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## Impact of eBusiness Supply Chain Technology on Inter-organisational Relationships: Stories from the Front Line

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### Abstract

*Implementing e-business systems on supply chains has been predicted to lead to closer inter-organisational (IO) relationships. Adopting a qualitative and exploratory approach, we conducted a preliminary interview study and a comparative case study that sought to surface more specifically the underlying dynamics of how e-business systems affect IO relationships. In total we conducted 75 interviews. Participants were drawn from two customer organisations: a large food retailer and a large aerospace component manufacturer, and from their supplier bases. Following the implementation of e-business supply chain management systems (e-SCMS) in the customer companies, we observed substantial changes to various relationship aspects such as communication, perceived transparency, trust and collaboration. Differences in contextual factors such as customer approach to customer-supplier relationships, inter-firm process re-engineering initiatives, and e-SCMS functionalities implemented, appeared to determine the extent to which IO relationships became closer. We propose a set of tentative mechanisms to explain IO relationship changes and discuss some of the wider implications of the increased transparency created by e-SCMS on IO relationship dynamics.*

### 1. Introduction

The advent of e-business solutions as a new way of conducting work through supply chains has elicited enormous interest. Since the late 1990s organisations have been making consistent efforts to implement e-business technology that will “web-enable” their supply chains. The potential benefits to be accrued are huge, and include increased responsiveness, improved customer service, reduced costs, reduced cycle times, new channels to market (KPMG, 1998; McGuffog, 2002). But more fundamentally, e-business technology also has the potential to radically transform procurement processes, supply chain management, and inter-organisational relationships. Indeed, many argue that the full benefits of e-business technology will only be reaped by full-scale integration of business processes, throughout the value chain (PriceWaterhouseCoopers, 1999; Dedman,

1998). Much of the work on e-business applications conducted so far has primarily focused on the business case for and technological aspects of e-business solutions (e.g., Dai and Kauffman, 2002; Amor, 2000). However, implementing e-business technologies in a supply chain is also likely to change the nature of the supplier-customer relationships, a fact that has been acknowledged as important (e.g., O'Leary, 2000; Andersen Consulting & Investors in People, 1998) without receiving commensurate empirical attention (Subramani, 2003). The present exploratory study aims to understand some of the more specific dynamics and implications of e-business technology-induced changes to inter-organisational (IO) relationships.

#### Definition of e-business in inter-organisational relationships

We define e-business as “the conduct of business transactions and activities using in large part electronic means and typically involving use of the Internet and the world-wide-web” (Clegg, Icasati-Johanson, and Bennett, 2002, p. 245). Business-to-business e-business can be facilitated by supply chain management systems (SCMS). SCMS are interorganisational systems technologies (IOS, Cosh and Konsynski, 1985) that serve to mediate customer-supplier transactions (Subramani, 2003). The primary function of early versions of these technologies was to support the automation of manual processes, such as ordering and payment of accounts (Riggins and Mukhopadhyay, 1994). However, new web-enabled SCMS often include a much wider range of applications such as information sharing, communication and collaboration functionalities. To distinguish web-enabled SCMS from their more limited predecessors, we describe the SCMS studied here as e-SCMS. Further, as IO relationships in the context of supply chains are often customer-supplier relationships, we utilize these terms interchangeably.

### **1.1 Expected Changes in Inter-organisational Relationships**

Although e-business technology is relatively new, IOS technology has been available for a number of decades (Zwass, 1996). Information Systems researchers have made considerable headway towards helping us understand how IOS technologies impact upon inter-firm relationships. Despite these advances, however, we do not yet fully understand the underlying dynamics or mechanisms that drive such closeness. Moreover, whereas new technologies share many similarities with the technologies investigated in the past, they are different both in scope and degree (Riggins and Rhee, 1998). The preliminary findings presented here can potentially shed further light into how supplier-customer relationships are made closer by the introduction of e-SCMS. Drawing on previous work we propose a set of mechanisms that aim to explain the relationship dynamics of web-enabled supplier-customer interactions.

#### Information technologies in inter-organisational relationships

Numerous authors have examined the impact of IT in interfirm relationships (Christiaanse and Huigen, 1997; Christiaanse and Venkatraman, 2002). Drawing on Malone et al (1987), Riggins and Rhee (1998) suggested that IOS technologies can enhance existing relationships between trading partners by promoting closer integration and increasing degree of interdependence between supply chain members. Furthermore, Bakos and Brynjolfsson (1993) proposed that IT use in buyer-supplier exchanges leads to closer co-operative relationships. Subramani (2003) found empirical support for this thesis and explained that SCMS provide a context for supplier investments in relationship-specific intangible assets (Williamson, 1995).

