



Understanding the role of electronic trading and inter-organisational cooperation and coordination

Conceptual
matrix
framework

545

A conceptual matrix framework

Colm Fearon

*Faculty of Business and Management, Canterbury Christ Church University,
Canterbury, UK*

Joan Ballantine

*Business and Management Research Institute, University of Ulster,
Newtownabbey, UK, and*

George Philip

*Queen's University Management School, Queen's University of Belfast,
Belfast, UK*

Received 16 April 2010
Revised 12 July 2010
Accepted 16 July 2010

Abstract

Purpose – This paper aims to examine the relationship between cooperation and inter-organisational coordination in the supply chain. There is much literature debate over the nature of electronic trading enabled cooperation and coordination in the supply chain. The paper examines the major concepts associated with inter-organisational cooperation in social network literature such as collaboration and partnership and how this is affected by changing forms of coordination (market and hierarchy) governance.

Design/methodology/approach – Seminal literatures about how electronic market and hierarchy coordination mechanisms have changed over time are examined. While some evidence from interviewing companies is used in conjunction with literature to inform discuss the workings of a matrix framework, the discussion remains essentially conceptual.

Findings – A conceptual cooperation and coordination matrix outlines four quadrant forms of cooperation relative to evolving electronic markets and hierarchy coordination contexts, namely; “collaboration”, “partnership”, “dominance” and “autonomous”. The matrix depicts and describes subtle differences in these forms of cooperation. Collaboration involves a low degree of vertical integration and a high number of trading partners transacting on short-term contracts. Partnering involves a higher degree of inter-firm linkage with fewer stable partners on a medium to long-term basis. Dominance is characterised as a traditional form of hierarchical inter-firm linkage with a high degree of vertical integration. The autonomous organisation specialises in the production and delivery of major super brands which in the case of information based products can be sold directly to the customer.

Originality/value – The contribution is a discussion analysis and new matrix framework depicting forms of cooperation relative to market and hierarchy coordination contexts in the supply chain. This is useful for understanding theoretical interplay between different forms of inter-firm cooperation and complex supply chain inter-dependencies that utilise information technology.

Keywords Partnership, Electronic commerce, Hierarchical control, Supply chain management

Paper type Conceptual paper



Internet Research
Vol. 20 No. 5, 2010
pp. 545-562

© Emerald Group Publishing Limited
1066-2243
DOI 10.1108/10662241011084095

Introduction

The nature of cooperation is changing in response to the greater use of information technology and the development of inter-organisational networks. The growth of business to business (B2B) electronic trading has focused attention on the need for developing effective and long term inter-firm coordination and cooperative relationships between large organisations as trading partners. In an increasingly cost conscious trading environment, organisations are trying to compete using what ever resources, assets and competencies they can use in order to deliver cost effective, high quality products and services among trading partners. The use of inter-organisational information systems (IOS) and B2B electronic trading using technologies such as electronic data interchange (EDI), web services, efficient consumer response (ECR), materials resource planning (MRP), has raised many issues concerning forms of cooperation and inter-firm coordination, with questions such as what forms of cooperation and coordination exist among buyers and sellers in the supply chain?

What are the key issues for inter-organisational cooperation?

Many authors suggest that a clear understanding of the characteristics of cooperation and terms such as “partnering” is required, especially in the area of supply chain management (Bello *et al.*, 1999; Cousins and Crone, 2003; Veludo *et al.*, 2004). The background to cooperation arguably assumes a focus on a relational, or relationship view and in a B2B setting this involves exchanging transactions and strategic information between buyers and sellers (Day, 2000). However, these relationship and transactional exchanges do not develop in isolation, they are normally supported by increased cooperation. The idea of partnership in the relational view represents a move away from dyadic positions towards cooperating as part of a supply chain in order to be competitive. Strong cooperation assumes that there is less need to be opportunistic and more of a requirement to trust, share resources and develop integrated and aligned capabilities with other buyers and sellers within the supply chain (Klein *et al.*, 2007). Adler (2001) argued that trust is an essential mechanism for building cooperative relationships and communities. He argued that trust develops through: familiarity based on repeated interaction; having mutual interest; understanding of interrelated costs, benefits, values and norms that engender trustworthy behaviour. Adler (2001) also noted that mechanisms which engender trust often relate to type of contact, reputation and a network community of trusted partners.

Social network theory suggests that information technology (IT) has a role in facilitating move away from traditional adversarial forms of inter-organisational cooperation, which are frequently characterised as “dominant” or traditional power based, to relationships based on collaboration among freely interacting corporations (Clemons and Row, 1992; Clemons *et al.*, 1993; Kumar and van Dissel, 1996). More recent ideas about cooperation and inter-organisational relationships are based on refocusing resource interdependencies in such a way as to promote mutual benefit attainment through shared resources and social influence in a trading network. This type of partnership is enabled through strategic information exchange and the building of long-term commitment and trust between buyers and sellers (Cavaye and Cragg, 1995; Chae *et al.*, 2005b; Webster, 1995). However, the extent to which close partnerships enabled by electronic trading exists remains questionable (Narayanan *et al.*, 2009). Even

in the more IT mature retail and manufacturing sectors in the UK, there is evidence to suggest that dominance as opposed to partnership is the more common form of inter-organisational cooperation (Morris *et al.*, 2003; Reekers and Smithson, 1996).

While there is much information system (IS) and supply chain literature, there remains a conceptual difficulty in clarifying definitions for terms such as “partnering” (Cousins and Crone, 2003). There is also difficulty in understanding changes in the nature of inter-organisational cooperation over time, for example, charting the route from traditional dominance to modern strategic partnering. We explore this conceptual understanding by examining the different modes of cooperation relative to inter-organisational coordination, within a context of the Malone *et al.* (1987) depiction of electronic markets and hierarchies.

Understanding inter-organisational coordination

Deriving a conceptual definition for coordination in an inter-organisational context is not straightforward even though there are many studies concerning the topic (Soroor *et al.*, 2009). Coordination may be viewed as comprising the management of specific dependencies among activities contributing to the output of a process, or task, as well as, a coordination mechanism to manage interdependencies among key activities and required resources (Crowston, 1997; Malone and Crowston, 1994). Crowston (1997) developed coordination theory based on understanding relationships between key actors, activities and organisational processes, as well as, the ability to create the need for resource dependencies which could be properly managed. Inter-organisational coordination is particularly important for being able to deliver benefits in the supply chain through the management of interrelated activities and appropriate coordination mechanisms to manage supply chain interdependencies (Ballou *et al.*, 2000). Key aspects of effective coordination include all members having a shared view of the overall coordination structure and a clear understanding of responsibilities in relation to overall organisational objectives (Soroor *et al.*, 2009). Power (2005) found support for the argument that a company’s overall strategic logic is affected by the extent of coordination with trading partners and suggests that effective relationships are a key ingredient for B2B e-commerce success. Chong *et al.* (2009) found that collaboration and information sharing in supply chain networks are important factors for the adoption of different forms of e-business.

