ELECTRONIC NETWORKS: IDENTIFYING A CONSTANT SOURCE OF STRUCTURAL HOLES PRIOR TO ENTRY

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ABSTRACT

The Internet, as an electronic network with easy to use, open standards and low associated costs, has encouraged the emergence of virtual communities and new networked business models. This study represent a conceptual framework developed from transaction cost economics, social networks literature, more specifically structural hole theory, the emergent business-to-business literature, and rich data gathered across three trader network case studies, the interaction between the nature of the information flow and trader behaviour is examined. This study represents encouragement the sharing of information and business processes via relationships that extend over increasingly blurred industry boundaries. As a result, many traditional intermediaries have disappeared, while new intermediaries who recognize the value in connecting buyers and suppliers electronically have emerged Technological innovations associated with the Internet have encouraged the formation of new information related products, processes, and methods of organizing, including the emergence of intermediated electronic networks. Such developments, particularly in the business-to-business arena have typically been linked to achieving increased efficiencies and reduced transaction costs in the exchange of information, however, to date there lacks empirical research in the area. As organizations increasingly enter into electronic networked trade it is important to understand to what extent they are likely to benefit from the extended functionalities offered by the Internet and new business intermediaries in terms of enjoying increased efficiencies and reduced costs. This study investigates the extent to which trader participants are able to leverage their value position immediately prior to entering a B2B intermediated electronic network. This study makes several important contributions to the literature.

[1].   1. INTRODUCTION

A full appreciation of the value of electronic trade can be made, it is important to understand the nature of the information flow between traders, in this instance, and the extent to which they are able to leverage this data prior to entering into new electronic business models such as the B2B (IE) network.

Transaction Cost Economics (TCE) provides a useful base to examine the degree to which the value of information exchange between traders can be maximised in terms of increased efficiencies and reduced costs prior to this particular web-based network. With its imperative of rational decision making in selecting the most cost effective and efficient governance structure between the market and the organizational form to conduct business, TCE has as its starting point a response to information related problems (Fransman, 1998; Williamson, 1998). Research within TCE has occurred in two main areas, one related to the value in creating efficient boundaries around make versus buy issues, and the other focusing on the value of organising efficient internal structures (Davis & Powell, 1990). Taking a somewhat complementary view to TCE is Social Network Theory that recognises the value embedded within collaborative relationships. Burt's (1982) structural hole theory within this literature provides a particularly useful link to examine the information gap that separates those traders who may move from operating in a non-electronic to an electronic network environment. Burt argues for the social capital to be leveraged from the participation in, and control of information diffusion between actors that may be either individuals or organizations or networks that are linked together by sparsely connected ties.

[2]. 2. BACKGROUND
2.1. The Electronic Environment

The B2B literature frequently mentions the potential benefit to traders when engaging in the exchange of information via the Internet in terms of their ability to reduce transaction costs and increase operational efficiencies (Afuah, 2003). The functionalities of the Internet are suggested to more easily provide access to increasingly rich quantities of information that reach across larger geographical expanses than before (Evans & Wurster, 2000), with increased speed that when combined; facilitate heightened levels of accuracy in decision making (Agrawal, Arjona, & Lemens, 2001). Furthermore, the Internet is argued to facilitate the clarity or transparency with which all trading parties can access and view information (Lamming, Caldwell, Harrison, & Phillips, 2001), especially across new web-based communities (Dyer & Singh, 1998; Gulati, Nohria & Zaheer, 2000).

One such community is the business-to-business intermediated electronic network. Drawing on Wood's (2000) definition, a B2B (IE) network is defined as a mechanism that brings buyers and sellers together into either, a one-to-one, a one-to-many, or a many-to-many virtual relationship, in one central intermediated electronic space, to facilitate the regular electronic exchange of information and ultimately transaction fulfilment, in accordance with the rules of the network.

2.2. Transaction Cost Economics

Transaction cost economics links together the value of information exchange with two concepts that prominently feature in the B2B literature, increased efficiencies and reduced transaction costs. According to TCE, when information is evenly or perfectly distributed through a process of rational decision making, individuals are more likely to prefer to use the market mechanism, with price being used to communicate in symbolised form supply and demand patterns. When information is unevenly distributed between members, especially in times of uncertainty, information asymmetries can arise that may ultimately lead to increased price discovery costs, such as search, negotiation, and asset specificity, hence providing a rationale for internalising activities within the firm (Coase, 1937).

Though TCE remains a sound theoretical perspective, critiques of this view argue that it remains neoclassical in its interpretation of economic behaviour. Individuals are viewed as rational decision makers, assumed capable of maximising their utility without moral judgement. The concept of trust is assumed to be a negative feature within the individual, and captured as a subset of risk in the concept of opportunism.

