

December 2005

Development of an Inter-Organisational System for Supply Chain Management Adoption Framework: A Proposed Study of Collaborative Factors from Supplier and Customer Perspectives

Vincent Pang
University of New South Wales

Follow this and additional works at: <http://aisel.aisnet.org/acis2005>

Recommended Citation

Pang, Vincent, "Development of an Inter-Organisational System for Supply Chain Management Adoption Framework: A Proposed Study of Collaborative Factors from Supplier and Customer Perspectives" (2005). *ACIS 2005 Proceedings*. 33.
<http://aisel.aisnet.org/acis2005/33>

This material is brought to you by the Australasian (ACIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ACIS 2005 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Development of an Inter-Organisational System for Supply Chain Management Adoption Framework: A Proposed Study of Collaborative Factors from Supplier and Customer Perspectives

Vincent Pang

School of Information Systems, Technology and Management,
University of New South Wales,
Sydney, New South Wales, Australia
Email: VincentPang@acslink.net.au

Abstract

This paper has identified a research gap to study how organisations collaborate together to adopt Inter-Organisational System (IOS) for Supply Chain Management (SCM). This paper outlines the development of a framework to examine how organisations collaborate together to adopt IOS for SCM from both supplier and customer perspectives. Nine collaborative factors have been identified in the framework. A proposed research approach to examine the adoption framework from both supplier and customer perspectives is also outlined.

Keywords

Collaboration; Inter-Organisational System (IOS); Supply Chain Management (SCM); Adoption

1 Introduction

Dabbawalas ('dabbas' means boxes), a "lunch box carrier" service industry, in Mumbai (Bombay), India, has achieved a six-sigma rating of 99.9997% from Forbes (Mahadeshwar 2003). The interesting fact is no information technologies (IT) or information systems (IS) are used to support the business; instead, a simple colour and numbering system is used on the dabbas for identification. 200,000 dabbas are delivered daily by 5,000 workers, mostly illiterate, but with an astounding figure of only one mistake in every two months (Deshpande 2001). Hence, this clearly shows that it is not always the technological factors that make a service supply chain work efficiently and effectively but the people!

The most appropriate definition of collaboration found for this paper is, "the action of working with someone to produce something" (Oxford English Dictionary 2004). Collaboration involves people and this paper wants to examine how people collaborate together to adopt IOS for SCM. In order to understand how suppliers and customers collaborate together to adopt IOS for SCM in a supply chain network, this paper examines both perspectives. A greater understanding of the factors influencing the adoption from both supplier and customer perspectives will therefore be a great contribution to the IOS and SCM literature.

This paper proposes and illustrates the development of an IOS for SCM adoption framework by examining how factors influence the collaborative process between suppliers and customers. Within this paper, an adoption framework has been developed from normative literature drawn from IS, IT and SCM disciplines resulting in nine collaborative factors being identified in influencing the collaborative process in IOS for SCM adoption.

This paper is divided into four sections: (a) identify research direction; (b) introduce IOS and SCM; (c) discuss the identified collaborative factors, examine the motivation behind adoption from supplier and customer perspectives, and propose of an IOS for SCM adoption framework to be examined from supplier and customer perspectives; and (d) outline a research approach to examine the proposed adoption framework.

2 Research Direction

"According to constructionism, we do not create meaning. We construct meaning. We have something to work with. What we have to work with is the world and the objects in the world" (Crotty 1998, pp. 43-44). This paper follows the constructionist's viewpoint because this paper focuses on the reality of collaborative process between the supplier and customer. Bunker et al. (2004) explain how epistemology impacts on the research direction: for example, when constructionism is selected as the epistemology, then interpretivism can be the preferred theoretical perspective, surveys and grounded theory can be chosen as the methodology, and case study and interview are among methods that can be selected. The findings using constructionism can be used to compare and to enrich the existing empirical literature.