According to Provan and Kenis (2007), most work on inter-organisational network coordination can be mostly categorised as either “network analytical” and, or “governance” approaches. The authors suggest that network analytical studies typically involve analysis of structural characteristics such as density, centrality and structural holes, or configuration characteristics such as edges, links, ties, positions, actors (Adler, 2001). On its own, this type of micro unit analysis depicts relational configurations by examining nodes, relations and embeddedness with a view to understanding how this may affect performance for any actor within a given network. According to Provan and Kenis (2007), the second governance perspective is broader and examines inter-organisational coordination in terms of market and hierarchy effects. Consequently, they argue that in rich tradition, governance approaches examine the continuum and interplay between inter-organisational coordination and linkage as a form of either markets, or hierarchies, or a move to the middle on the continuum. In terms of the role of IT in enabling inter-organisational linkage and

changing forms of coordination, we examine seminal arguments in terms of Malone *et al.* (1987) and Clemons and Row (1991, 1992) and Clemons *et al.* (1993) work on predictions for electronic market and hierarchies as well as the effects of electronic trading on inter-organisational coordination. In the following sections, we argue that the externalised push of the market place will be a starting point for organisations to seek new opportunities, while the internalised pull for reducing costs and combining resources will also affect coordination decisions over time. A cooperation coordination matrix is then developed relative to forms of cooperation and governance.

“Externalising” – electronic market effect

According to the market coordination view, externalised transactions take place in the market where trading partners are always free to seek new opportunities and resource partnerships, as well as, switch to the lowest cost buyer or seller of a product or service, so that the forces of supply and demand dictate free market exchange as the predominant governance mechanism (Bakos, 1998; O’Reilly and Finnegan, 2005). According to Malone *et al.* (1987, p. 485):

Markets coordinate the flow through supply and demand and force external transactions between different individuals. Market forces determine the design, price, quantity, and target delivery schedule for a given product that will serve as an input into another process.

The freedom of the market has the advantage of allowing trading partners, (or buyers and sellers) a high degree of flexibility and the freedom to choose any trading partners in the market, based on factors such as low product cost and high service quality (Benslimane *et al.*, 2005). A core tenet of transactions cost economics suggests that organisations will act opportunistically to gain as much as possible from exchange scenarios (Ouchi, 1980; Williamson, 1975). The motivation during organisational exchange is to keep costs as low as possible while safeguarding against opportunism from competitors (Malone *et al.*, 1987; Williamson, 1991). The “make” or “buy” decision in electronic markets leans in favour of “buy” as production costs tend normally to be lower in markets compared with hierarchies, thus there are more alternative supply sources and a market to buy at lowest cost.

Finding new information about products and services and identifying the characteristics of buyers and seller organisations becomes pivotal to success in a market scenario. A problem for companies always seeking to buy rather make within a market scenario are the high supplier search, contracting and information related costs. Electronic markets tend to be heterogeneous and incorporate electronic intermediaries that specialise in market and product search capabilities for many different markets (Bakos, 1997). For example, the recent ground swell in the number of insurance, finance and mortgage brokers that can advise on the merits of particular product or service options, or the rise of Internet comparison sites that offer real time latest products and pricing from sellers. However, in addition to incurring market search costs, there are disadvantages for companies constantly seeking new suppliers or customers because of the degree of risk and uncertainty about cooperating over the long term, as most trading partners are not locked into trading arrangements and thus can effectively switch at any time (Bakos, 1998).

Malone *et al.* (1987) suggest a pattern of externalised transactions can lead to the development of “electronic markets”. They arise from the use of what the authors term

electronic interconnection, or in our case electronic trading and information processing which can help facilitate new trading relationships via the medium of electronic brokerages. An electronic broker is an agent who matches buyers and sellers using technology, more commonly through the Internet in 2010. Bakos (1991, 1997) is narrower in his definition of electronic market places, suggesting it is an inter-organisational information system that allows the participating buyers and sellers in some markets to exchange information about prices and product offerings. Typical characteristics of trading relationships within electronic markets include: increasing the number of buyer and seller alternatives; increasing the quality of the alternatives selected; and decreasing the cost of information search about product offerings and prices (Malone *et al.*, 1987; O'Reilly and Finnegan, 2005). The use of the Internet has meant a shift in power to buyers in terms of ability to carry out multiple searches and increased trading partner ability to coordinate and collaborate with key supply chain activities (Chou *et al.*, 2004). The benefits realised by individual participants in the market increase as more organisations join the market resulting in the critical mass effect, or positive network externalities (Riggins *et al.*, 1994). Internet based electronic markets have now become the norm in many industries and technology has been a major driver in the formation and structures of many markets (Sherer and Yao, 2006). Electronic marketplaces are characterised by the ability to bring buyers and sellers under the same roof (aggregation) and deriving optimum balance between offers and prices (matching) (Ordanini, 2005). A characteristic of electronic markets is the development of public exchanges, or fee based marketplaces which are market structures owned by industry consortia or third party investors. In addition, private exchange operate based on internal markets that are closed to the public but allow information exchange between existing trading partners (Sherer and Yao, 2006).

Malone *et al.* (1987) originally suggested that IT would lead to the rise of electronic marketplaces. Ultimately, over time the nature of cooperation has changed allowing collaboration and partnering to develop with key partners as suggested by the “move to the middle” hypothesis.

“Internalising” – the electronic hierarchy effect

Internalised transactions are managed internally within a controlled “hierarchy” where large buyers and key sellers are either subsumed in mergers, or adopt close vertical linkages and sole source in upstream linkages in response to the forces of global competition (Clemons and Row, 1992). According to Malone *et al.* (1987, p.485):

Hierarchies ... coordinate the flow of materials through adjacent steps by controlling and directing it at a higher level in the managerial hierarchy. Managerial decisions, not the interaction of market forces, determine design, price [if relevant], quantity, and delivery schedules at which products from one step on the value chain are procured for the next.

