept for customers and they need to know what it is going to cost”. This change resulted in increased buyer adoption and revenues.

Cost structure refers to the operational (overheads and administrative costs) costs which a marketplace faces. Such costs impact upon the performance of all the electronic marketplaces researched. Operational costs incorporate all the everyday costs which a marketplace encounters in operating. These include office space, personnel and technology costs. The critical point for the electronic marketplaces researched is how to manage these costs, and vitally, whether organisational revenues are large enough to offset the costs. Therefore, the costs required to run, maintain and develop the electronic marketplaces influences marketplace profitability.

Market Factors

Market factors are those factors which are outside the direct control of the electronic marketplace and consist of; maturity of the electronic marketplace concept, trading culture, competition, and market conditions. Analysis revealed that these factors impacted upon performance measures within the customer category. An overview of how these factors impact upon electronic marketplace performance is presented in table 5.

The maturity of the marketplace concept impacts upon electronic marketplace performance, as reflected in buyer & supplier numbers, number of speculators and number of transactions. This was illustrated in six of the electronic marketplaces studied: BTTransact, Comdaq, Dealcotton, Proceedo, IBX and Nordpool (table 5).

Factor	BTTransact	Comdaq	Dealcotton	Eutilia	Globalcoal	IBX	Nordpool	Procedo
Maturity of the Marketplace concept: Level of acceptance and understanding of the electronic marketplace concept among market participants.	Buyers & Suppliers Transactions Revenues	Buyers & suppliers	Buyers & Suppliers	No impact	No impact	Buyers & suppliers Transactions	Volumes Buyers & suppliers Speculators	Buyers & suppliers Transactions
Trading Culture: Predominant method by which business is conducted and goods are bought and sold in the sector in which the electronic marketplace operates	NA ⁴	Buyers & Suppliers Volumes	Buyers & Suppliers Volumes	No. of buyers	Buyers & Suppliers Volumes	NA	Buyers & Suppliers Volumes	Transactions
Competition: Challenge which electronic marketplaces face from other sources	Buyers Transactions	Buyers & Suppliers	Buyers & Suppliers	Buyers & Suppliers Transactions	Buyers & Suppliers Volumes	Buyers Transactions Tenders	Buyers & suppliers	Buyers Transactions Tenders
Product Specific Market conditions: The level of demand/supply and price volatility for the product being traded.	NA	Volumes Transactions	Volumes	NA	Buyers & Suppliers Transactions	NA	Speculators Transactions Volumes	NA

Table 5: Electronic Market factors impact on Electronic Marketplace performance

The greater the level of maturity of the marketplace concept in the marketplaces target sector, the better the marketplace performed. For example, for Procedo, the maturity of the electronic marketplace concept among private sector organisations in the indirect goods market (in its primary market, Sweden) greatly impacted upon Procedo's adoption levels (buyer & supplier no's). Even by 2001, after three years operating in the market, Procedo's Vice President argued that the market had not as yet reached a level of maturity whereby the business community understood the concept of an electronic marketplace and what it delivered. Procedo management argued that one of the reasons for the lack of awareness of the role and functions of electronic marketplaces relates back to the late 1990s. At this juncture, there were a large number of venture capitalist backed entities on the market

⁴ Companies signed up to both BTTransact and IBX direct their personnel to procure all these goods through these marketplaces

calling themselves different things such as emarkets, electronic marketplaces and service providers. Proceedo's Vice President stated that "there was a lot of confusion amongst market participants of what exactly an electronic marketplace was". Proceedo's Vice President argued that this lack of acceptance and understanding of the electronic marketplace concept among private sector organisations in Sweden made it very difficult to establish and define a market for electronic marketplaces and accordingly "greatly inhibited our performance, especially in trying to get buyers to sign up".

Trading culture impacts upon the performance of electronic marketplaces, especially those that operate in commodities. For these marketplaces, the difficulty is that participants have been trading commodities via bilateral contracts for decades. As a result of this culture, many participants are unwilling to migrate to marketplaces to procure goods. This is reflected in many instances in lower than anticipated buyer & supplier numbers, traded volumes and transaction numbers.