3 IOS for SCM

This section briefly discusses IOS and SCM, and the importance of developing IOS for SCM in a supply chain network. Johnston and Vitale (1988) define an Inter-Organisational System (IOS) as, “an automated information system shared by two or more companies. An IOS is built around IT, that is, around computer and communication technology, that facilitates the creation, storage, transformation and transmission of information. An IOS differs from an internal distributed information system by allowing information to be sent across organisational boundaries”. Bensaou and Venkatraman (1996) have developed a conceptual framework to understand inter-organisational relationships from technological capabilities. Mukhopadhyay et al. (1995) have shown how Chrysler Corporation benefits from lowering operational costs using Electronic Data Interchange (EDI). Themistocleous and Irani (2002) discuss how integration software can help IOS adoption. Humphreys et al. (2001) show how IOS can be used by intermediaries such as how Hong Kong firms link their Chinese suppliers to their Western customers. However, Gunasekaran and Ngai (2004) still find that there is still a lack of research to-date on IT integration in SCM.

Most of the supply chain literature focus on manufacturing industries. Before examining SCM, the components of a supply chain have to be understood. A typical generic supply chain for the pharmaceutical industry, as an example, is shown in Figure 1, and is made up of three major components, namely supplier (upstream), manufacturer the focal organisation (internal) and customer (downstream). In turn, the manufacturer is a supplier for its customers, namely the hospitals. The inter-relationships between these components can be summarised as a manufacturer orders its raw materials from its upstream suppliers, uses these raw materials to produce pharmaceutical products, and then sell these products to its downstream customers (Turban et al. 2004). This paper examines how the collaborative factors influence IOS for SCM adoption from supplier and customer perspectives, and the research domain is shown in Figure 1. Suppliers are not limited to manufacturers only but also intermediaries.

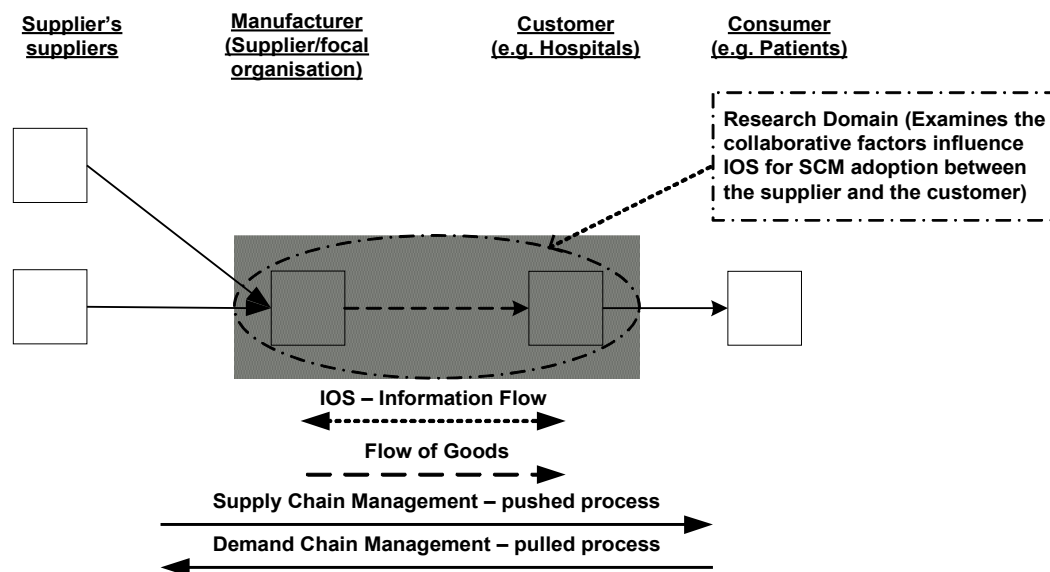


Figure 1 A typical generic supply chain (for pharmaceutical industry)