#### Communication

The ability to transmit accurate, relevant, and understandable information, openly and promptly is central to the success of supplier-customer relationships (Anderson and

Weitz, 1989). IT inter-connections allow more information to be transmitted in less time and they dramatically decrease the cost of communication (Malone, Yates and Benjamin, 1987). Mukhopadhyay, Kekre and Kalathur (1995) found that IOS technology leads to improved information sharing between trading partners. Based on these findings and considering the higher levels of media richness (Daft and Lengel, 1986) afforded by web-enabled technologies, one would expect the quality of inter-organisational communication to improve following the implementation of e-SCMS. This improved communication would in turn contribute to bringing supply chain relationships closer.

#### Perceived transparency

One key characteristic of successful supply chain management is free sharing of information (Lamming, 1993; Spekman, Kamauff and Myhr, 1998), and companies involved in supply chain partnering often share more information than is customary (Macbeth, 1998). Lamming, Caldwell and Phillips (2002) have defined the two-way, justified and selective exchange of knowledge or information flows in a supply chain relationship as “transparency”. Transparency, which occurs when a customer allows the supplier to understand the customer’s own operations, is said to improve inter-organisational relationships through the development of a new customer-supplier bond that helps reduce costs and delays characteristic of traditional supply relationships (Lamming, 1993; Lamming et al, 2002). Although until recently transparency was considered unwise (Lamming et al., 1996), the introduction of e-business to the supply chain entails increased visibility and transparency amongst partners (Younger, 1998). In light of this, we would expect high levels of perceived transparency to lead to closer supplier-customer relationships.

#### Trust in inter-organisational relationships

In the context of supply chains, trust is “the belief that a voluntarily accepted duty will prevail ensuring that no party exploits the other's vulnerabilities” (Kerrin and Icasati-Johanson, 2002, p.81). Trust entails an optimistic expectation of positive future behaviour and is comprised of a number of elements, including *integrity*, *competence*, *fairness*, *loyalty* and *openness* and *frankness* (Clark and Payne, 1997). In the present context, thus, we consider trust as a multidimensional construct where the presence or absence of one or more of these elements simply determines the overall degree of trust in the relationship (Kerrin and Icasati-Johanson, 2002).

Trust is a key facilitator of inter-firm relationships and a crucial source of competitive advantage (Anderson and Weitz, 1989; Anderson and Narus, 1990; Dion, Easterling, and Miller, 1995; Mohr and Spekman, 1994), it is pivotal to the development of long-term buyer-seller relations (Dwyer *et al.*, 1987) and to the continuity of those relations (Aulakh *et al.*, 1996; Landeros, Reck, and Plank, 1995). In the context of technology mediated relationships, Zaheer and Venkatraman (1994) found that a customer’s decision to offer electronic interfacing may play a key role in generating trust in the inter-firm relationship. In light of this, we would expect trust to increase following the implementation of e-SCMS. In turn, that trust may be seen as an indicator of closer supply chain partner relationships.

#### Collaboration

Supply chain collaboration refers to concentrating bilateral efforts on achieving goals that would not be easily attainable when alone, such as improving areas of mutual concern, like delivery, quality, productivity and consumer satisfaction (Mohr and Spekman, 1994; Landeros *et al.*, 1995). Supply chain partners frequently need to work collaboratively to meet the diverse demands of the market. Moreover, most of this collaboration can only be attained through the use of Internet enabled IOS technologies (Riggins and Rhee, 1998). As noted above, there has been evidence to suggest that customer-supplier collaboration

increases following e-SCMS implementations (Subramani, 2003). In turn, collaboration will play a key role in the development of closer supply chain partner relationships.

## **1.2 Context of the Studies**

### Approach to supplier-customer relationships

We report on an exploratory interview study, and a comparative case study of companies in the retail and aerospace sectors that have recently embarked on the long process of electronically integrating their supply chains with e-business supply chain management systems. We studied two customer companies and their respective supplier bases. The two customers adopted different approaches to their customer-supplier relationships, which can be placed somewhere along Sako's (1992) continuum of customer-supplier relationship types. At one extreme we find arms' length contract relations (ACR), characterised by low trust and hard bargaining and at the other extreme we find obligational contract relations (OCR), which depend on high-trust co-operativeness. Broadly, and interestingly, the retailer's customer-supplier relationships may be placed closer to OCR end, whilst the manufacturer's relationships may be placed closer to the ACR end of Sako's continuum.