Competition impacts upon the performance of all the electronic marketplaces included in this study. This is reflected in buyer & supplier numbers, transaction numbers, volumes traded and tender success rate of electronic marketplaces. Competition for electronic marketplaces comes in two guises: 1. electronic marketplaces, and 2. other forms of competition. Marketplaces which facilitate the trade of indirect goods face intense competition from each other. Competition among electronic marketplaces (IBX, Proceedo) in the Nordic is very intense as they operate in a market characterised by low market penetration levels. For example, only seven tenders were published in the Nordic markets in 2003. In 2004, the sales cycle in this market according to Proceedo's Vice President was approximately "15 months long from tender through to a decision to adopt". This is why both Proceedo and IBX assess their tender success rate. For those electronic marketplaces which operate in the commodities market, OTC bilateral contracts represent the largest share of the market. This negatively impacts upon the number of buyers & suppliers adopting the marketplace and volumes.

Market conditions impact upon the marketplaces operating in commodities markets (Comdaq, Dealcotton, Globalcoal and Nordpool) in terms of the number of buyers/suppliers (specifically speculators), transactions and volumes traded. Market conditions are affected by unanticipated market shocks and production conditions. Unanticipated market shocks affect the number and types of traders utilising electronic marketplaces. The study revealed that market shocks have resulted in an increase in commodity prices and consequently a reduction in the number of speculators operating on marketplaces financial markets, as well as a reduction in volumes traded on both physical and financial markets. Production conditions, and levels of demand/supply for the product being traded, have also impacted upon volumes traded. The number of buyers/suppliers, together with volumes traded, in turn impact upon revenues earned by electronic marketplaces.

Ownership Factors

Analysis reveals that ownership is a multi-faceted issue consisting of investor's objectives and structure, investor commitment levels and governance efficiency. Analysis reveals a multitude of investor objectives for marketplace investment, broadly categorised as; transactional, financial or fear. We found that investor objectives impact upon investor commitment levels with those investors interested in the transactional benefits of electronic marketplaces being most committed. Analysis revealed that the least committed grouping were those investors that were purely interested in financial gain. The level of investor commitment impacts upon electronic marketplace performance in terms of volumes traded, number of transactions, buyer & supplier numbers and revenues. This is evident in all marketplaces (see table 6).

For example, IBX's investors have been highly committed to actively using the marketplace and have all signed commitment agreements. IBX management believes that these high levels of commitment are crucial to its performance. Each investor signed a three year service level agreement with a firm rollout plan for a specified amount of that organisations' procurement spend. IBX's Communications Director stated that "*over 80% of revenues in the initial year were contracted volume from our shareholders, which was a very safe way of developing the company*". This contrasts with Globalcoal. Globalcoal's Vice President believes that Globalcoal would truly succeed if the larger investors traded only 10% of their coal through Globalcoal. Globalcoal's President stated "*if we could get these guys to put half of their uncommitted tons through us, we would have a totally different scenario in terms of our traded volumes and profitability*". To summarise, the greater the commitment levels among investors, the better the electronic marketplace performs.

Analysis revealed that investor’s objectives also impacted upon electronic marketplace governance efficiency, with electronic marketplace governance efficiency in turn impacting upon electronic marketplace performance (table 6). This was illustrated in the Eutilia, Globalcoal and IBX cases. For instance, there were 11 members on Eutilia’s board until 2003. Each investor nominated a single participant to the board. Eutilia management believes that six of the eleven investor’s main objective was to utilise Eutilia to meet their procurement needs. However, the other five were very indecisive. This resulted in a “total lack of efficiency in relation to policy formulation...certain directors just sat there and did nothing...in many cases this very much reflected their investors’ indecision in relation to their marketplace investment” (Eutilia’s Business Analyst). Investors’ diverse range of agendas, communicated through their nominees on Eutilia’s board, meant that there was much indecision in relation to policy formulation and decision making. Up until a change in ownership in 2004, obtaining agreement among board members proved to be very difficult. The change in ownership structure came into effect in March 2004 and its impact at board level was quickly evident. With the reduction in the number of investors from 11 to 6, and the size of Eutilia’s board being reduced by 5 members, governance efficiency and decisiveness was improved. The Commercial Manager stated that “decisiveness among investors is now much better”. Policy formulation is now much more decisive. This is reflected in the decision to abandon transaction services in 2004 and Eutilia’s strategy to solely focus on its supplier optimisation service (SOS). Analysis revealed that this change had a positive effect on electronic marketplace performance. Revenues increased by over 30% between 2003 and 2004; the number of active buyers increased by over 200; the number of suppliers by over 2000; and Eutilia was operating at breakeven by late 2005.