The concept of SCM is not new but the understanding of SCM has only become more important for business applications in the last few decades. Logistics was originally the main building block for understanding SCM but, now, SCM is, “the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders” (Lambert et al. 1998, p. 1). One of the primary functions to adopt SCM is to reduce the uncertainty demand of products in a supply chain network, and information sharing between organisations is a means to achieve this objective (Lee et al. 1997). Supply chain literature emphasises that in future it will become one supply chain network versus another supply chain network to achieve competitive advantage. Kanter (1994) supports this argument by emphasis the successful partnerships and relationships between organisations can enhance competitive advantage. Therefore, linking business processes and sharing information becomes essential and critical for all organisations in one supply chain network, and IOS is a means to link these organisations. Information sharing (shown as “information flow” in Figure 1) in a supply chain network between these components is to overcome

the bullwhip effect. The bullwhip effect is referred to as, “the phenomenon where orders to the supplier tend to have larger variance than sales to the buyer (i.e., demand distortion), and the distortion propagates upstream in an amplified form (i.e. variance amplification)” (Lee et al. 1997, p. 546). Therefore, IOS for SCM is the essence for integrating SCM and business processes together, and allowing information sharing between organisations across the supply chain network (Garcia-Dastugue and Lambert 2003).

SCM can benefit organisations in areas such as lower inventories, lower operating costs, improved operational efficiency, improved productivity, decreased processing error, reduced overpayment to suppliers, reduced waste, reduced processing time and reduced paper work (Barrett and Konsynski 1982; Lee et al. 1997; Frohlich and Westbrook 2001, 2002). In a supply chain network, maximum benefits can be achieved if an organisation integrates its business processes and information systems together with both its upstream suppliers and its downstream customers, whereas one-sided integration, i.e. only integrates with its supplier or its customer, and does not achieve the same result (Frohlich and Westbrook 2001).

With today’s technological advancements, such as the Internet and web services, adopting an IOS for SCM is not as problematic from the technical perspective as it is cheaper and easier to implement than EDI (Riggins and Mukhopadhyay 1999; Attaran 2004). Some of the successful examples in IOS implementation include American Health Supply Corporation (Baxter Limited), Dell Computer Corporation and Seven-Eleven in Japan (Short and Venkatraman 1992; Magretta 1998; Johnston and Vitale 1988; Whang et al. 1997, cited in Lee and Whang 1998). Unfortunately, most organisations try to reproduce the success of Dell’s “direct model” by only implementing the technical part of the system while ignoring Dell’s collaborative activities in communicating and establishing relationships with its 1,400 suppliers: “it takes a lot of hand-holding just to get the ball rolling” (Magretta 1998; Gilbert 2000). Gunasekaran and Ngai (2004), and Barratt (2004) argue that most organisations focus and over-rely on the technical dimension as the solution to achieve efficiency and cost savings in the IOS for SCM adoption, and neglect people dimensions within organisations. This paper will try to fill this gap by focusing more on people dimensions in the collaborative process in IOS for SCM adoption.

4 Collaboration

Collaboration is the foundation for organisations to build an IOS for SCM but it has been demonstrated that it is difficult to implement (Barratt 2004). The characteristics of collaboration in SCM are closer relationships, integrating processes, and sharing of information, knowledge, risk and profits between organisations (Barratt 2004; Kanter 1994).

Collaboration involves people and the majority of the collaborative factors tend to be socially related elements. Wood and Gray (1991) review nine research articles in two special editions, titled “Collaborative Alliances: Moving from Practice to Theory”, in *the Journal of Applied Behavioral Science*. These nine articles use six different theoretical perspectives, namely resource dependence theory, corporate social performance-institutional economics theory, strategic management-social ecology theory, microeconomics theory, institutional-negotiated order theory and political theory, to examine collaboration and collaborative alliances between organisations. However, Wood and Gray (1991) conclude that none of the theories from these studies can fully explain the preconditions, processes, and outcomes of collaboration: “No single theoretical perspective provides an adequate foundation for a general theory of collaboration”. Hence, no general collaboration theory can explain all of the collaboration activities because it is a complex, multidisciplinary and extensive domain (Grover 1993).

