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Philip O'Reilly

University College Cork, philip.oreilly@ucc.ie

Pat Finnegan

University College Cork, p.finnegan@ucc.ie

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A MODEL FOR ASSESSING PERFORMANCE IN ELECTRONIC MARKETPLACES

Philip O' Reilly

University College Cork
+ 353 21 4903833
Philip.OReilly@ucc.ie

Pat Finnegan

University College Cork
+353 21 4903344
P.Finnegan@ucc.ie

ABSTRACT

Theories of inter-organisational co-ordination propose that information processing capabilities (structure, process and technology) must be aligned with information processing needs (environmental, partnership and task uncertainty) and the fit between both is a strong determinant of performance. Electronic marketplaces dominate new developments in electronic commerce. While traditional models predominantly deal with one-to-one relationships, electronic marketplaces are mainly characterized as being one-to-many and many-to-many in nature. Such developments have meant performance is based on more than just the fit between information processing needs and information processing capabilities. Consequently measuring performance has become much more difficult. From utilising current research the authors develop a theoretical model examining issues such as trust, investment and ownership. The paper details the development of the model and proposes a research strategy for testing it.

1. INTRODUCTION

An electronic market refers to organisation artifacts [Malone et al, 1987]. An electronic marketplace [Bakos, 1998] focusses on the mechanisms that a digital market might offer to buyers and sellers. In recent times, the formation of electronic marketplaces has declined considerably. In July and August 2000, just 15 new B2B electronic marketplaces were announced as opposed to 115 two months earlier [Yu and Chaturvedi, 2001]. One of the major problems which has been highlighted in the literature with regard to electronic marketplaces is how they are evaluated [Klueber et al, 2001]. Indeed a major problem of stakeholders, such as the marketmaker, customers, buyers, investors, is how to assess the performance of electronic marketplaces. In this paper, we develop a conceptual model for evaluating electronic marketplaces and propose a two phased approach to testing this model. This paper outlines the conceptual model and documents the research in progress.

2. ELECTRONIC MARKETPLACE PERFORMANCE

Klueber et al [2001] state that the rapid adoption of eMarketplaces seems to be very optimistic considering barriers like the lack of trust, knowledge and the high costs of technology investments. Indeed, in the current business environment business-to-business (B2B) marketplaces are not having the impact that it was envisaged that they would make. E-marketplaces have gained little momentum and in many cases are failing [Gill and Wu, 2001]. Oesterle et al [1999] state that only a few eMarketplaces will survive in each industry and succeed in reaching a critical mass of participants, products and services to cover the industry members needs. Evaluating e-marketplaces is not an easy task. Klueber et al [2001] believe that it is necessary to examine the entire ecosystem/value chain in order to evaluate e-marketplaces.

Optimal performance occurs only if there is a tight fit among the domains of strategy, structure, management processes, individual roles and skills and technology [Scott Morton, 1991]. The idea that fit leads to high performance has been most comprehensively developed around the link between strategy and structure [Chandler, 1962; Chatfield and Yetton, 2000]. Researchers have purported a number of different theories on the sequence which these five domains should be implemented [Mintzberg, 1979; Chatfield and Yetton, 2000], with the dominant view being that changes in business strategy precede structural adoption [Rumelt, 1974], with structural adoption driving a realignment of management processes. IT has an enabling role in strategy formulation both in terms of redesigning the business [Hammer, 1990] and its incorporation into the “strategy-structure fit”.

Electronic marketplaces have evolved from Inter Organisational Systems (IOS) [Reimer, 1996]. Therefore, it may be useful to examine existing theories in relation to performance in an IOS. Bensaou and Venkatraman [1994] have proposed a conceptual model in relation to evaluating the performance of a traditional dyadic IOS. They argue that the fit between the information processing needs and information processing capabilities is a strong determinant of performance. The key determinants of information processing needs are environmental, partnership and task uncertainty. The key determinants of information processing capabilities are structure, process and information technology [Bensaou and Venkatraman, 1994]. A number of fundamental differences exist between inter organisational systems and electronic marketplaces.