Factor	BTTransact	Comdaq	Dealcotton	Eutilia	Globalcoal	IBX	Nordpool	Procedo
Investor commitment levels: The decision by an investor whether or not to utilise the electronic marketplace	Buyers Volumes	No impact	Transactions Revenues Buyers	Buyers Suppliers Transactions	Volumes Revenues Buyers & Suppliers	Buyers Revenues Transactions	NA	Buyers Revenues Transactions
Governance Efficiency: How efficiently decisions are made and consensus achieved by the electronic marketplace Board in relation to business strategy.	No impact	No impact	No impact	Transactions Buyers & Suppliers Revenues Volumes	Transactions Buyers Revenues Volumes	Buyers Transactions	No impact	No impact

Table 6: Ownership factors impact upon Electronic Marketplace Performance factors.

This situation can be contrasted with IBX. In IBX, each investor also has a representative on the Board. However, there is agreement among investors in relation to their objectives for IBX. According to IBX’s Communications Director there is “consensus among investors, reflected at board level in relation to policy formulation for IBX”. This “single mindedness is reflected in decisions (to get new investors involved for example)” (IBX’s President). This has greatly contributed to IBX’s success in terms of getting buyers to adopt and utilise IBX.

A Marketplace Model

Figure 1 illustrates how market factors, ownership factors and marketplace design impact upon electronic marketplace performance (as determined by financial and customer measures). Analysis revealed that market factors impact upon customer performance measures. Ownership and marketplace design factors impact upon financial and customer measures.

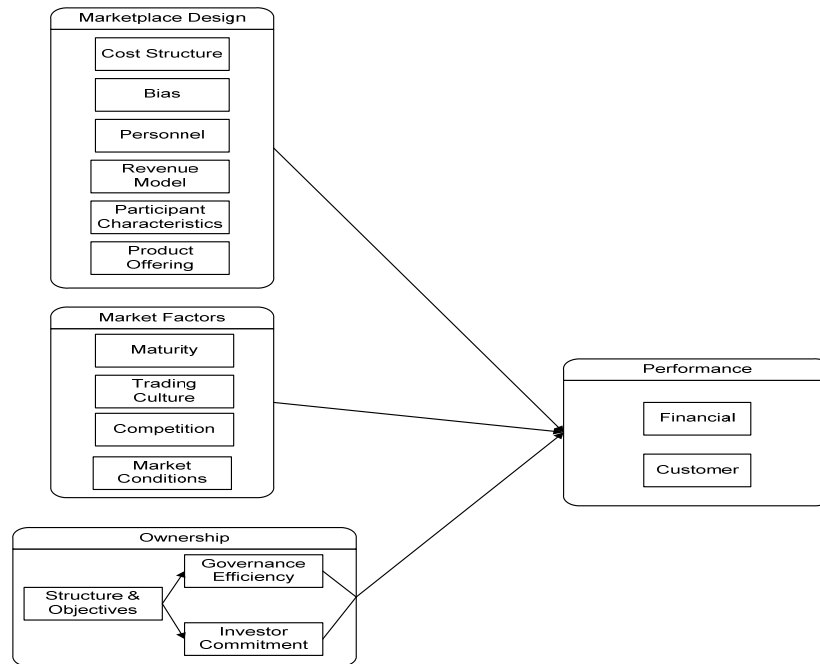


Figure 1: An Electronic Marketplace Performance Model

Analysis revealed that the concept of fit is useful in helping to further explain electronic marketplace performance. Specifically, the fit between: 1. product offering and trading culture, 2. maturity of the electronic marketplace concept and revenue model, and 3. investor structure & objectives and maturity of the electronic marketplace concept, are seen to affect electronic marketplace performance.