In an era where companies compete in value chains, it is the competitiveness of the whole value chain, driven by the demands of huge buyers such as Walmart, Marks & Spencer and Sainsbury that drive the need for integrated electronic trading. Effective sourcing and inventory management strategies are also needed for maximum profit and all partners seek economies of scale and close arrangements with trading partners to share necessary resources and lower costs (Cousins and Crone, 2003; Subramani, 2004).

While the total cost as a proportion of production costs are normally higher than within an electronic market, production costs can be controlled through effective procurement and management of holding costs through electronic trading supply chain initiatives such as MRP and JIT (Gurbaxani and Whang, 1991). According to Malone *et al.* (1987), “electronic hierarchies” are created through the electronic integration effect. This is where the use of technology is used not to just speed up communication but to change and lead to tighter coupling of inter-organisational processes that create and use information. The advantages of the internalised transactions scenario, if tightly controlled, include lower production costs, which include the primary processes in the value chain necessary for the manufacture and distribution of a product (Clemons and Row, 1991). For example, costs should be lowered in relation to holding inventory, if there is information sharing concerning commitment to purchase orders and fulfilment, goods despatch, shipping information, tracking, matched invoicing and payment. In this way, buyers and suppliers can interact automatically across the supply chain reducing unwanted inefficiencies and decreasing overall costs of administration and manual intervention (Masseti and Zmud, 1996; Narayanan *et al.*, 2009). There is also reduced uncertainty because suppliers are assured of trading relationships with single or multiple key buyers over the long term (Clemons and Row, 1991, 1992). Unwanted activities within the value chain can be removed, as well as, assets and resources shared, such as buyers providing information for suppliers on sales of key products by region and quarter. A major disadvantage of highly internalised hierarchies, however, is the high switching costs to other trading partners, so that in effect, a buyer or seller can become locked into an arrangement which is contractually costly to break (Bakos and Brynjolfsson, 1993; Marcussen, 1995; Subramani, 2004). From a cooperation perspective, hierarchies are frequently characterised by a dominance relationship, however, as global marketplaces have evolved many large companies have moved away from that model of cooperation in favour of partnering with key suppliers or buyers in different markets as a consequence of vertical disintegration. Clemons *et al.* (1993) believed that this type of move from traditional hierarchies to a situation where increased outsourcing and fewer but stable relationships would indicate a move to the middle in terms of governance, whereby including some characteristics of the externalised market.

Move to the middle

There has been debate that electronic trading will enable changing cooperative relationships and changing patterns of coordination, suggesting that electronic market forms will increase every time when new opportunities occur (Malone *et al.*, 1987). Others have traditionally argued that integrated vertical network forms will endure (Johnston and Lawrence, 1988; Konsynski, 1993). A mature electronic market versus hierarchy view states that IT enabled coordination will facilitate a “move to the middle” mode of coordination based on a network of freely interacting organisations that can change and react according to economic circumstances (Bensaou and Venkatraman, 1996; Clemons *et al.*, 1993). Sherer and Yao (2006) contend that a move to the middle has happened consistent with predictions from both Clemons *et al.* (1993) and also Malone *et al.* (1987), in the sense that industry consortia led public exchanges (marketplaces) and private company exchanges have helped create a situation that supports both collaboration and partnership. Researchers now believe that changing

coordination contexts are related to the nature of cooperation, such as network partnering, organisational collaboration and information exchange (Kim *et al.*, 2010; Veludo *et al.*, 2004). Many also argue that strategic alliances based on developing partnerships, sharing of resources, knowledge transfer and social capital are important (Inkpen and Tsang, 2005; Rottman, 2008). However, the extent to which cooperation benefits from using electronic trading innovations have led to widespread partnerships is still questionable (Morris *et al.*, 2003). Narayanan *et al.* (2009) suggested that despite assertions, more work is needed to examine research claims that there has been improved supply chain coordination, timely information exchange and forecasting benefits from adopting electronic trading and EDI.

Aim of the paper

We use the rest of this paper to discuss a new matrix framework (see Figure 1) in order to gain a better conceptual understanding of inter-organisational cooperation, relative to electronic market and hierarchy coordination contexts (Clemons *et al.*, 1993). We believe the matrix framework can be useful for researchers in the areas of cooperation and coordination because of the many calls for greater conceptual understanding of cooperation and in particular, terms such as “partnering” (Bello *et al.*, 1999; Cousins and Crone, 2003; Veludo *et al.*, 2004).

Rationale for research design and methodology

The paper develops a comprehensive literature review highlighting key issues based on seminal debate surrounding inter-organisational cooperation and coordination. The paper then presents some evidence within an integrated discussion based on a

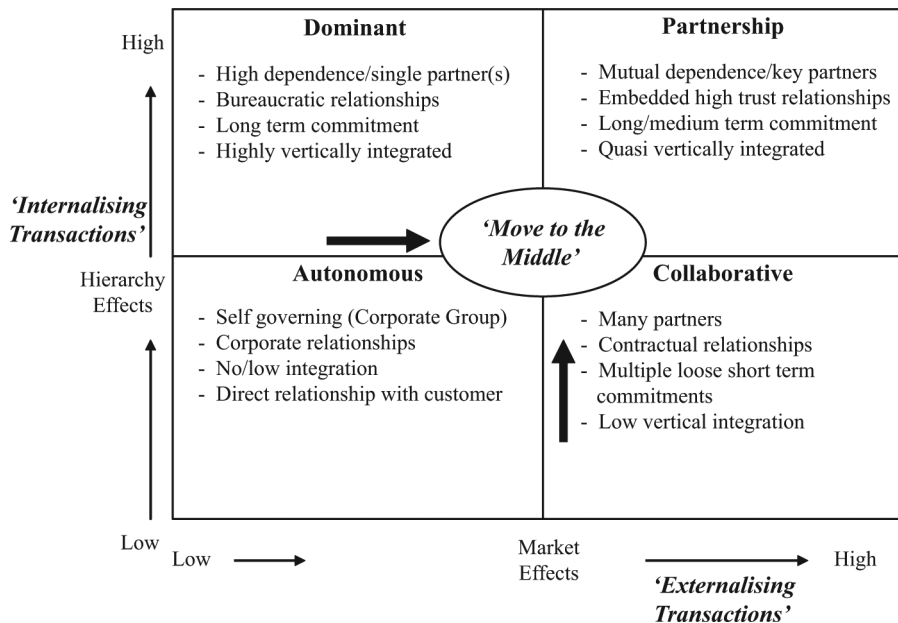


Figure 1.
Co-operation and
co-ordination matrix

longitudinal study with several UK companies concerning their use of electronic trading and inter-organisational relationships. The interview evidence used in the discussion should be considered “light touch” in that findings serve to help conceptualise the workings of the matrix framework and inform the general discussion, hence the paper is categorised in the “conceptual” category for this publication. The authors realise that the approach taken straddles the “research paper” category. However, after seeking advice, the findings were deemed to support the new conceptual matrix framework through extending key themes from the literature as suggested by Meredith (1993). In addition, interview findings were more exploratory and illustrative, as opposed to empirical. It would be difficult to infer or deduct generalisable findings about such complex phenomena as cooperation and coordination from such a small sample size of companies. Nevertheless, the conceptual matrix framework is useful for highlighting key questions and informing sources of debate within supply chain management; for example, what are the characteristics of true partnering?, as opposed to collaboration, or dominance.