The definition of collaboration used for this paper is, “the action of working with someone to produce something” (Oxford English Dictionary 2004). When two organisations decide to adopt an IOS, the two organisations must collaborate together to build and implement an IOS for SCM. There must be a collaborative process between these two organisations to adopt an IOS for SCM. Furthermore, there must be factors that influence the collaborative process in the IOS for SCM adoption. In order to identify which factors will influence the collaborative process, this paper uses the significant adoption predictors and factors, and related findings from previous literature in IT, IS and SCM. These factors are identified to have a direct or indirect influence in the adoption process and this paper believes that these factors also influence the collaborative process in the IOS for SCM adoption. The nine identified factors that influence the collaborative process are summarised into organisational characteristics, top management support, information sharing, financial, value-added, power, trust, information technology and organisational culture.

The background literature of the identified collaborative factors and some of the inter-relationships between the factors will be discussed in Sections 4.1 to 4.9. The collaborative process linking these collaborative factors will be discussed in Section 4.10. Furthermore, these factors will be examined from both supplier and customer perspectives (see Section 4.11). No framework, model or theory in IS/IT is currently found specifically for explaining the influence of collaborative factors in the IOS for SCM adoption. This approach is taken in order to

build on the previous research domain while extending and enriching the knowledge and capabilities in this research area. A proposed IOS for SCM adoption framework is outlined in Section 4.12.

4.1 Organisational Characteristics

Organisational characteristics, such as size, number of employees, public or private, location and industry sector, are found to have an influence in the level of adoption. Iacovou et al (1995) and Chwelos et al. (2001) have found that size of an organisation can influence level of adoption: larger organisations are more ready to adopt EDI than small and medium-sized enterprises (SME) because they have more resources such as money and IT personnel. Location also has an influence in the level of adoption. Pulapaka (2001) has found that for mining companies in Australia, transportation and logistics rank the highest as an inhibitor in adoption because delivering to a remote area is a major issue. On the other hand, Yen (2002) finds that some SMEs are reluctant to adopt because they argue that Hong Kong is small and easy to move around.

4.2 Top Management Support

Top management support helps to increase the success of IOS adoption; adopters have shown to have greater top management support (Premkumar and Ramamurthy 1995; Premkumar et al. 1997). One of the strengths of successful IOS adoption is having top management support from both supplier and customer perspectives (Ragatz et al. 1997). Sharma and Yetton (2003) link management support to the success of IS implementation. Top management have to accept adoption risks, namely organisational, management and financial risks (Grover 1993).

4.3 Information Sharing

Information gives organisations value and competitive advantage (Porter and Millar 1985; Johnston and Vitale 1988). Information sharing is the purpose of building an IOS. Lee et al. (1997) suggest that information sharing should be used in a supply chain network to reduce uncertainty demand of products, i.e. overcome the bullwhip effect. However, organisations are still concerned with data ownership (More and McGrath 2000). Keskinocak and Tayur (2001) question the amount of internal information an organisation willing to share with its partners without jeopardising its competitive advantage. Unfortunately, some customers deliberately overstate their demands for their own strategic gain which results in their suppliers ignoring their demands; or organisations misuse the information resulting in anti-competitive behaviour (Lee and Whang 1998). Furthermore, the mitigating risk of information sharing does not always translate into sales (Crum and Palmatier 2004). Leidner (2003) links the willingness to share information with individual and organisational culture.

4.4 Financial

Mukhopadhyay et al. (1995) have shown cost savings can be achieved by adopting IOS using EDI. Cost savings include process savings, inventory savings and error savings (Subramaniam and Shaw 2002). Information sharing can lead to less stock-on-hand (process savings), less unused raw materials (waste savings), less outdated stock (inventory savings), and the ability to response to market changes faster; but the downside is that organisations have to inject large amounts of capital before the benefits can be realised (Mukhopadhyay et al. 1995; Gunasekaran and Ngai 2004). Sharing resources between organisations such as education and training, intellectual assets, human assets and physical assets can help to reduce the development and maintenance costs of these systems (Ragatz et al. 1997).