### Inter-firm process re-engineering initiatives

Numerous authors have highlighted the importance of inter-firm process re-engineering when implementing IOS technologies (Lee, Clark and Tam, 1999; Riggins and Mukhopadhyay, 1999; Clark and Stoddard, 1996). In the present study, the Retailer implemented e-SCMS in the context of an explicitly articulated inter-firm process re-engineering initiative, namely effective consumer response (ECR) the industry wide initiative for collective improvement of FMCG supply chains. As such they regarded the introduction of e-business as part of a company wide initiative to work jointly with trading partners and to provide consumers with better service, quality, choice and convenience. The Manufacturer, in contrast, did not appear to have formally accompanied the implementation of e-SCMS with any such initiative. The key drivers behind their e-SCMS implementation were streamlining transactional and order fulfilment processes, reducing transaction and purchased goods costs, and reducing cycle time.

### Characteristics of e-SCMS studied

Two slightly different e-SCMS, were the subject of the present study. The e-SCMS were both Internet-based private exchanges, which interface with the initiating customer's internal information systems. They were free to suppliers but access was password controlled. Both systems supported information sharing and the automation of previously manual processes. In addition, in the case of the Retailer, the e-SCMS also supported communication and collaboration. Table 1 illustrates the various functionalities available through each e-SCMS however, a brief description of each e-SCMS is provided below.

### *Retailer's e-SCMS*

The Retailer's e-SCMS included a broad range of functionalities. Logistics and performance data site, this gave suppliers access to key supply chain information (sales, product availability, depot availability, and performance levels). Web EDI, used for orders, forecasts and invoices. Collaborative event planning system, this enabled planning and evaluation of promotions, which included embedded e-mail facilities. Scorecard, a tool for collaboration on improving the inter-firm relationship and an information flow forum site where information and best practice ideas are shared. Overall the retailer's e-SCMS served not only as information repositories but also as a means of fostering interdependent interaction across the firms.

### *Manufacturer's e-SCMS*

The manufacturer's e-SCMS functionalities mainly provided suppliers with access to a limited range of information. Suppliers had online access to order schedules, invoice status, goods receipts, and technical information. None of these functionalities incorporated any feedback or e-mail messaging facilities.

## **2. Method**

The work presented here is exploratory, as little empirical or in-depth work has, to date, been conducted on the impact of e-business supply chain technology on inter-organisational relationships and as such, the use of qualitative methodology was deemed most suitable. In particular, qualitative methods were chosen because they would allow the authors to uncover important questions, processes and relationships in the data. The research was conducted in two stages, namely the groundwork stage and the in-depth interviewing stage.

### **2.1 Groundwork Stage**

13 participants took part in preliminary interviews: 9 leading UK e-business experts, and 4 employees responsible for the implementation of an e-procurement system in their manufacturing organisation (see appendix for full list). The main tasks during this stage entailed identifying issues that participants considered important pre-requisites for the successful implementation and uptake of e-business technology in supply chains. The questions were broad and exploratory, and addressed the main human and organisational issues related to implementation of e-business technology and main enablers and obstacles to the success of e-business. Preliminary interviews were tape recorded and transcribed verbatim. Each transcript was then scrutinised for themes emergent in the data. These themes allowed the researchers to develop an initial model of important factors in the implementation of e-business technology in supply chains, and helped in the development of a more comprehensive interview schedule for stage 2.

### **2.2 In-Depth Interviewing Stage**

#### Design

The second stage of this research consisted of two in-depth case studies of the implementation of e-business supply chain technology. These were conducted in two different contexts, namely a large UK food retailer and its supplier base, referred to here

as R-S group; and a large UK aerospace component manufacturer and its supplier base, referred to as the M-S group.