Proactive actions by marketplaces to improve the fit between their product offering and trading culture have resulted in improvements in performance. Analysis revealed that providing functionality that does not take into account trading culture in their marketplace's market sector has a negative impact upon electronic marketplace performance. For example, both Dealcotton and Globalcoal designed auction-based trading systems, with the objective of bringing transparency to trading in the cotton and coal markets, respectively. Yet in both these sectors, the trading culture is dominated by the use of OTC contracts and trade brokers to procure goods. Many of the large suppliers and buyers were reluctant to commit volumes to these marketplaces as they believed that transparency impacted upon the price they received/paid. Therefore, the transparency which both these marketplaces provided, impaired their performance, reflected in volumes, the number of buyers & suppliers adopting the marketplace and profitability. As a result, Dealcotton decided in 2002 to abandon the auction mechanism and develop a workflow management solution for mill-to-merchant trading. This solution could be configured to handle a contract negotiation workflow including: original offer, counter bid, counter offer, counterparty acceptance, counterparty rejection, finalised contract, PDF contract document, logistics, and insurance. The cotton industry supply chain has traditionally been notorious for the amount of paper generated and the lack of standardisation in relation to transactions. By utilising generic templates of the workflow management solution, Dealcotton hoped to improve standardisation in the supply chain and reduce transaction costs for participants. According to management, the introduction of the workflow management solution was one of the key reasons for the improvement in volumes and increased buyer/supplier adoption on Dealcotton post 2002.

Analysis also revealed that the fit between the maturity of the electronic marketplace and the revenue model impacted performance. All the electronic marketplaces studied found that choosing an appropriate revenue model and pricing strategy was critical to performance. The revenue models adopted by these marketplaces have evolved over time, predominately as a result of the degree of maturity of the electronic marketplace concept, and in an effort to improve performance. For example, Dealcotton initially adopted a transaction-based model but due to the immaturity of the electronic marketplace concept, management switched to a subscription based model in late 2002. Dealcotton management reported that this change increased acceptance amongst buyers & suppliers. As a result of this management found it much easier to attract new buyers & suppliers to the marketplace.

Analysis also reveals that the fit between investor's objectives and structures, and maturity of the electronic marketplace concept, impacts upon electronic marketplace performance. Management in Comdaq, Dealcotton, Eutilia and Proceedo agreed that when their marketplaces were set up, electronic marketplaces were an emerging phenomenon with marketplace designers having few successful marketplaces in their respective industries to observe. The owners didn't have input into designing their electronic marketplace's value proposition; nor was their motivation for investing in the electronic marketplace explored by marketplace designers. Since their inception, the investor structure changed in Dealcotton, Eutilia, Proceedo, and IBX. These changes in investor structure can be partially attributed to the maturity of the electronic marketplace concept. The immaturity of the electronic marketplace concept in the utilities sector is reflected in certain investors' motivations for joining Eutilia: these involve either the hope of financial gain or the fear of being left out. However, it was the opinion of management at Eutilia that in certain instances these investors didn't fully understand the role which Eutilia played in the sector. Eutilia's performance suffered as a result. This brought about a change in ownership, whereby in 2003 there was a reduction in the number of investors from the original 11 to 6. The six remaining members were all committed to utilising Eutilia for procurement purposes. As a result, Eutilia's performance improved as illustrated in an improved number of suppliers (2542 in 2003 to 4500 in 2004) and revenues (an increase of 30% between 2003 and 2004) earned by Eutilia. This contrasts with the IBX case. Both Ericsson and SEB (the initial investors) accepted and understood IBX's role in the marketplace. IBX's Communications Manager revealed that the belief within these organisations that electronic marketplaces represented an ideal mechanism for procuring goods meant that they, together with the existing investors, were happy for Novo Nordisk to become involved as an investor in 2003. This design helped to contribute to the increase in the number of buyers and sellers utilising IBX in 2003 and 2004.