4.5 Value-Added

Porter (2001) insists that organisations should distinguish themselves from their competitors by having value-added services. Cox et al. (2001) distinguish three different types of value-added services: value proposition, value-adding process and value appropriation. Short and Venkatraman (1992) argue that it is neither cost savings nor technology linkages but the value-added services to the businesses that help to drive the success of IOS; examples given include Baxter's "one stop shop", Owens and Mines' same day delivery and having multi-delivery points. Rahim et al.'s (2002) case studies find one of the suppliers adopted IOS to improve its customer service level by reducing the amount of order entry errors even though no large cost saving is achieved.

4.6 Power

Studies have shown that some organisations will only adopt IOS if they are pushed by external pressure such as competitor's pressure, dependency on a trading partner, enacted trading partner power and industry pressure (Chwelos et al. 2001; Iacovou et al. 1995; Premkumar et al. 1997; Kautz and Henriksen 2002). External pressure can be further classified into mimetic, coercive and normative (Teo et al. 2003). Hart and Saunders (1997) go further to explain how persuasive power or coercive power is used for getting the organisation's partner to adopt IOS. Kautz and Henriksen (2002) argue how politics plays a significant role in IOS adoption. Hart and Saunders

(1997) relate power and dependence in a buyer-seller relationship. Premkumar et al. (1997) use socio-political structure to capture power-dependence relationships. Cox (2001) describes power-dependence relationships using a power matrix consisting of attributes for buyer dominance, supplier dominance, interdependence and independence. Porter (2001) discusses the bargaining power of suppliers and buyers. Johnston and Vitale (1988) further divide bargaining power into raising switching costs, unique product features and search-related costs. Some organisations resist and are reluctant to adopt IOS with just one supplier because they argue they may lose their negotiation and bargaining power (Clemons and Row 1992).

4.7 Trust

Lee and Whang (1998) emphasise that trust is considered as one of the important factors in a collaborative network. Keen et al. (2000) argue that it is trust, not technology that paces the advancement of e-commerce. A high degree of trust is required between organisations as well as trust within organisations; however, building trust within an organisation can be difficult to achieve (Barratt 2004). Newell and Swan (2000) further uncover two distinct kinds of trust, namely interpersonal and inter-organisational; it has been argued that interpersonal relationships have to be surpassed if collaboration between organisations is to be successful. Hart and Saunders (1997) find that trust can help to reduce uncertainty during IOS development; trust can include competence, openness, reliability and caring relationships (e.g. providing help and training). Walker et al. (2000 cited in Barel 2004) explain how trust is built from experiences between organisations.

4.8 Information Technology

IT/IS readiness of the organisation's partners is one of the major factors influencing IOS adoption (Iacovou et al. 1995; Chwelos et al. 2001; Premkumar et al. 1997). Attaran (2004) explains how the Internet, eXtensible Markup Language (XML) and web services are the latest tools for building IOS for SCM. Grover (1993) and Premkumar et al. (1994) discuss greater success of IOS adoption for high technical compatibility of IT/IS systems and infrastructures. Subramani (2004) shows how IT benefits suppliers in IOS. The lack of skilled IT personnel and IT infrastructure, especially for SMEs, is a major inhibitor for IOS adoption (Cook et al. 2001). According to Fawcett and Magnan (2002), most organisations have not accomplished internal systems integration. Reich and Benbasat (2000) point out that sharing domain knowledge can influence the alignment between business and IT executives in system development.