The study itself was non-directed in the sense that as new projects came on-line within each company we were able to reflect on company experiences informally via meetings, conversations, as well as, more formally using semi-structured interviews in order to evaluate the effectiveness of electronic trading initiatives. Given the contribution of this paper in terms of developing a new conceptual framework for understanding cooperation and governance, a qualitative structure using semi-structured interviews within an interpretivist paradigm was considered to be the most appropriate approach for exploring new and interrelated concepts within a complex setting (Klein and Myers, 1999; Walsham, 1995).

To that end, formal semi-structured interviews were carried out with a number of informants from the different companies between 2003, 2006 and again in 2009. The interviews were designed to elicit details regarding the nature of trading relationships between organisations in different industry contexts. The diverse range of business and electronic trading opportunities allowed us to draw rich comparisons and inferences about the nature of cooperation in different industry sectors based on the experience of different companies in conjunction with the literature.

Interviews were carried out with a range of industry sectors, seven companies in total are included for this paper within the retail, aerospace, insurance, banking and finance sectors (see Table I). Companies were chosen to participate in the research based on their acknowledged achievements with information technology and their long term usage of electronic trading technologies such as EDI, web services, MRP, JIT, ECR. Formal semi-structured interviews on each typically lasted between one and two

| Nature of company | Informants | Number of informants |
|--------------------------------|--------------------------------------|----------------------|
| Leading wholesaler distributor | IT director and senior managers | 3 |
| Large supplier/drinks company | IT director, finance, sales managers | 3 |
| Aerospace | Senior logistics manager | 1 |
| Leading insurance company | Senior insurance consultant | 1 |
| Banking | Senior e-business manager | 1 |
| Banking finance and insurance | Senior commercial managers | 2 |
| Banking | Senior e-business manager | 1 |

Table I.
Companies interviewed

hours and were conducted with technical and senior business managers. Data was analysed according to key themes and interviews were designed to elicit a rich understanding of electronic trading and the relationships between trading partners in different industry sectors. Questions asked during interviews included such issues as: the competitive nature of the industry, how business was transacted, the historical development of IT and electronic trading, how market forces operated, the nature of contractual and trading relationships, the role of IT enabled competitiveness, the nature and type of electronic trading and the performance benefits for their logistics. The researchers were able to build working relationships with informants and were able to ascertain and discuss new projects as they developed.

The informants were revisited to explore issues and particular projects in greater detail. This enabled us to adopt an iterative process of cross referencing interview findings with ideas from the literature and subsequently incorporating them in an integrated discussion (Cadili and Whitley, 2005).

Discussion

Our discussion is informed by the development of a cooperation and coordination matrix (see Figure 1) which draws much of the material and questions outlined earlier. We use the grid framework or matrix to help conceptualise the type of relationship organisations may adopt by analysing electronic markets and hierarchies.

“Collaboration” and “partnering” – the right side of the matrix

Electronic markets, as depicted on the right hand side of the matrix (see Figure 1), evolved within the insurance industry in the UK between key insurance providers and brokers after the adoption of EDI and on line electronic trading. Before the introduction of electronic trading, there were a multiple brokers interacting with many insurance providers on a collaborative yet short-term contractual basis. Collaboration in the context of the matrix involves a low degree of vertical integration with other firms and a high number of trading partners. For example, independent brokers in the mortgage or insurance industry can have multiple arrangements with providers without being locked into exclusive trading arrangements. Collaboration offers the advantage high degree of market freedom at the expense of high uncertainty, as contracts and ties with trading partners are not long term and ultimately at the mercy of changing consumer preferences, products, rates and market influences. Ahuja (2000) discussed the benefits of technological linkages offering spill-over benefits in terms of increased information exchange when organisations collaborate but are not directly tied as in a long term partnership. In the collaborate quadrant, trust is based on relational contracts and exchange based on the notion of spot markets and negotiation based on best price (Adler, 2001).

In the emerging electronic markets, proactive insurance brokers in the UK were rewarded with more price competitive deals from providers compared with those insurers and brokers who did not use electronic trading.

As a senior insurance consultant, stated:

IT is fundamental to us. We need it to get the best deals for our customers. The quotations we obtain and the services we have to offer our clients depend on us getting the latest information and deals from the insurers.

A banking informant noted:

We talk to and collaborate with many different people. The information we get about deals is vital for underwriting business. A lot of ebusiness is all done through secure private networks. Our client information database is huge and we get really excellent information [from transactions] for reports now.

Interestingly, after the introduction of electronic trading for the insurance industry, an electronic market did not evolve. Instead, a move to the middle occurred so that the more proactive brokers found themselves being attracted away from simply collaborating with a high number of insurers on a daily basis to creating preferential relationships with a number of key insurers by virtue of being leaders in the adoption of electronic trading. A “partnership” approach (see Figure 1) enabled by electronic trading and embodied in medium and long term trading agreements ensued between key insurers and brokers. As predicted by Clemons *et al.* (1993), emergent partnership relationships between key trading partners evolved, with the major insurance companies who were the initiators of the electronic market only transacting with the more proactive technology brokers. Over time, this created a stable quasi-vertical market and creating a value chain resulting in lower cost insurance for the end consumer (Bensaou and Venkatraman, 1996).

As the insurance consultant noted:

We originally traded with lots of companies, but now we are selective with the companies that we use . . . and the systems allow us to get the best deals for customers. We can also capitalise and work out which products are best suited for individual customers. The technology allows us to do it, it is fantastic.

In financial markets too, new banking products and services have emerged enabled by electronic trading via the Internet. A wide range of new mortgage, insurance and banking services that are now offered over the Internet help bolster multi-product portfolios. The extent of this transformation was reiterated by a comment from one of our banking and finance informants, a senior commercial manager who stated:

[...] electronic trading has completely transformed how we do business and the type of services we can offer. We can do your banking, sell you a mortgage and arrange insurances etc. for you . . . the customer has much more choice and flexibility to meet their needs.