The information processing needs of a dyadic IOS are different from those of an electronic marketplace. Processing is the only phase conducted electronically; interaction predominately being application to application. In an electronic marketplace, all interaction phases are conducted electronically [Reimer, 1996]. Much of the interaction between firms in a dyadic IOS is conducted in a non-electronic setting, thus alleviating a certain amount of uncertainty. However, because of its structure/architecture, uncertainty is much greater in an electronic marketplace. Information processing capabilities also differ. With the multi-partied nature of an electronic marketplace, the structure of an electronic marketplace is fundamentally different from an IOS. Usually, electronic marketplaces utilise different technologies than an IOS, with differing process mechanisms being the norm.

In an electronic marketplace, the strategy of the parties involved in the value chain will have an effect on the structure of the marketplace both from the buyers, sellers and market makers perspective [Timmers, 1999; Klueber et al, 2001]. Thus, joint economic action [Chatfield and Yetton, 2000] will not only be dependent on the relations between the buyer and the seller, but between all parties involved in the value chain whose complexity is dependent on the structure and interaction patterns of the parties involved.

Non-contractible investments are also crucial in an electronic marketplace [Bakos and Brnjolfsson, 1993]. Commitment and cooperation between the parties involved in the value chain are crucial if the electronic marketplace is to be a success. Rockart and Short [1991] state that in the transition to a more networked approach, increased interpersonal skills were necessary. With the possibility of a diverse value chain, social ties and individual role and skills [Bakos and Nault, 1997; Klueber et al,

2001] play a crucial role in value creation in an electronic marketplace. Therefore, individual skills and social interaction is crucial if the electronic marketplace is to be a success. Chatfield and Yetton [2000] argue that in an arms length (market) relationship, low embeddedness is found because strategic links or ongoing close people links are absent. With the possibility of many varied structures and interaction patterns between parties involved in electronic marketplaces partnership choice plays a crucial role.

3. BUILDING THE CONCEPTUAL MODEL

From reviewing the characteristics of an IOS and electronic marketplaces, we observe that a number of fundamental differences exist [table 1]. Thus Bensaou and Venkatraman's [1994] model in relation to performance of an IOS is limited in its applicability to an electronic marketplace. The main limitation of the model is that it perceives information processing as being the only interaction between parties involved in an IOS. While this may be adequate to explain performance in an IOS as processing is the only phase which is conducted electronically, in an electronic marketplace, all phases of the interaction are conducted electronically [Reimer, 1996]. Thus, information processing in an electronic marketplace is only one aspect which affects performance. In this section, we evolve Bensaou and Venkatraman's (1994) model, developing a model which we believe could more comprehensively explain performance in electronic marketplaces. An analysis of table 1 has revealed that performance affecting factors can be summarised under the headings of (a) Value Added / Value Supply (b) Ownership / Investment (c) Trust / Security Based Mechanisms.

Inter Organisational System	Electronic Market
<p>Buyer Relationships – Buyer/ Supplier relationship is determined in advance with the anticipation it will be an ongoing relationship based on multiple transactions [Senn, 2000]</p> <p>The rules of the relationship may be formatted in a formal non electronic setting</p>	<p>Buyer Relationship – Two types of relationship may exist:</p> <ol style="list-style-type: none"> 1. Buyer/Seller linkage is established at time of transactions and may be for one transaction only (i.e. purchase transaction) 2. Buyer/Seller purchase agreement is established whereby the seller agrees to deliver services or products to buyer for a defined period of time (i.e a subscription transaction) [Senn 2000] <p>Rules of relationship formatted in an electronic setting [Reimer, 1996]</p>
<p>Structure/Architecture – Dyadic, one to one, one to many in nature [Swatman and Swatman, 1992]</p> <p>Electronically supports the processing phase [Reimer, 1996]</p>	<p>Structure/Architecture - Multi Partied [Bakos,1998]</p> <p>Electronically supports the initiation, negotiation and processing phases between all parties [Reimer, 1996]</p>
<p>Buyer/Seller Agreements – Advance arrangements results in agreement on the nature and format of business documents that will be exchanged [Senn, 2000]</p>	<p>Buyer/Seller Agreement – Sellers determine, in conjunction with the market maker which business transactions they will provide [Senn, 2000]</p> <p>Buyers and Sellers independently determine which communication networks they will use in participating in the electronic market. The network used may vary from transaction to transaction [Senn, 2000]</p>
<p>Interaction Pattern is one to one, one to many in nature [Swatman and Swatman, 1992]</p>	<p>Interaction patterns take various forms [Timmers, 1999]</p>