### Sampling

As access to e-SCMS is usually granted to a limited number of people (often in boundary spanning roles), a snowball sampling approach that builds on the connections of respondents (e.g., Human and Provan, 1997) was deemed most appropriate in the present context. Thus, through key contacts in the two industries the researcher gained access to the customer organisations. Each customer company was asked to produce lists of in-house employees that could be suitable participants in the study because of their knowledge and experience of the e-SCMS and its implementation. In addition, the customer companies produced lists of supplier companies with access to their e-SCMS, and a named contact person. All the participating supplier companies were chosen randomly from these lists. Named contacts were then asked to nominate suitable participants in their own organisations.

A total of 62 in-depth interviews were conducted and analysed. Participants were drawn from both customer and supplier organisations and from different levels of the organisational hierarchy. All the participants occupied boundary-spanning positions in their respective organisations (see appendix for list of job titles). The make up of the sample was as follows: The R-S group was comprised of 30 interviewees: 20 were suppliers to, and 10 were employees of, the retailer. The M-S group was comprised of 32 interviewees: 20 were suppliers to, and 12 were employees of, the manufacturer.

### Interview Procedure

All interviews, preliminary and in-depth, followed the same pattern. Semi-structured interviews were conducted at the participating organisations' premises, each lasting between 1 and a half to 2 hours. On each occasion, respondents were asked to focus on the impact that use of e-SCMS had had on their relationship with the customer (or with suppliers), and within their own organisation.

### In-Depth Interview Schedules

To develop the in-depth interview schedule used in this study, a number of sources were employed, namely the existing literature, examination of company documentation relevant to the implementation of e-business supply chain systems, attendance to e-business workshops organised by the participating companies and their suppliers, and the key areas of concern identified during the groundwork stage. Questions were grouped in different categories, and included, 1) human and organisational issues (e.g., inter-personal interaction across and within organisations, communication, work roles, business processes or working practices); 2) impact of e-business tools on inter-organisational relationships (e.g., levels of collaboration, levels of information sharing, degree of closeness); 3) impact on the nature and levels of trust (e.g., pre-existing levels of trust, current levels of trust, changes observed, and reasons for trusting or not trusting supply chain partners); and 4) impact of the introduction of e-business technology on supply chain performance (e.g., observed changes in inter-firm performance).

### Analyses

The analysis of the in-depth interviews was facilitated by the use of NVivo, a software application designed for the analysis of qualitative data. As the analyses of the preliminary interviews had yielded a set of key themes, these served as a pre-defined template that could be altered and added to throughout the analysis. The main techniques used were derived from grounded theory (Strauss and Corbin, 1990) whereby the data are minutely examined and a range of theoretical categories created. Throughout this process, relationships between categories were noted. Once the analysis of each customer-supplier

group had been finalised, we proceeded to search for cross-case similarities and differences between the R-S group and the M-S group.

### 3. Findings

We will now attempt to develop a tentative model that may account for the observed improvements in supply chain relationships following the implementation of e-SCMS. To do this we describe the findings highlighting some of the differences between the two groups that emerged during the interviews.

#### 3.1 *Expected Changes in Inter-organisational Relationships*

##### Communication in IO Relationships

Both the R-S group and the M-S group described improvements to the quality of communication across the organisational boundaries. In particular, communication was described as faster, easier, clearer, more detailed, more relevant and meaningful. The range of topics discussed has become wider and conversations are now more constructive and positive. Moreover, there is now more confidence that messages are being understood. Finally, both groups described similar to the communication quality improvements within their own organisations.

*“It’s provided more clarity to information, made people more precise about the information they pass. It’s put discipline on the process, it makes you think about what is important and what is superfluous information” (Retailer).*

*“Communication is now apples and apples. We’re talking the same, we’re talking about the same documents. We can now actually see if we agree a change with [Manufacturer] they can change it and we can see it happen on screen” (supplier in M-S Group).*

##### Perceived Transparency

As highlighted above, there were considerable differences in the types and amounts of information shared by the customer companies. The extent to which a customer is prepared to share information appears to translate into the customer’s perceived willingness to be transparent and willingness to work collaboratively with suppliers. The supplier quotes below clearly illustrate marked differences between the Retailer’s and the Manufacturer’s perceived willingness to be transparent with their respective suppliers. Perceived transparency appears to contribute to levels of trust (see below).