The large scale investment required for an electronic market is evident, as there are high costs of investment in IT hardware and software for both the banks and the insurance industry. Many of these financial companies are brokers and are in the collaborate quadrant of the cooperation and coordination matrix, competing on the ability to search and transact with a large selection of providers in order to get the best prices and flexible deals for the end consumer. Margins are tight and typical trading patterns can change on a daily basis depending on which provider is offering the best rates at any given time.

The rise of the “autonomous” organisation

The “autonomous” category is interesting, most examples being of emergent markets specialising in the production and delivery of major super brands, in this case in the form of information based products and services sold directly to the customer. Large banking institutions such as Barclays have an interesting resource capability to

generate financial resources and create new companies and internal value chains that can be entirely controlled in house and be self governing within the confines of a corporate group and identity. Recent events of course, namely the financial crisis and large scale government intervention have questioned the wisdom of allowing autonomous corporate organisations to become so large in a global marketplace. Microsoft, is another example which has dominated the software market and serious questions have been raised over the extent of its power and control over rivals. The autonomous organisation has developed value relationships with customers that are sustained through continual innovation and understanding of network relationships with the customer, often using the Internet as a medium.

Direct writer insurance companies also have similar capabilities and link directly with the consumer. For example, AXA Direct bypass brokers and sell directly to consumers at lower rates because of their ability to cut out the “middle man” in household and motor insurance. These large companies have the resources they require internally and do not need to use brokers as intermediaries in the value chain. Instead, they compete in this “autonomous” quadrant on the matrix, using the Internet to trade directly with the end consumer through brand presence and use of Internet technology.

Internalisation and “dominance”

Electronic hierarchies are traditional forms of supply chain vertically defined sectors that use IT and electronic trading to support either the mergers or coupling of wholly controlled companies within the value chain in the “dominance” quadrant on the cooperation and coordination matrix (see Figure 1). Malone *et al.* (1987) noted that electronic integration occurs when IS are used not just to speed up communication but lead to the tighter coupling of the processes and strategies that create and use information. Examples of this relate to just in time (JIT) in aerospace or efficient consumer response (ECR) in the retail industries. The net effect is to reduce duplication and wasteful inefficiencies by increasing the interdependence of value added activities from a supply chain perspective. As the IT director of a drinks supplier in this study noted:

The push has been from customers, and around invoicing where they can get the benefits from electronic trading as opposed to ourselves ... the primary driver is [bilateral] from Tesco, Sainsbury, the big multiples ... they do invoice matching compared to their order ... looking at despatch, as they come of the truck they scan them which is coming from their warehouse scanning system to check that what was ordered matches up with what was despatched ... and subsequently that should feed into their invoicing system.

Investments in electronic trading have been shown to strengthen vertical linkages in order to gain immediate operational benefits sponsored by an electronic integration effect as in the insurance industry (Bensaou and Venkatraman, 1996; Zaheer and Venkatraman, 1994).

The dominance quadrant can be considered hierarchical (Malone *et al.*, 1987) characterised as a traditional organisational structure with a high degree of vertical integration in dyadic relationships. The initiator of the dyadic relationship is frequently dominant and is generally found in organisations that have wholly owned subsidiaries in the manufacturing and retail sectors (Morris *et al.*, 2003; Reekers and Smithson, 1994). The dominance quadrant benefits from all of the characteristics of hierarchies outlined earlier with the exception that it is strongly tied with key trading partners resulting in a high degree of cooperative certainty relative to electronic

markets. The type of relationships found can often be characterised based on coercive or enabling bureaucratic forms (Adler and Borys, 1996). They may also be likened to intra-corporate networks with centralised decision making being made with the various subsidiaries via the controlling interests of a centralised headquarters organisation (Inkpen and Tsang, 2005).

Moves towards vertical disintegration

In recent years, there has also been strong evidence of moves towards vertical disintegration from the dominance quadrant, in the form of long term subcontracting arrangements based on the enabling power of electronic trading to offer market alternatives (O'Reilly and Finnegan, 2005; Willcocks and Ju Choi, 1995). These provide similar benefits, but with a relatively low transaction risk (Chong *et al.*, 2009; Clemons and Row, 1991; Clemons *et al.*, 1993; Webster, 1995). The rise of the virtual company has been categorised by closer technology links in the supply chain without vertical integration (Johnston and Lawrence, 1988; Kannan and Tan, 2010; Kasper-Fuehrer and Ashkanasy, 2003) which has arguably induced less adversarial practices in favour of more collaborative arrangements in the supply chain (Cunningham and Tynan, 1993; Miles and Snow, 1992).

This type of move from vertical integration to the partnership quadrant in the matrix (see Figure 1) is characterised by the aerospace company in this study who favoured disintegration in terms of moving from wholly owned subsidiaries to contractual relationships with key suppliers, so that they could outsource components manufacturing and some sub assembly operations in order to reduce the holding costs on their accounts.

Senior logistics manager:

[...] It simply didn't make any sense for us to keep manufacturing and assembly in house. Now we have supply arrangements across the globe on a supposed JIT system. This has huge benefits in terms of holding inventory costs ... but the downside is the amount of coordination needed to keep all suppliers and subcontractors delivering items to the assembly line.

This partial disintegration of the hierarchy, or downsizing, facilitated improved efficiency in terms of managing inventory and freeing up resources to concentrate on core business activities. The sourcing, negotiating and monitoring arrangements of suppliers however is still controlled centrally within the company, to ensure that international suppliers can deliver orders on time.

Implications for research: how does the matrix inform our knowledge of cooperation?

A true network perspective, we suggest is depicted by the right side of the cooperation and coordination matrix (see Figure 1) and is based on information partnerships and collaboration (Cunningham and Tynan, 1993; Konsynski and McFarlan, 1990; Law *et al.*, 2009). "Collaboration" and "partnership" quadrants in Figure 1 are identified within the context of electronic markets and hierarchies, however in practice forms of cooperation on the matrix may evolve over time based on the nature of relationships and types of coordination exchange (Adler, 2001). An important part of this evolution is not just the sharing of resources, or a singular view of each firm being able to lower its individual transaction costs. Rather trust relationships can develop and grow often based on "win-win" performance motives so that most trading partners can achieve

improved competitiveness and decrease total costs within their overall value chain (Cunningham and Tynan, 1993; Veludo *et al.*, 2004).