Control of the relationship – Relatively simplistic [Malone et al, 1987]	Control - much more complex [Bakos, and Nault, 1997]
Trust - established in a non electronic fashion	Trust – normally established in electronic environment [Bakos and Nault, 1997] Uncertainty/Level of risk is much greater than in an IOS
Networks – IOS’s may be built around private or publicly accessible networks [Senn, 2000]	Networks – Electronic markets are typically built around publicly accessible networks [Senn, 2000]

Table 1: Differences between an Electronic Market and IOS

3.1. Value Added / Value Supplied

Value Added can be interpreted as the benefit amassing to parties involved in the marketplace. The key determinants of value added are market reach, lower prices for buyers, cutting cost of buyers operations, industry best practices and market value. Value supplied is the value supplied by parties entering the marketplace. The key determinants of value supplied are industry structure and firm strategy. Electronic marketplaces expand everyone’s market reach [Bakos, 1998; Kerrigan et al, 2000]. Without B2B marketplaces, buyers may have difficulty finding suppliers with the right parts and prices and suppliers equal difficulty finding motivated buyers. Electronic Marketplaces generate lower prices for buyers. Electronic marketplaces cut the cost of buyers operations. Most electronic marketplaces now provide services that cut the cost of procurement processes which traditionally consume much staff time and effort. Greater efficiency and improved speed and accuracy in purchasing are mentioned as two of the greatest benefits in utilizing an electronic marketplace [Kerrigan et al, 2000]. Electronic marketplaces identify industry best practices. Some e-marketplaces have identified distinctive, high value added content [Kerrigan et al, 2000]. An example of two electronic marketplaces that have identified best practices in their respective industries include Neoforma.com and Sitestuff.com. Capital markets react positively to firm announcements of e-commerce initiatives, leading to a significant enhancement of the firm’s market value. This positive effect is observed for both net firms and non-net firms [Subrammi and Walden, 1999]. Interpreting this hypothesis, we presume that entering an electronic marketplace will have a positive effect on a firms market value. These determinants influence the demand for parties to be involved in an electronic marketplace. They represent the value creation for a party entering an electronic marketplace. On the opposite end of the spectrum from value added is value supplied, the value which a party contributes to an electronic marketplace. The industry structure will impact the value supplied in/by an electronic market place [Porter, 2001]. Commentators [Swatman and Swatman, 1992; Cavaye and Cragg, 1995] noted the impact which SABRE made on the airline industry. In that particular monopolistic scenario, the industry structure played a crucial role in the performance of the system. However, in a more open environment, the value supplied by a party will be dependent on the number of players within the specified sector [Klueber et al, 2001], the reputation of the party [Kim and Prabhakar, 2000] involved and the knowledge and commitment [Bakos and Brnjolfsson, 1993] of that party to the marketplace. Intermediaries/Marketmakers [Bakos, 1998; Klueber et al, 2001] will also have a key role to play in the structure of the marketplace and indeed the success of the eMarketplace [Klueber et al, 2001]. A firms strategy will have an impact on the value which it will supply to an electronic marketplace [Bakos and Nault, 1997; Porter, 2001]. A parties strategy with regard to competitive advantage, the role they wish to play in a marketplace and the reward which they see emulating from involvement in the marketplace will have an impact on the value supplied [Porter, 2001]

3.2 Ownership / Investment

Research [Bakos and Nault, 1997] has demonstrated that a correlation exists between ownership and investment in an electronic marketplace. The more that is invested in an electronic marketplace, the more likely it is to succeed. The key determinant of ownership is market bias. For the purpose of

classification we utilise buyer bias, neutral and seller bias. The key determinants of investment are contractible, non-contractible and cooperation. In recent times, with the evolution of the value chain and architecture, many more potential business models have emerged, adding further complexity to the classification process. Indeed, Timmers [1999] identifies eleven possible business models.