*“Before e-SCMS the information was available to the buyers but they wouldn’t always share it. They might share it if it was a new product or a promotion, but they wouldn’t share it all the time on every product, it was too much work! If you go back to when [The Retailer] was much more arrogant, they would have said ‘no, you can’t have any information’ ...” (supplier in R-S Group).*

*“I wish we had the information they have available to them. There is a lot more information they could give us besides the delivery schedule. These schedules tell us when they want them but their screen tells them when they really need them. I wish we had that ... I know we’re delivering parts that they don’t need. So, it could help us a lot more if they actually gave us the information of when they actually needed it for” (supplier in M-R Group).*

### Trust in IO Relationships

Participants in the R-S group said trust had increased following the implementation of e-SCMS. These changes can be explained in terms of the increased availability of information and its impact on re-enforcing or fostering the development of elements of trust in the relationship. Thus, in the R-S group, for example, the increased visibility afforded to suppliers was interpreted as the customer's willingness to be *open and frank*. Moreover, since any broken promises or lack of honesty become visible parties are forced to behave with *integrity*. Thus, an element of security is added to interactions and transactions, and the expectation of negative behaviours is reduced.

*"Trust comes out of being able to physically see, a visibility of what you agreed on, what is actually happening. You don't have to check anything, all you need is visibility of what's happening to realize that what the other person is saying is true" (supplier in R-S Group).*

In the M-S group there was an ambivalent response from suppliers, in terms of trust, following the implementation of e-SCMS. Thus, initially suppliers were mistrusting of the motives of the customer, particularly because of the introduction of e-negotiations. This was followed by a slight increase in trust in some suppliers and a reduction in trust in others. In a similar fashion to the R-S group, the slight increase in trust was explained in terms of increased transparency, reduced ambiguity regarding the customer's needs, and increased certainty as electronic records of requests made by the customer served as "insurance" against opportunistic behaviour. Unlike the R-S group, however, the M-S group also experienced the negative effects of increased visibility in the supply chain. Thus, rather than increase trust, a high degree of transparency in the M-S group actually reduced trust levels because it made the customer's internal inefficiencies highly visible, and therefore undermined the trust element of competence.

*"A few weeks ago I would have said yes [trust levels had changed] in that we were getting much longer visibility. They were sharing more information with us. But circumstances change, trust builds up and then it gets destroyed, with [The Manufacturer] that often happens" (supplier in M-S Group).*

*"No [I don't trust them], I don't have a lot of respect for the way in which [The Manufacturer] operates, the left hand doesn't know what the right hand's doing in most cases, the different business units don't know what's going on, they don't talk to each other. That to me is a badly run organisation" (supplier in M-S Group).*

### Collaboration

Participants in the R-S group described a number of improvements to inter-organisational collaboration some of those included better joint event management, better joint forecasting, better product availability, and better supplier service.

*"There's collaboration on activities such as promotions, new lines, events, and then there is collaboration on 'how can we make our jobs more efficient?' We're collaborating on making orders absolutely perfect... 'how can we reduce the number of returns from depot?', 'how can we improve our processes, how can we make them quicker, automate them, remove, simplify?' 'how can we improve service and reduce cost?" (Retailer).*

In the M-S group, in contrast, little change in levels of collaboration was reported. Some members of the customer company however, described a slight increase in collaboration through participating in joint initiatives to improve performance and highlighting order related problems.

*“I’ve tried to encourage from the supplier more collaboration but at the moment they’ve not responded in the way that I would have liked. I think to a certain extent they guard some of the information that they have... they’re perhaps a bit suspicious of giving too much information to a customer” (Manufacturer).*

### **3.2 Outcomes**

#### Improved inter-organisational relationships

In the R-S group both, customer and suppliers, said inter-personal relationships across organisations had become closer and had improved greatly. The range of cross-organisation contacts was described as more wide ranging, and relationships across boundaries were seen as more harmonious, more amenable, more open and understanding. In the M-S group, improvements to customer-supplier relationships were slightly more modest than in R-S group. Nevertheless, employees of the manufacturer described interactions with suppliers as more dynamic, more structured, more effective and more understanding. Moreover, because there is less conflict they are more positive. M-S suppliers reported some improvements to relationships with the customer. These were mainly attributed to increased clarity in IO communications and increased mutual understanding.