The partnership quadrant can be achieved for companies that originally started within an electronic market leading to some vertical integration, such as the insurance brokers in the UK. Companies in the dominance, or autonomous quadrant may also opt for partnering as a strategy, if they need to share resources with other firms to reduce overheads through outsourcing of non-core activities, or need to form strategic alliances to get closer to customers and distribution channels in an international market. Alter and Hage (1993) believed that the development of inter-organisational networks as a consequence of outsourcing, downsizing for example were going to replace how traditional organisations operate and thus increase competitiveness. They believed that “symbiotic networks” referring to organisations coming together from different sectors would allow cooperation on tasks ranging from information sharing through to collective production and delivery of products and services. Having a shared system of meaning, or ontology in terms of discourse and standards can help with creating semantic information management, developing a shared business language and increasing the potential for information sharing in the value chain (Schwartz, 2008).

The partnership quadrant on the matrix is linked to a quasi vertically integrated form of coordination, with high trust, mutual dependence and rewards for all participants. Ahuja (2000) discussed the benefits of direct ties between organisations based on technological linkage in terms of resource sharing and combining organisational know how skills and assets. There are multiple key partners with medium and long-term contractual obligations which may include arrangements such as joint ventures and risk sharing partnerships. They should embody many of the facets of collaborative advantage beyond opportunism and exhibit trust and embedded mechanisms for communication (Kanter, 1994). Trust allows participants in the supply chain to develop ties, communicate and be creative in their activities while at the same time focus attention on lowering unnecessary transaction costs (Kim *et al.*, 2010). There can be moves towards strategic alliances and greater flexibility away from the confines of the traditional hierarchy. For maturing electronic markets, they can also offer greater prospect of long-term stability and reduced uncertainty.

A common theme for organisations in the partnership quadrant is that long term inter-network competition can be elevated above short term intra-network rivalries, resulting in greater cooperation and trust within the value chain of B2B electronic trading activities (Chae *et al.*, 2005a; Lee and Lim, 2003; Webster, 1995). Partnership networks facilitate strong information sharing habits that boost the overall value of products and services within their network (Miles and Snow, 1992; Webster, 1995). In terms of adopting electronic trading innovations, participation and mutual long-term commitment should be a goal for participating buyers and sellers alike (Hausman and Stock, 2003; Narayanan *et al.*, 2009).

However, a disadvantage of partnerships is that they require commitment and strong ties in order to gain a positive network externalities effect (Riggins *et al.*, 1994). This is particularly difficult when smaller players who have limited resources decide to be non-proactive in a partnership model. For example, the IT director of the drinks supplier in this study described a business partner project aimed at getting smaller suppliers on board using on-line ordering over the Internet:

We think [on-line ordering] operates fine for our customers who are big multiples, the big multiples are bulk of our trade, with bulk orders, one or two large invoices a week ... However, if we could get the small stores and businesses also booking electronically going onto a website pulling their invoices down then that's where we would all get our benefits.

To this end, the supplier and wholesaler in this study originally initiated a pilot scheme with the help of government to introduce an XML based system which small and medium sized organisations could avail of. In other words, for smaller retailers to be successful they should be able to order on-line via an Internet based electronic trading system, thus helping to promote greater integration and avoid the costs of traditional proprietary systems. In the beginning the wholesaler found:

[...] the whole uptake of the electronic marketplace ... has been very slow, people are still weary of trading electronically. We can send an e-mail for an invoice, but it is getting people to sign up and use the system is the difficult thing ... I think there is still an issue over trust.

The extent to which there is true "partnership" is common in practice as depicted in the cooperation and coordination matrix (see Figure 1) can be called into question. Cousins and Crone (2003) have argued that examining partnerships and collaboration is a complex issue for modern supply chain management and implementing relational contracting strategies for example is not a clear process, especially as many organisations have complex parallel sourcing arrangements.

Some authors believed that the motivation for adopting new technology is predominantly resource based and thus forced sellers to adopt new innovations and change business practices as a consequence of coercion from large buyers (Morris *et al.*, 2003; Reekers and Smithson, 1995). For electronic marketplaces, it is the relationship with the end consumer which will be the driving force for innovation and evolving coordination structure. It may be that collaboration is the way forward as new markets emerge, encouraging market flexibility and product choice.

Conclusions

This paper examines the role of cooperation and inter-organisational coordination in the supply chain. We examine the major issues surrounding forms of cooperation in social network literature such as collaboration and partnership relative to coordination. Electronic trading has led to the development of electronic market and hierarchies as forms of coordination. We examine how electronic market and hierarchy coordination mechanisms have changed over time and how a move to the middle has been facilitated. A conceptual cooperation and coordination matrix outlines four quadrant forms of cooperation relative to changing electronic markets and hierarchy coordination contexts, namely; "collaboration", "partnership", "dominance" and "autonomous". Some evidence from companies is used in conjunction with literature to discuss the workings of the matrix.

The paper contributes to the literature by developing a conceptual matrix framework for understanding inter-organisational coordination and cooperation in order to better understand the role of electronic trading related initiatives in the supply chain. This has been an exploratory study seeking to understand the role of electronic trading in markets and hierarchies and relationships with key forms of cooperation.

The authors expect this paper to represent a key milestone for refining concepts before moving on to develop further propositions within case study work. In addition, we hope to

develop an empirically tested research model with hypotheses using a survey method which will examine key variables and relationships in greater detail. It is envisaged that future research would be useful in examining the true extent of partnering in the supply chain and the complex inter-dependencies that utilise information technology.