Underinvestment [Bakos & Nault, 1997] is particularly problematic in electronic marketplaces and one must remember that contractible investments are crucial. For a marketplace to succeed it needs to generate a strong revenue model [Klueber et al, 2001] and without investment, this may prove extremely difficult. Non-contractible investments are also crucial in an electronic marketplace [Bakos and Brnjolfsson, 1993]. Firms that are successful in creating superior IT capability in turn enjoy superior financial performance by bolstering firm revenues and/or decreasing firm costs. Firms that incur the costs of IT without developing an IT capability will be at a comparative disadvantage [Bharadwaj, 2000]. The failure of the parties involved in the electronic marketplace to commit intangible resources [Bakos and Brnjolfsson, 1993] to the marketplace will have a direct effect on whether or not the relationship is successful. A firm's IT infrastructure, its human IT skills and its ability to leverage IT for intangible benefits serve as firm – specific resources, which in combination create a firm wide IT capability. A key aspect of a firm's intangible resources is its intellectual capital or knowledge assets [Bharadwaj, 2000]. A firm's knowledge capital is widely recognized as a unique, inimitable and valuable resource [Matusik and Hill, 1998; Bharadwaj, 2000]. The relationship between organizational knowledge and competitive advantage is moderated by the firms ability to integrate, transfer and apply knowledge [Matusik and Hill, 1998]. A major contribution of the resource based theory is its explicit recognition of the value of intangible organizational resources [Bharadwaj, 2000]. Several organizational intangibles such as know how [Teece, 1998], corporate culture [Barney, 1991], corporate reputation [Vergin and Qoronfleh, 1998] and environmental orientation [Russo and Fouts, 1997] have been seen as key drivers of superior performance. Firms with strong human IT resources are able to (1) integrate the IT and business planning processes more effectively (2) conceive of and develop reliable and cost effective applications that support the business needs of the firm faster than the competition (3) communicate and work with business units more effectively (4) anticipate future business needs of the firm and innovate valuable new product features before competitors [Bharadwaj, 2000].

3.3 Trust / Security Based Mechanisms

The attainment of trust is crucial in an electronic marketplace. The determinants of trust in an electronic marketplace are institutional characteristics, word of mouth referrals, trustor's propensity to trust and the perceived risk of e-commerce. Trust/Security based mechanisms can aid in establishing trust in a marketplace. The determinants of trust/security based mechanisms are legislation, technology and assurance seals.

In an electronic marketplace all phases of interaction between parties are conducted electronically [Reimer, 1996]. This leads to a perception by businesses that e-commerce transactions may be both insecure and unreliable. Research [Ratnasingham and Kumar, 2000] suggests that a perceived lack of trust in e-commerce transactions by trading partners using the Internet could be a possible reason for its slow adoption rate. Therefore, trust will play a crucial role in marketplace performance. Kim and Prabhakar [2000] have proposed a research model in relation to the initiation phase (initial trust in the electronic channel). They identify three distinct elements which combined, have a direct influence on whether or not the electronic channel is adopted. The three elements can be defined as trustor's propensity to trust [Sitkin and Pablo, 1992], word of mouth referrals [Stewart, 1999; Kim and Prabhakar, 2000] and institutional characteristics [Zucker, 1986; Kim and Prabhakar, 2000]. Indeed, research [Noteberg et al, 2000] demonstrated that a correlation exist between institutional characteristics and perceived risk, with consumers believing that the risk is much higher when dealing with an unknown vendor.

Trust and Security based mechanisms are safeguard protective measures. Accordingly, they provide technological, organizational and relationship benefits by ensuring timely, accurate and complete

transmission and receipt of transactions, thereby achieving transaction integrity, authentication, confidentiality, non-repudiation and availability [Jamieson, 1996; Ratnasingham and Kumar, 2000]. Instruments would include digital signatures, encryption techniques and industry standards [Panko, 1997; Ratnasingham and Kumar, 2000]. Government legislation plays a key role in gaining trust in an electronic marketplace. Assurance seals added to a website are another method utilised to gain consumer trust, with research [Noteberg et al, 2000] demonstrating that assurance seals do provide an additional effect on the likelihood of purchase. If properly implemented and managed, these instruments should aid in increasing trust in an electronic marketplace.

4. A RESEARCH MODEL

Thus, upon evolving Bensaou and Venkatraman's model on IOS performance and combining the individual elements which have been mentioned as influencing performance in an electronic marketplace, we propose a new model as shown in figure 1 for describing the performance of an electronic marketplace.