*“[now] we can reach lots more different people... historically you’d have the account manager and the buyer, and supply manager and their supply chain manager, and that would kind of be it. You would have two points of contact. But now the demand planner talks to the buyer, to the person placing the orders, to the supply chain manager, to the people doing the forecasting. So, it builds a much bigger network of relationships” (supplier in R-S Group).*

*“Yes, there’s a better relationship and there’s a closer relationship with [The Retailer] because there is more communication, there is more reason to be speaking to them. And over time that relationship has become closer... they’ve pretty much opened their doors to suppliers. And going back to before [e-SCMS] they didn’t really let suppliers through the doors. They were very much a traditional retailer, so having suppliers working with their personnel probably wasn’t part of their culture, but for whatever reason that changed. So for them to have suppliers working with their supply chain, to be rolling out these kinds of B2B things, they will have a relationship with suppliers, and you have a closer relationship with individuals. So it’s changed quite a lot” (supplier in R-S Group).*

*“Yes, yes. It’s actually made them [relationships] easier. It was extremely frustrating at one point when we would be talking to [Manufacturer] and they would be chasing us for product ... it used to get very confusing... you never knew whether we were talking the same language. It’s always easier when people have the same piece of paper in front of them. Particularly when you’re talking to somebody where the nearest ...site is ... about an hour and a half away” (supplier in M-S Group).*

### **3.3 Emergent Findings**

#### Improved intra-organisational relationships

Both the R-S group and the M-S group observed qualitative changes to inter-personal relationships within their own organisations. Thus, since the implementation of e-SCMS

interactions across business units have become more wide ranging and numerous, there is now better and more dialogue across business units, and interactions are more effective.

*“I think having the information means that areas that probably wouldn’t have got involved before, like marketing, suddenly want to know all about [The Retailer] because the information is there. So if marketing launch a new product, they no longer look at total market, they say ‘how’s that performing in [The Retailer]?... they want to know specific account information” (supplier in R-S Group).*

#### Mutual- or Inter-organisational Understanding

The disclosure and availability of information appears to have generated greater mutual understanding of the dynamics of each other’s businesses. People are now better placed to see ‘the bigger picture’. High visibility of relationship-relevant information means that suppliers can now take the perspective of the customer and vice-versa. As a result parties have become more aware of each other’s limitations and of the true impact the ‘behaviour’ of their own organisation has upon that of other organisations. In addition, mutual- or interorganisational understanding appears to be further fostered by the increase in number of contact points across the firm boundaries. That is, availability of information through more points of contact appears to be helping in the development of a collective mutual understanding. This has also allowed parties to jointly identify areas in the relationship that are in need of improvement and those that can benefit from collaboration.

*“B2B facilitates learning and it breaks down the barriers by sharing information. You get the opportunity to open up the relationships between [The Retailer] and the supplier base... by sharing all of this information the suppliers have the opportunity to improve their understanding about supply chain and likewise with us... So it facilitates learning between the organisations” (Retailer).*

*“A lot of MRP controllers would only see things from the point of view of [Manufacturer], and I think what this [SCMS] has offered them is a much bigger picture... So MRP controllers are now aware of why there is a problem... It makes us realise that we are part of a larger system” (manufacturer).*

*“I think what’s happened is that you have a greater exchange of information with suppliers about the key issues for them and about the key issues for us... You have a wider perspective. We are far more cognisant of the demands on our suppliers and they are far more cognisant on the demands that we have than we would have been without some tools to support it.” (Retailer).*

*“I think now if we have a supply problem [Retailer] know that It’s not just because we’ve got the forecast wrong, we guessed wrong, they know that we’ll have used all the information that’s available, and we’ve come up with a forecast and if we then can’t supply it’s either because there’s been a factory breakdown or something that we can’t control or it’s because they’ve ordered too much” (supplier in R-S group).*

## **4. Summary and Discussion**

This exploratory study aims to contribute to our understanding of the impact of e-business supply chain management systems (e-SCMS) on supplier-customer relationships. Inter-organisational systems technologies have been predicted to improve trading relationships by promoting closer integration (Malone et al., 1987), increasing degree of interdependence across firms (Riggins and Rhee, 1998), and promoting the creation of

relationship specific intangible investments (Subramani, 2003). Unlike traditional IOS, new e-SCMS, offer a wider range of applications to support information sharing, communication and collaboration. There is a need to understand whether and how these more complex e-SCMS bring suppliers and customers closer.

We conducted a preliminary study and a comparative case study of two customer-supplier groups, namely the Retailer-Supplier (R-S) and the Manufacturer-Supplier (M-S) group. A number of contextual differences characterised the two groups. First, the two customer companies differed in terms of their approach to supply chain relationships. The Retailer adopted an obligational contract relations approach, whilst the Manufacturer adopted a more arms' length contract relations type of approach (Sako, 1992). In addition, the e-SCMS functionalities offered by the two customers were slightly different. The Retailer's e-SCMS supported information sharing, communication and collaboration, whilst the Manufacturer's e-SCMS supported mainly information sharing. A summary and interpretation of the findings is presented below (please see also table 2).