4.9 Organisational Culture

Organisational culture is not established, formed nor developed, it emerges "from long-established practices, procedures, structures and systems" (Bunker 2001; Love and Gunasekaran 1997). "Because no two organisations are the same, organisational culture distinguishes the members of one organisation from another" (Serour and Henderson-Sellers 2002, p. 78). Taylor-Cumming (1998) claims the major cause of system development failures is a "culture gap" between IT and business in an organisation. Serour and Henderson-Sellers (2002, p. 78) have found that, "while most managers tend to support new technologies, many of them turn away when they realize how much that technology is likely to change their traditional organizational culture". Managers have to be seen as the drivers behind the changes, and consistently communicating with their employees by explaining the reasons behind the changes (Davenport and Short 1990; Love and Gunasekaran 1997).

4.10 Collaborative Process

From previous collaborative studies, collaboration can be divided into three stages: preconditions, process and outcomes. Gray and Wood (1991, p.13) explain the three collaborative stages as: "the preconditions that make a collaboration possible and that motivate stakeholders to participate, the process through which collaboration occurs, and the outcomes of the collaboration." Three key collaborative issues, namely interests, motivation and interdependence, can be distinguished in the preconditions stage. "Interests or stakes are what the organisations expect in the outcomes. The degree of interdependence the organisation perceives to have when dealing with other organisations" (Logsdon 1991). Organisations must have motivation to collaborate; efficiency and transaction costs reduction are examples of drivers behind organisational collaboration (Fleisher 1991).

An organisation usually has some kind of interests, motivation and interdependence before collaborating with another organisation. In order to understand how the collaborative factors influence in the collaborative process, all collaborative factors are assigned to one of the three key collaborative issues in the preconditions stage:

- Interests: management support [and strategy approach].
- Interdependence: information sharing, information technology, organisational characteristics, organisational culture, power and trust.
- Motivation: financial and value-added.

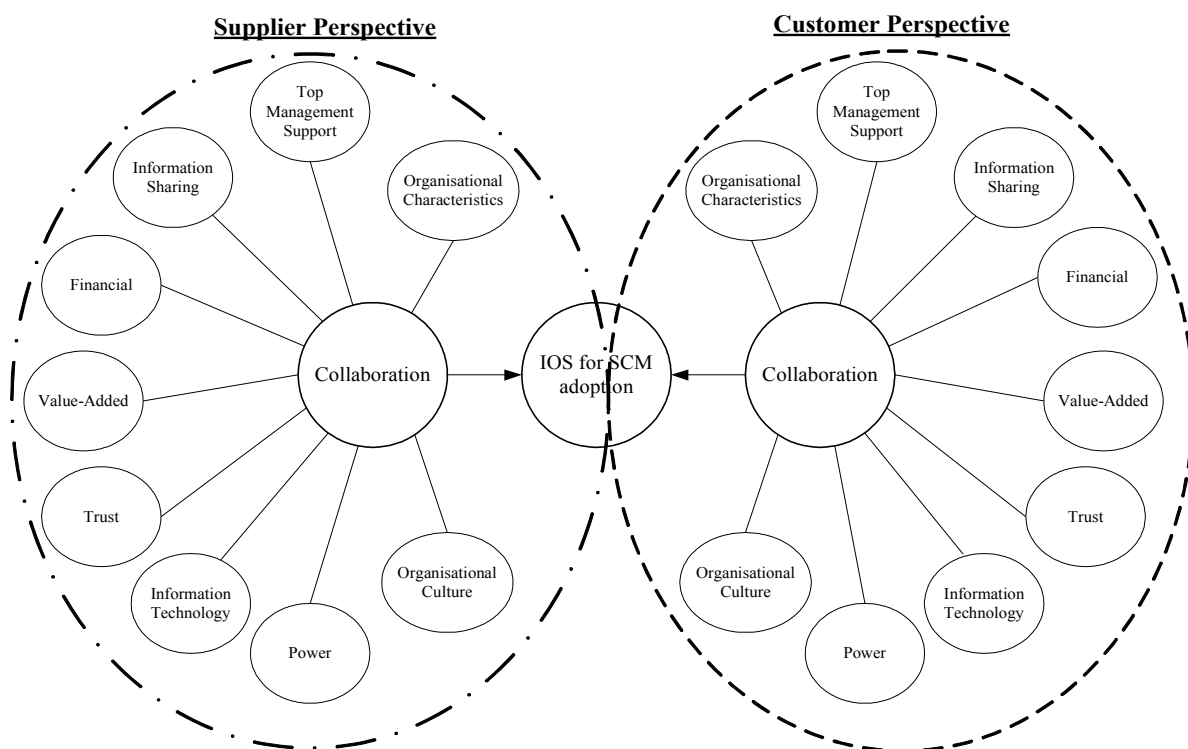
In the process stage, interests, interdependence and motivation (from preconditions) are the issues that commence collaborative negotiation process with other organisations. This paper will study how the collaborative process between the organisations unfolds that resulting in IOS adoption. Negotiated order and agency theories are to be used to study the interpenetration, interaction and collaborative relationship between principal (hospital) and agent (supplier). Interpenetration is the process that brings organisations with interests, interdependence and motivation together in a problem domain through collaborative negotiation that result in IOS adoption. “Interpenetration refers as the process whereby stakeholders seeking to collaborate in a problem domain engage in direct or mutual negotiations, pool resources, and/or create or employ a third party as a linking device” (Westley and Vredenburg 1991, p.68). Governance rules can be used as a means to protect interests in common resources for the participant organisations (Golic 1991).