References

- Adler, P.S. (2001), "Market, hierarchy, and trust: the knowledge economy and the future of capitalism", *Organisation Science*, Vol. 12 No. 2, pp. 215-34.
- Adler, P.S. and Borys, B. (1996), "Two types of bureaucracy: coercive vs enabling", *Administrative Science Quarterly*, Vol. 41 No. 1, pp. 61-89.
- Ahuja, G. (2000), "Collaboration networks, structural holes and innovation", *Administrative Science Quarterly*, Vol. 45 No. 3, pp. 425-55.
- Alter, C. and Hage, J. (1993), *Organisations Working Together*, Sage Publications, London.
- Ballou, R.H., Gilbert, S.M. and Mukherjee, A. (2000), "New managerial challenge from supply chain opportunities", *Industrial Marketing Management*, Vol. 29 No. 1, pp. 7-18.
- Bakos, J.Y. (1991), "A strategic analysis of electronic marketplaces", *MIS Quarterly*, Vol. 15 No. 3, pp. 295-310.
- Bakos, J.Y. (1997), "Reducing buyer search costs: implications for electronic marketplaces", *Management Science*, Vol. 43 No. 12, pp. 1676-92.
- Bakos, J.Y. (1998), "The emerging role of electronic marketplaces on the Internet", *Communications of the ACM*, Vol. 41 No. 8, pp. 35-42.
- Bakos, J.Y. and Brynjolfsson, E. (1993), "Information technology, incentives and the optimal number of suppliers", *Journal of Management Information Systems*, Vol. 10 No. 2, pp. 37-53.
- Bello, D., Lohtia, R. and Dant, S. (1999), "Collaborative relationships for component development: the role of strategic issues, production costs, and transaction costs", *Journal of Business Research*, Vol. 45, pp. 15-31.
- Bensaou, M. and Venkatraman, N. (1996), "Inter-organisational relationships and information technology: a conceptual synthesis and a research framework", *European Journal of Information Systems*, Vol. 5 No. 2, pp. 84-91.
- Benslimane, Y., Plaisent, M. and Bernard, P. (2005), "Investigating search costs and coordination costs in electronic markets: a transaction costs economics perspective", *Electronic Markets*, Vol. 15 No. 3, pp. 213-24.
- Cadili, S. and Whitley, E.A. (2005), "On the interpretative flexibility of hosted ERP systems", *Journal of Strategic Information Systems*, Vol. 14 No. 2, pp. 167-95.
- Cavaye, A.L.M. and Cragg, P. (1995), "Factors contributing to the success of customer oriented inter-organisational systems", *Journal of Strategic Information Systems*, Vol. 4 No. 1, pp. 13-30.
- Chae, B., Yen, R.B. and Sheu, C. (2005a), "Information technology and supply chain collaboration: moderating effects of existing relationships between partners", *IEEE Transactions on Engineering Management*, Vol. 52 No. 4, pp. 440-8.
- Chae, B., Coch, H., Paradice, D. and Huy, V. (2005), "Exploring knowledge management using network theories: questions, paradoxes", *The Journal of Computer Information Systems*, Vol. 45 No. 4, pp. 62-74.
- Chong, A.Y.L., Ooi, K.B., Lin, B. and Tang, S.Y. (2009), "Influence of interorganizational relationships on SMEs' e-business adoption", *Internet Research*, Vol. 19 No. 3, pp. 313-31.

- Chou, D.C., Tan, X. and Yen, D.C. (2004), "Web technology and supply chain management", *Information Management & Computer Security*, Vol. 12 No. 4, pp. 338-49.
- Clemons, E.K. and Row, M.C. (1991), "Information technology at Rosenbluth Travel: competitive advantage in a rapidly growing service company", *Journal of Management Information Systems*, Vol. 8 No. 2, pp. 53-79.
- Clemons, E.K. and Row, M.C. (1992), "Information technology and industrial cooperation: the changing economics of coordination and ownership", *Journal of Management Information Systems*, Vol. 9 No. 2, pp. 9-28.
- Clemons, E.K., Reddi, S.P. and Row, M.C. (1993), "The impact of information technology on the organisation of economic activity: the 'move to the middle' hypothesis", *Journal of Management Information Systems*, Vol. 10 No. 2, pp. 9-35.
- Cousins, P.D. and Crone, M.J. (2003), "Strategic models for the development of obligation based interfirm relationships", *International Journal of Operations & Production Management*, Vol. 23 No. 4, pp. 1447-73.
- Crowston, K. (1997), "A coordination theory approach to organisational process design", *Organisation Science*, Vol. 8 No. 2, pp. 157-75.
- Cunningham, C. and Tynan, C. (1993), "Electronic trading, inter-organisational systems and the nature of buyer-seller relationships: the need for a network perspective", *International Journal of Information Management*, Vol. 13 No. 1, pp. 3-28.
- Day, G.S. (2000), "Managing market relationships", *Journal of the Academy of Marketing Science*, Vol. 28 No. 1, pp. 28-30.
- Gurbaxani, V. and Whang, S. (1991), "The impact of information systems on organisations and markets", *Communications of the ACM*, Vol. 34 No. 1, pp. 59-73.
- Hausman, A. and Stock, J.R. (2003), "Adoption and implementation of technological innovations within long term partnerships", *Journal of Business Research*, Vol. 56 No. 8, pp. 681-6.
- Inkpen, A. and Tsang, E. (2005), "Social capital networks and knowledge transfer", *Academy of Management Review*, Vol. 30 No. 1, pp. 146-65.
- Johnston, R. and Lawrence, P.R. (1988), "Beyond vertical integration – the rise of value-adding partnerships", *Harvard Business Review*, Vol. 8, pp. 94-101.
- Kannan, V.R. and Tan, K.C. (2010), "Supply chain integration: cluster analysis of the impact of span of integration", *Supply Chain Management Journal: An International Journal*, Vol. 15 No. 3, pp. 207-15.
- Kanter, R.M. (1994), "Collaborative advantage: the art of alliances", *Harvard Business Review*, Vol. 72 No. 4, pp. 96-108.
- Kasper-Fuehrer, E.C. and Ashkanasy, N.M. (2003), "The inter-organizational virtual organization: defining a Weberian ideal", *International Studies of Management and Organization*, Vol. 33 No. 4, pp. 33-64.
- Kim, D.Y., Kumar, V. and Kumar, U. (2010), "Performance assessment framework for supply chain partnership", *Supply Chain Management: An International Journal*, Vol. 15 No. 3, pp. 187-95.
- Klein, H.K. and Myers, M.D. (1999), "A set of principles for conducting and interpreting evaluative field studies in information systems", *MIS Quarterly*, Vol. 23 No. 1, pp. 67-94.
- Klein, R., Rai, A. and Straub, D.W. (2007), "Competitive and cooperative positioning in supply chain logistics relationships", *Decision Sciences*, Vol. 38 No. 4, pp. 611-46.
- Konsynski, B.R. (1993), "Strategic control in the extended enterprise", *IBM System Journal*, Vol. 32 No. 1, pp. 111-42.