In line with Mukhopadhyay et al. (1995), and despite the marked contextual differences observed, both the R-S and M-S groups reported considerable improvements to the quality of not only their inter-organisational but also their internal communications. In particular, e-SCMS contributed to improving the precision and clarity of communications.

An important implication of introducing e-SCMS is that it increases transparency. Suppliers can 'see' more of the customer's internal information and processes than before. This allows the suppliers to gain a better understanding of the customer's needs and requirements, making the e-SCMS an important enabler of coordinated supply chain activities. Transparency also makes the customer's internal processes more visible to the suppliers. The transparency created by e-SCMS can be seen as a combination of a fishbowl and a magnifying lens: internal processes (both good and bad) become visible to the suppliers, and this visibility of the good (and bad) practices is magnified.

Our findings on trust in the two cases can be understood using this idea. In the R-S group, trust improved considerably following the e-SCMS implementation. E-SCMS appeared to foster the trust elements of openness and integrity. The suppliers were able to see that the retailer was seeking to open their processes up, and move away from an adversarial approach. The transparency afforded by the e-SCMS also allowed the suppliers to determine that the retailer was serious about their collaborative approach to supply chain management, which provided integrity.

In contrast, in the M-S group, trust levels fluctuated and even decreased following the introduction of e-SCMS. In part this was because many internal processes within the manufacturer were inefficient and the transparency afforded by the e-SCMS made the suppliers privy to how inefficient these processes were. As a consequence, the trust component *competence* was reduced with a negative impact on trust. This illustrates how the transparency afforded by the e-SCMS can be a double-edged sword.

Different levels of customer-supplier collaboration were observed between the two customer-supplier groups. The R-S group participated in a great deal of collaborative inter-firm activity, whilst the M-S group reported only small amounts of collaboration. The observed levels of collaboration would seem to be counter-intuitive (see Bakos and Brynjolfsson, 1993). However, the contextual differences observed across the two samples may shed some light here. As noted, the various e-SCMS functionalities offered by the two customer companies studied differed markedly. In particular, whilst the Retailer's e-SCMS supported information sharing, communication and interdependent collaboration, the Manufacturer's e-SCMS only supported information sharing. Some authors have recently highlighted the role different patterns of use of SCMS play in explaining variations in the benefits derived by firms using identical technologies

(Subramani, 2003; Devaraj and Kholi, 2003). Subramani distinguished between two SCMS usage patterns. *SCMS use for Exploitation* refers to use of SCMS to carry out structured, repetitive tasks such as order processing, inventory management, exchange of delivery information, etc. In contrast, *SCMS use for Exploration*, refers to SCMS use that gives suppliers access to a broad array of information and helps them develop an understanding of their customer's business. This work may help explain the present findings.

As predicted by past authors (Roberts and Mackay, 1998), customer-supplier relationships improved, albeit to different degrees, in both groups. In line with Riggins and Rhee (1998) relationships became more closely integrated and levels of cross-firm interdependence increased. In particular, inter-firm networks became a lot wider ranging. Moreover, similar findings were observed in intra-organisational relationships. Overall, thus, we have found that e-SCMS have contributed to bring inter-organisational relationships closer, lending support to previous findings (Subramani, 2003). Furthermore, we propose that the transparency afforded by e-SCMS gives rise to mutual- or inter-organisational understanding a further mechanism which explains improved customer-supplier relationships.

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**Table 1: eSCMS Functionalities**