Conclusion

We now conclude by discussing the contribution of this research to the electronic marketplace literature, and outlining the possibilities for future research. Previous research (Ribbers et al., 2002; Buyukozkan, 2004) reported that financial measures are suitable for measuring an electronic marketplace's performance. Our research elaborates by illustrating that financial measures (specifically revenues and profitability figures) are the most important financial measures. In contrast, our study did not support the findings of previous research (Kambil and Van Heck, 1998; Lee and Clark, 1999; Ribbers et al., 2002; Soh et al., 2006) that liquidity and market efficiency are useful measures of the performance of electronic marketplaces.

In examining the factors that impact upon performance, previous research (e.g. Choudhary et al., 1998; Kambil and Van Heck, 1998) reports that the competition facing an electronic marketplace impacts upon performance. We confirm this and illustrate that competition impacts upon electronic marketplace performance in terms of the number of buyers & suppliers adopting the marketplace, number of transactions, and volumes traded. Trading culture has been previously reported (Kambil and Van Heck, 1998; Son and Benbasat, 2007) as impacting upon electronic marketplace performance. We extend the concept of trading culture to situations where the entire trading process takes place electronically, and illustrate that trading culture impacts upon electronic marketplace performance as reflected in the number of buyers and suppliers, the number of transactions, and volumes traded through electronic marketplaces. Previous research (e.g. Lennstrand et al., 2001; Son and Benbasat, 2007) found the success of an electronic marketplace to be related to buyers buying into the vision of an electronic marketplace. This study extends this concept by illustrating that the level of acceptance and understanding (maturity) of the electronic marketplace concept among market participant's impacts upon marketplace performance in terms of the number of buyers & suppliers adopting the marketplace and transaction numbers.

Previous research (Lennstrand et al., 2001; Greiger 2003; Byungjoon et al., 2007) utilised the concept of electronic marketplace ownership to categorise electronic marketplaces, and illustrated that ownership impacts upon entry and promoted content. This study has revealed three distinct aspects of ownership of electronic marketplaces; investor

structure & objectives, investor commitment and governance efficiency. We conclude that investor objectives affect both investor commitment and governance efficiency, which in turn impact the performance of electronic marketplaces as reflected in volumes, buyer & supplier numbers, transactions and revenues.

Previous studies have not examined how the characteristics of marketplace participants impact upon performance. Our study reveals the importance of 'blue chip' companies as buyers in attracting other participants, and the importance of speculators to ensuring liquidity in marketplaces operating financial markets for commodities trading.

Analysis of the existing electronic marketplace research revealed that the expertise and knowledge of electronic marketplace personnel was not mentioned as being important. However, our study illustrates the importance of electronic marketplace personnel, and particularly how their expertise, knowledge, and contacts impact upon marketplace performance, reflected in the number of buyers & suppliers adopting the marketplace and a marketplaces revenues. Finally, the study illustrates that the fit between particular factors is useful in helping to explain the performance of electronic marketplaces.

Prior to this study, the performance of just 15 electronic marketplaces had been examined by researchers. By examining 8 electronic marketplaces in different industry sectors in a manner that treats operational and performance characteristics in a consistent manner, this study significantly extends the body of research on electronic marketplace performance. This study contributes to the electronic marketplace literature by illustrating how the electronic marketplaces studied measure performance, and reveals performance measures which were previously unreported in the electronic marketplace literature. Indeed, a key contribution of this study is that it reveals the factors that affect electronic marketplace performance and identifies the relationships between specific factors and measures. However, this study is exploratory in nature, and the findings are restricted by the limitations of the chosen research strategy. The area of electronic marketplace performance now requires further research. In particular, we call for research to test the applicability of the performance model to other marketplaces. The second step in this research process would be the operationalisation of the refined research model to help electronic marketplace managers improve their marketplace's performance. This would require an action research approach and would necessitate a researcher being involved in the decision making process in order to bring about controlled change of specified variables. However, such research may be difficult to conduct due to practical limitations; with management in many marketplaces perhaps unwilling to grant such access due to their need to control their marketplace.

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