4.11 A Proposed Study: Examination of IOS for SCM from Supplier and Customer perspectives

Most of the literature examines adoption and implementation of IOS for all stakeholders or from one perspective of the supply chain network. A few examine the same study from both supplier and customer perspectives such as Rahim et al.’s (2002) motivation study and Johnston et al. (2004) examination of how supplier’s trust influences a buyer’s outcome. In a supply chain network, one has to understand who drives the flow of goods (as shown in Figure 1). Vollmann et al. (2000) introduce the term Demand Chain Management (DCM); Frohlich and Westbrook (2002, p. 729) define DCM as a, “practice that manages and coordinates the supply chain from end-customers backwards to suppliers”. DCM is a mirror of SCM. The difference is DCM is a pull-process, i.e. the demand to buy goods driven by the customers, whereas SCM is a push-process where the suppliers want to sell or push their goods to their customers. Furthermore, Frohlich and Westbrook (2002) identify different issues related to supply and demand integration. Hence, the factors that influence the supplier to collaborate might be different from those of the customer. A greater understanding from both supplier and customer perspectives is therefore an issue of interest to academics and practitioners alike.

4.12 IOS for SCM adoption framework

Figure 2 shows the proposed IOS for SCM adoption framework to examine the collaborative factors from both supplier and customer perspectives. This framework is to be used as a starting point in an exploratory study (see next section) to see how each of these factors influences the collaborative process from different perspectives and does not imply causal relationships between the factors. This paper acknowledges that there are inter-relationships between the collaborative factors but they are not shown in the framework.



Note: Inter-relationships between the collaborative factors are not shown but this paper acknowledges that there are relationships between these factors

Figure 2 IOS for SCM adoption framework from supplier and customer perspectives

Furthermore, this paper also acknowledges that IOS for SCM adoption also incorporates factors covered by such authors as Szulanski (1993), and Parasuraman and Grewal (2000). Szulanski (1993) discusses the awareness, exchange, adaptation and institutionalisation stages in the intra-firm transfer of best practice. It is envisaged that the identified collaborative factors will directly feed into these stages. Parasuraman and Grewal (2000) highlight the key drivers of loyalty which could also be applicable to the development and commitment to IOS. These examples indicate that factors and influences between organisations are complex and a challenge to map.

5 Research Approach for the Proposed Study

To accommodate the complexity, multidisciplinary and extensive collaboration activities, the overview of the research approach for the proposed study recommended by this paper is summarised in Figure 3. There are five stages in the research approach design, which is based on Galliers' "use of alternative information systems research approaches in the process of theory building, testing and extension" (Galliers 1992, Figure 8.1, p. 16).