Retailer-Supplier Group		Manufacturer-Supplier Group	
eSCMS	Functionalities	eSCMS	Functionalities
<b>Home page</b>	Web portal made up of password protected e-business technology tools.	<b>Home page</b>	Web portal made up of password protected e-business technology tools.
<b>Web-EDI</b>	Invoices, orders, production planning and forecasts sent via the web.	<b>Vendor Delivery Schedules</b>	Lists parts ordered. Forward visibility of parts required. Good movements reports.
<b>Performance Data Site</b>	Shows daily commodity data: sales; availability; depot stock & problems, supplier service; forecasts.	<b>Invoice Status and Goods Receipt Information</b>	Visibility of received invoices; cleared for payment invoices; held invoices, and reason for being held.
<b>Collaborative Planning Systems</b>	Promotions are agreed, implemented and monitored. Embedded e-mail facility.	<b>Goods Receipt Input Problem</b>	List of parts delivered that have receipt problems.
<b>SCORE</b>	Web based scorecarding application: supports working together to improve the supply chain.	<b>Supplier Advanced Business Relationship</b>	Quality documents of all the customer's processes.
<b>Customer Product Complaints</b>	Suppliers receive product complaints online.	<b>eNegotiations</b>	Process of negotiating new contracts for parts using an online auction web site.
<b>Data Sharing Resource</b>	Provides up-to-date details of people at each end of relationship.		
<b>Primary Distribution</b>	Order tracking and stock tracking		

**Table 2: Summary of Findings**

Contextual Aspects		
	<b>RETAILER-SUPPLIER</b>	<b>CUSTOMER-SUPPLIER</b>
<b>Approach to supplier-customer relationships</b>	Characterised by obligational contract relations behaviours	Characterised by arms-length contract relations behaviours
<b>Inter-organisational process re-engineering initiatives (IOPREI)</b>	eSCMS adopted in the context of explicitly articulated IOPREI: Effective Consumer Response.	eSCMS adopted to streamline processes, reduce costs and lead times. No explicitly articulated IOPREI.
<b>eBusiness SCMS functionalities</b>	eSCMS supported information sharing, communication, and collaboration activities. E-mail embedded in one functionality.	e-SCMS supported information sharing. No e-mail embedded in any functionality.
Expected changes in IO relationships		
<i>Communication</i>	Improved considerably. Conversations more wide ranging, constructive and positive. Increased confidence messages understood.	Improved considerably. Conversations more wide ranging, constructive and positive. Increased confidence messages understood.
Perceived transparency	Large amounts of information shared. Suppliers saw increased transparency as customer's willingness to be open and work collaboratively.	Improved levels of information sharing, although not as much as suppliers would have liked. Manufacturer seen as less willing to share important information.
<b>Trust in IO relationships</b>	Increased due to perceived transparency. Expectation of negative behaviours is reduced thus perceived <i>integrity</i> increased.	Increased slightly but later decreased as customer's internal inefficiencies became more visible, thus reducing perceived <i>competence</i> .
Levels of collaboration	Improved joint event management; forecasting; product availability and supplier service.	Small improvements in jointly solving order related problems.
<b>Improved IO relationships</b>	IO relationships improved greatly.	IO relationship improved modestly.
Emergent Findings		
<b>Improved intra-organisational relationships</b>	Internal interactions improved: more effective and wider ranging.	Internal interactions improved: more effective and wider ranging.
<b>Mutual- /Inter-organisational understanding</b>	High visibility of relationship relevant information and increased number of points of contact helps in development of mutual or IO understanding.	High visibility of relationship relevant information and increased number of points of contact helps in development of mutual or IO understanding.

### Appendix 1

Groundwork Stage Participants
the head of supply chain development,
the eProcurement manager,
and the eBusiness directors of two large UK manufacturers;
a supply chain manager in a large UK food retailer;
a senior supply chain consultant at an international consultancy;
the marketing director in a supplier of e-business tools for supply chains;
the CEO of a web design and development agency;
the head of e-business of a UK government department, and,
a leading supply chain advisor to another UK government body.
Deputy User Project Manager – eProcurement, UK Manufacturing Company
Director Business Process Improvement - Engineering, UK Manufacturing Company
User Project Manager – eProcurement, UK Manufacturing Company
E-Procurement Manager – eProcurement, UK Manufacturing Company

### Appendix 2

Participants in M-S Group	Participants R-S Group
logistics directors	directors of supply chain
eProcurement managers	directors of operations
works managers	account directors
product specialists	customer operations managers
a market manager	customer supply chain managers
product managers	supply chain managers
manufacturing managers	supply chain development managers
an international customer support team manager	national account and account managers
technical managers	B2B and eBusiness managers
logistics managers at both supplier and customer sides of the supply chain	customer integration and retail managers
purchasing executives	business account executives
a business development manager	trade controllers
eProcurement analysts	business analysts
user project managers	customer services co-ordinators
material controllers	buyers
commercial managers	demand managers; etc.
eBusiness director	
managing directors; and others.	

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