- Konsynski, B.R. and McFarlan, W. (1990), "Information partnerships, shared data, shared scale", *Harvard Business Review*, Vol. 68 No. 3, pp. 114-20.
- Kumar, K. and van Dissel, H.G. (1996), "Sustainable collaboration: merging conflict and cooperation in inter-organisational systems", *MIS Quarterly*, Vol. 20 No. 3, pp. 279-99.
- Law, K.M.Y., Helo, P., Kanchana, R. and Phusavat, K. (2009), "Managing supply chains: lessons learned and future challenges", *Industrial Management & Data Systems*, Vol. 109 No. 8, pp. 1137-52.
- Lee, S. and Lim, G.G. (2003), "The impact of partnership attributes on EDI implementation success", *Information and Management*, Vol. 41 No. 2, pp. 135-48.
- Malone, T.W. and Crowston, K. (1994), "The interdisciplinary study of coordination", *ACM Computing Surveys*, Vol. 26 No. 1, pp. 87-119.
- Malone, T.W., Benjamin, R.J. and Yates, J. (1987), "Electronic markets and electronic hierarchies: effects of information technology on market structure and corporate strategies", *Communications of the ACM*, Vol. 30 No. 6, pp. 484-97.
- Marcussen, C.H. (1995), "The effects of EDI on industrial buyer-seller relationships: a network perspective", *International Journal of Purchasing and Materials Management*, Vol. 32 No. 3, pp. 20-6.
- Massetti, B. and Zmud, R.W. (1996), "Measuring the extent of EDI usage in complex organisations: strategies and illustrative examples", *MIS Quarterly*, Vol. 20 No. 3, pp. 331-45.
- Meredith, J. (1993), "Theory building through conceptual methods", *International Journal of Operations & Production Management*, Vol. 13 No. 5, pp. 3-11.
- Miles, R. and Snow, C. (1992), "Causes of failure in networked organisations", *California Management Review*, Vol. 34 No. 4, pp. 53-72.
- Morris, D., Tastivan, M. and Wood, G. (2003), "The social and organizational consequences of the implementation of electronic data interchange systems: reinforcing existing power relations or a contested domain?", *Organisation Studies*, Vol. 24 No. 4, pp. 557-74.
- Narayanan, S., Marucheck, A.S. and Handfield, R.B. (2009), "Electronic data interchange: research review and future directions", *Decision Sciences*, Vol. 40 No. 1, pp. 121-63.
- Ordanini, A. (2005), "The effects of participation on B2B exchanges: a resources based view", *California Management Review*, Vol. 47 No. 2, pp. 97-113.
- O'Reilly, P. and Finnegan, P. (2005), "Performance in electronic marketplaces: theory in practice", *Electronic Markets*, Vol. 15 No. 1, pp. 23-37.
- Ouchi, W. (1980), "Markets, bureaucracies and clans", *Administrative Sciences Quarterly*, Vol. 25 No. 1, pp. 129-41.
- Power, D. (2005), "Strategy development processes as determinants of B2B e-commerce performance: A comparative model in a supply chain management context", *Internet Research*, Vol. 15 No. 5, pp. 557-81.
- Provan, K.G. and Kenis, P. (2007), "Modes of network governance: structure, management and effectiveness", *Journal of Public Administration, Research & Theory*, Vol. 18, pp. 229-52.
- Reekers, N. and Smithson, S. (1994), "EDI in Germany and the UK: strategic and operational use", *European Journal of Information Systems*, Vol. 3 No. 3, pp. 169-78.
- Reekers, N. and Smithson, S. (1995), "The impact of EDI on inter-organisational relationships: integrating theoretical perspectives", *Proceedings of the Hawaii International Conference on Systems Sciences in Maui, HI, IEEE*, Computer Society Press, Los Alamitos, CA, pp. 757-66.

- Reekers, N. and Smithson, S. (1996), "The role of EDI in the European automotive industry", *European Journal of Information Systems*, Vol. 5 No. 2, pp. 120-30.
- Riggins, F.J., Kriebel, C.H. and Mukhopadhyay, T. (1994), "The growth of inter-organizational systems in the presence of network externalities", *Management Science*, Vol. 40 No. 8, pp. 984-99.
- Rottman, W. (2008), "Knowledge transfer within offshore supplier networks: a case study exploring social capital in strategic alliances", *Journal of Information Technology*, Vol. 23, pp. 31-43.
- Schwartz, D.G. (2008), "Semantic information management and e-business: towards more transparent value chains", *International Journal of Business Environment*, Vol. 2 No. 2, pp. 168-87.
- Sherer, S.A. and Yao, Y. (2006), "Which move to the middle: industry consortia or private exchanges?", *International Journal of E-business Research*, Vol. 2 No. 2, pp. 22-37.
- Soroor, J., Tarokh, M.J. and Shemshadi, A. (2009), "Theoretical and practical study of supply chain coordination", *Journal of Business and Industrial Marketing*, Vol. 24 No. 2, pp. 131-42.
- Subramani, M.R. (2004), "How do suppliers benefit from information technology use in supply chain relationships", *MIS Quarterly*, Vol. 28 No. 1, pp. 45-73.
- Veludo, M.L., Macbeth, D.K. and Purchase, S. (2004), "Partnering and relationships within an international network context", *International Marketing Review*, Vol. 21 No. 2, pp. 142-57.
- Walsham, G. (1995), "Interpretative case studies in IS research: nature and method", *European Journal of Information Systems*, Vol. 4 No. 2, pp. 74-81.
- Webster, J. (1995), "Networks of collaboration or conflict?: Electronic data interchange and power in the supply chain", *Journal of Strategic Information Systems*, Vol. 4 No. 1, pp. 31-42.
- Willcocks, L. and Ju Choi, J. (1995), "Cooperate partnership and total IT outsourcing: from contractual obligation to strategic alliance", *European Management Journal*, Vol. 13 No. 1, pp. 67-78.
- Williamson, O. (1975), *Markets and Hierarchies: Analysis and Antitrust Implications*, The Free Press, New York, NY.
- Williamson, O. (1991), "Comparative economic organisations: analysis of discrete structural attributes", *Administrative Science Quarterly*, Vol. 36 No. 2, pp. 269-96.
- Zaheer, A. and Venkatraman, N. (1994), "Determinants of electronic integration in the insurance industry: an empirical test", *Management Science*, Vol. 40 No. 5, pp. 549-66.

Further reading

- Miles, M.B. and Huberman, M. (1984), *Qualitative Data Analysis: A Sourcebook of New Methods*, Sage, London.
- Volkoff, O., Chan, Y.E. and Newson, E.F. (1999), "Leading the development and implementation of collaborative inter-organisational systems", *Information Management*, Vol. 35, pp. 63-75.

Corresponding author

Colm Fearon can be contacted at: colm.fearon@canterbury.ac.uk

To purchase reprints of this article please e-mail: reprints@emeraldinsight.com
Or visit our web site for further details: www.emeraldinsight.com/reprints

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.