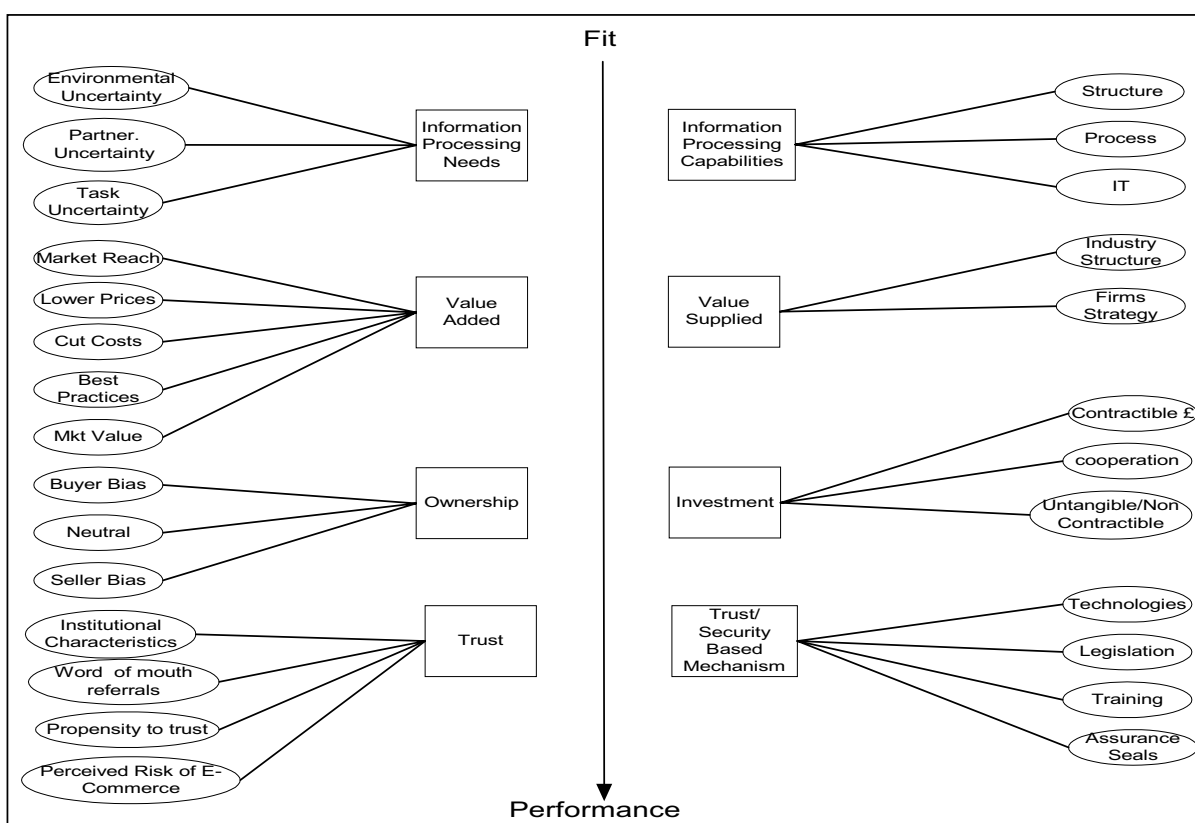


Figure 1: A conceptual model for assessing the performance of an electronic marketplace

5. PRELIMINARY ANALYSIS

The objective of this research is to purport and test a conceptual model for assessing the performance of an electronic marketplace. In order to advance our model we have adopted a two tiered strategy. In tier one we propose testing the concept of assessing performance through our four layer model. In this regard we have analysed an electronic marketplace using publicly available information. The outcome of this tier will be to refine the conceptual model and to determine measures for each of the conceptual components. Tier two of our research will focus on explaining the relationship between each of the components of the model and marketplace performance. In this regard we propose conducting a series of case studies. Electronic marketplaces are a recent phenomenon, and there is little research that examines how one assesses the performance of these phenomenon. Marshall and Rossman [1989] and

Galliers [1992] indicate that when the state of knowledge in a field is at an early stage of investigation, a need exists for the research purpose to focus on 'discovery' and 'theory-building', and be 'exploratory' in nature. Galliers [1992] states that for a theory building/theory testing approach, a case study is a valid research method. The first phase in relation to testing the model is an initial exploratory case study of an electronic marketplace. The data gathering method utilised was observation and interaction with the website.