This concept of beyond rational behaviour could also include the overlapping concepts of intuition, insight and creativity highlighted by Simon (1996) as non-rational behaviour. When these issues are combined with the situation where there has been relatively little empirical research within TCE on the network as an organizational form, structural hole theory in the social networks literature becomes a useful complementary base to examine value potential for traders 'prior to entering a B2B (IE) network.

2.3. Structural Hole Theory

Burt (1982, 1992) theorises about the nature of structural holes or the chasm beneath the bridge that supports the flow of information between two sparsely connected ties and the competitive advantage to arise in the form of social capital for actors whose network spans the holes. Building on Granovetter's (1973) weak tie concept, and thereby moving to the other end of the continuum from Coleman's (1988) closure theory, Burt argues the value of information flow brings about two key benefits. First, are the informational benefits to be enjoyed by actors on either side of the hole, who are provided with access to a broader range of often new, more novel or timely information, especially when they are positioned in networks with a large number of structural holes. Actors on either side of the hole may already know each another but central to the theory is that they circulate in different information flows.

Burt (2001) argues for the benefit likely to accrue to brokering actors in the form of information access and its control. Actors brokering structural holes are argued to have greater access to information that makes it more likely for them to identify when it is most valuable to coordinate certain disconnected parties, especially when the information flow has the potential to become distorted or ambiguous (Burt, 2001). Operating somewhere between corporate authority and market dexterity, entrepreneurial brokers create value by moving accurate, ambiguous or distorted information across the structural hole, especially in times of high uncertainty (Burt, 2003).

3. CONCEPTUAL FRAMEWORK

As organizations increasingly enter into electronic networked trade it is important to understand to what extent they are likely to benefit from the extended functionalities offered by the Internet and new business intermediaries in terms of enjoying increased efficiencies and reduced costs. To date, structural hole theory has identified some benefits and outcomes of bridging the information gaps from both the perspective of the actors on either side of the hole, and the broker. However, further investigation is required into just why these holes exist, the benefits of these holes remaining open and even extending on some occasions in either size or number, especially in preparation for entering the electronic environment. Furthermore, with the focus on increased efficiencies and reduced costs to be enjoyed by Internet trade; together with claims such as those made by Guillen, Collins, England, and Meyer's, (2003) that Burt is not entirely clear on how the value of social capital directly leads to increased organizational efficiency, leaves room to more fully investigate the socio-economic impact information flow. Thus useful links can be made between structural hole theory, Sampler's (1998) information flow characteristics and TCE that focuses on the value of increased efficiencies and reduced transaction costs, including the information asymmetry and bounded rationality dimensions (Williamson, 1985). Furthermore, potential links can be built between Williamson's (1985) interpretation of Simon's (1982) bounded rationality concept, and Etzioni's (1988) beyond rationality concept in the social networks literature. This step would assist understanding on how the role of human behaviour might influence the value capture from the information flow in preparation for entry into an electronic network. Hence, this research investigates, to what extent traders' are able to leverage their value position immediately prior to entering a B2B (IE) network? This question is underpinned by two specific lines of enquiry.

- What is the content and strategic nature of the information flow required by traders across the transaction process prior to their joining a B2B (IE) network?

- How do the rational and beyond rational behaviours of traders' impact upon the content and strategic nature of the information flow to achieve increased efficiencies and reduced costs?

4. METHOD
4.1 Research Strategy

The multi-case study research method was selected in order to build a bridge between a skeletal framework constructed from existing theory and the formation of new and extended insights (Numagami, 1998). The skeletal framework was developed from a priori research in the social networks, transaction cost economics, and emergent B2B literatures, in accordance with the data reductionist technique promoted by Glaser and Strauss (1967), to identify a series of emergent concepts and the relationship between them. Such a framework provides an overall boundary and general direction, while remaining open to the rich and detailed accounts of data findings (Laughlin, 1995).

Since all traders were participating in a B2B (IE) network at the time of data collection they, along with intermediary staff, were asked to take a retrospective view of trader behaviour and information needs immediately prior to the traders' entering their respective network. Data was also sourced from written and web based material made available by each of these networks. Yin (1989) argues for the case study approach when "the boundaries between phenomenon and context [in this instance the B2B (IE) network]

are not clearly evident" (p. 59). The multi-case study design, with three cases being examined in this instance, is in accordance with the number advocated by Eisenhardt (1989) to permit the collection of rich data that promotes the building of testable theory through theoretical replication logic (Yin, 1989).

4.2 Population / Sample

The criteria trader selection was that each trader had previously conducted business in a non-electronic network environment without the assistance of electronic business intermediary and was now trading within a B2B (IE) network. To increase consistency each B2B (IE) network was selected on the grounds that the business intermediary (1) was a neutral entity that on no occasion became a trader participant, (2) operated as an e-business where 80% or more of their revenue was generated from transactions conducted over the Internet, and (3) was physically located within one country.

4.3 Data Collection

In accordance with Strauss and Corbin (1990), the items in each semi-structured questionnaire were developed to guide participants toward the topic of interest with some uniformity and consistency in the questions being asked both within and across cases. Furthermore, the semi-structured design of the items were sought to elicit an improved understanding of how the findings might connect the literatures, while simultaneously reducing the likelihood of researcher bias. The trader questionnaire called for data in the following areas: (1) the date and rationale for commencing business individual trader business; (2) product / industry characteristics; (3) fellow trader and strategic partner characteristics; (3) the depth of functionality of the exchange processes and structures; (4) overall perception of current value accrual, and (5) date of entry into B2B (IE) network and expectations from this form of trade. The business intermediary questionnaire addressed these same dimensions from their perspective. Pilot questionnaires were administered to two trader participants and two business intermediary staff within one network prior commencing.

4.4 Data Analysis

The grounded theory technique was used to analyze the accumulated data (Glaser & Strauss, 1967; Miles & Huberman, 1994). In order to maximize the validity of the results, the process began with checking for data source, method, and researcher consistency, as advocated by the triangulation technique (Denzin, 1978; Jick, 1979). Using Strauss and Corbin's (1990) open-coding process, interview and company data was initially combed back and forth within each network to identify both expected and emergent patterns. Variations were found in nature of the written material provided across the three business intermediaries. Since the stage of each electronic network was clearly different and reflected in interviewee recall about the requirements of traders' prior to entry, care was taken to ensure consistency in coding the data across the three networks, while also retaining their individual characteristics. The electricity network M-co had been operating three years, the timber network Global Ecomex for four years, and the general products network EDIS, for one year. Since organizational data was gathered by a single researcher, consistency of interpretation was sought by randomly selecting four traders and two B2B (IE) network staff from separate networks to view the draft write-up of data from each respective network.

5. RESULTS
Iterative analysis across the data from the three case studies and then with the skeletal conceptual framework resulted in the formation of a grounded model that identifies the content and nature of the information flow required by traders, and the characteristics of the information gaps, prior to their joining a B2B (IE) network. The key constructs of the model include (1) two primary information source categories - an outer environment and an inner environment information flow, (2) two strategic information characteristics - time specificity and product complexity, (3) two behavioural filters –

bounded rationality (physiological, psychological, organizational) and beyond rationality (trust and creativity) filters.

6. DISCUSSION

A key finding in this study is the discovery of two behavioural filters that surround and impact upon the information flow between traders prior to their entering into each of their respective B2B (IE) networks. The first filter identified is the bounded rationality filter that includes three overlapping sub-filters, physiological, psychological and organizational. This finding is based on TCE's interpretation of Simon's (1982) concept of bounded rationality. The second filter is the beyond rationality filter that includes two sub-filters, trust, and creativity. The beyond rationality filter centres upon the work of Etzioni (1988), recognising that Simon's (1982) interpretation of bounded rationality also includes non-rational behaviour.

A second important finding in this study links together the individual actor to their organization and network to provide an explanation as to why structural holes might remain open. When the discovery of the inner and outer environment information flows were combined with the identification of two strategic information characteristics – information specificity and complexity, and the two behavioural filters this impacted upon the nature and volume of the information flow between the trading parties and ultimately the extent to which the information gaps remained open. For example, when much time specific, complex information was sought at the network level from a variety of sources, as was the case with the electricity traders, together with the boundedly rational and beyond rational behavioural potential at the individual and organization levels, these traders remained in a continuous state of having a number of structural holes remain open.

This study makes a unique exploratory contribution to our understanding of the extent to which networked traders are likely to accrue value immediately prior to entering a B2B (IE) network. Yet, the generalization of these findings is limited due to the bounded size and scope of the sample, with three case studies being used, all within one geographical context. Since networked trade continues to grow, especially in the electronic arena, several interesting and challenging areas arise for further research. There is the opportunity to replicate the current findings using quantitative methods. Further work could examine in more detail the interrelationships between the individual, the organization and the network, perhaps using Etzioni's (1988) I and We concepts as a base to develop a more informed understanding of the value potential to be derived in the networked setting.

The findings of this study could be extended to investigate the brokering roles of the business intermediary and the Internet once traders enter an electronic network. Current literature suggests participants in an electronic network enjoy increased efficiencies overall due to the brokering role of the Internet (Spulber, 2003). However in light of the findings in this study, the extent to which the strategic characteristics of the information sought, and the behavioural filters operating around the transaction channel, is likely to influence the transaction process and ultimately the ability of the traders' to accrue increased value. Furthermore, investigation is needed into just what role the business intermediary might play in brokering this network type, especially in the areas of opportunity recognition into the creative discovery and evaluation of new opportunities.

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