Capital.com is a business marketplace where premier financial institutions compete to provide capital and financial services to small and mid-sized companies. Initial research has documented the following:

The first element of our model to be tested is the information processing needs versus information processing capabilities dimension. Capital.com's marketplace is rich with information, detailing all aspects of business finance, to meet the information needs of clients/potential clients. Capital.com's information processing capabilities are diverse in nature. Customers utilise technology (email, phone, fax) to interact with the marketplace. Their six-step process for obtaining finance is outlined on the marketplace. Their continuous interaction with their large number of partners gives them the ability both to obtain and sort large quantities of information quickly and efficiently to offer their clients the best deal possible.

The second element of our model to be tested is the value added/value supplied dimension. Capital.com has quite exponentially increased the market reach for both the buyers and sellers of financial services. It may be described as a "one stop shop" for both procurers and suppliers of capital. It makes the process of procuring capital much cheaper, faster and easier than conventional means and provides an existing client base for suppliers of capital. The industry structure has played a key enabling role in the success of Capital.com, creating a demand for parties involved in the financial services sector to enter electronic marketplaces. For example, Mr Opel (chief operating officer) states, "*there is a keen incentive for financial institutions to join Capital.com*". Mr. Opel points out that many banks see the emerging Internet marketplace as one more way to attract additional business. If banks don't embrace these electronic marketplaces, experts predict that banks are likely to lose some of their business. Deregulation in the United States is a key factor in the emergence of electronic marketplaces in the financial services sector, such as Capital.com. The Gramm -Leech-Bliley Act 1999 has allowed financial marketplaces to enter this sector which was traditionally the guise of the banks. From a content perspective, Capital.com provide value to their clients by being rich with information about small and medium-size businesses and their financial needs. Free services like business valuation tools are also offered. The marketplace extends the market reach for both providers and procurers of capital. It represents a more efficient and cost effective way for procurers to obtain finance. In financial terms, an example of how successful Capital.com has been is demonstrated by the fact that they have engineered three loans worth \$30 million in total.

The third element of our model to be tested is the ownership/investment dimension. Capital.com strategy's is to target the capital needs of small and mid-sized companies, utilizing a tailored value chain of financial institutions to bid for loans. They are not biased towards any specific supplier but help companies assess the bids and select the most attractive one based on their needs. Capital.com have made a significant investment in their electronic marketplace. They have invested contractible resources in terms of site design, personnel etc but also in terms of non contractible resources, investing time and commitment in establishing relationships with both partners and customers.

The fourth element of our model to be tested is trust. As stated earlier, trust is dependent on a number of factors, namely institutional characteristics, word of mouth referrals, trustor's propensity to trust and the perceived risk of e-commerce. Capital.com's strategy with regard to gaining potential customers trust is incorporated in their website, with the characteristics of their marketplace and their partners, many of whom are leaders in the financial services sector outlined on their website. Referrals are documented in Capital.com's dedicated press section with both clients and external third parties outlining their opinions/experiences of capital.com. Capital.com try to alleviate any fears which their

customers may have with regard to risk, by clearly outlining their processes and policies on their site. With regard to establishing trust, Capital.com have utilised a number of security/trust mechanisms in relation to establishing trust with their customers. Where sensitive information needs to be transmitted over the Internet, Capital.com utilise modern encryption technologies. They also utilise assurance seals on their website in relation to privacy and legal matters. Legislative and legal mechanisms are also utilised by Capital.com. In the case of any customers utilising the services provided by Capital.com, legal contracts are exchanged, thus providing a clearly defined legal architecture to the relationship between the parties involved. Capital.com are also governed by government legislation. For example, The Gramm-Leach-Bliley Act 1999 governs what type of business may be conducted in such e-Marketplaces and provides a legislative architecture within which Capital.com must operate.

6. CONCLUSION/FURTHER RESEARCH

Initial results suggest that our model may be utilized for assessing performance in an electronic marketplace. However, further analysis of the capital.com data is required. Also, we now need to develop a set of operational performance measures so that we can use the model to conduct the two tier case studies.

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