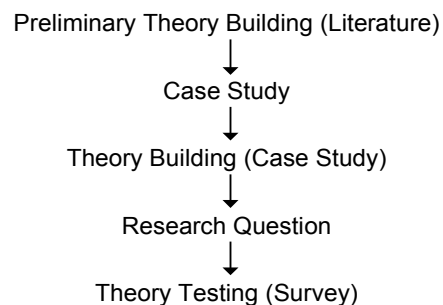


Figure 3 Overview of the proposed research approach (based on original work by Galliers 1992, Fig. 8.1, p.161)

The building of the IOS for SCM framework is based on the literature but collaborative activities between organisations are still not widely understood in IS research. Many of the identified collaborative factors and their inter-relationships are still unexplored in the research domain. If the framework is tested using only one research method then there will be a risk that some of the collaborative factors or inter-relationships between these factors may not be adequately identified and explored. Hence, the framework may have missing factors. Furthermore, one might not be able to explain the reasons behind unexpected results from the survey without first talking to the participants; hence, interviewing the participants becomes mandatory.

A pluralist methodology, described as a study using combination of research methods, is selected; having different information sources helps to improve and to generate a richer understanding of the complexities in the development and sustainment of inter-organisational collaborative issues (Mingers 2001; Yin 2003). Sequential research design, "methods employed in sequence with the result of one feeding into the later one", is selected (Mingers 2001, p. 252).

This research approach is classified into two stages, namely exploratory and confirmatory. At the exploratory stage, the proposed IOS for SCM adoption framework is used to investigate and to analyse the identified collaborative factors. A number of different personnel from the hospitals and suppliers will be interviewed. A semi-structured interview method will be used to gain a greater understanding from the supplier and customer perspectives. Results will be utilised to further develop the proposed IOS for SCM adoption framework; research questions and hypotheses will then be generated from the framework. An example of a research question might be, "How are suppliers' intentions to adopt IOS influenced by the collaborative factors?" At the confirmatory stage, a survey method will be used.

Two different data analysis methods are applied for the two research methods. Cross-case interpretive analysis will be used to interpret the data from the interviews whereas Structured Equation Modelling (SEM) with Partial Least Square (PLS) will be used to analyse the data from the survey. SEM with PLS can be used to explain how the factors (constructs) influence the adoption of IOS. SEM with PLS can handle exploratory and confirmatory research and it allows the inclusion or exclusion of inter-relationships between the collaborative factors without having pre-determined inter-relationship questions (Chin 1998; Subramani 2004; Teo et al. 2003).

6 Conclusion

Drawing from IS, IT and SCM literature, this paper develops and proposes an IOS for SCM adoption framework in which nine collaborative factors are identified to influence the collaborative process as well as highlighting the relationships between some of these factors. A research approach based on a pluralist methodology is proposed to test and enhance the framework. The outcomes of this research expect to show how collaborative

factors influence IOS for SCM adoption and the differences from supplier and customer perspectives. It is expected that the inter-relationships between the collaborative factors will be revealed as a result of this study.

References

- Attaran, M. (2004), Exploring the relationship between information technology and business process reengineering, *Information & Management*, 41 (5), pp. 585-596.
- Barel, R. (2003), e-Procurement in Australian Healthcare, Honours Thesis, University of New South Wales.
- Barratt, M. (2004), Understanding the meaning of collaboration in the supply chain, *Supply Chain Management: an International Journal*, 9 (1), pp. 30-42.
- Barrett, S. and Konsynski, B. (1982), Inter-Organization Information Sharing Systems, *MIS Quarterly*, 6 (4), pp. 93-105.
- Bensaou, M. and Venkatraman, N. (1996), Inter-organizational relationships and information technology: a conceptual synthesis and a research framework, *European Journal of IS*, 5 (2), pp. 84-91.
- Bunker, D. (2001), A philosophy of information technology and systems (IT & S) as tools: tool development context, associated skills and the global technology transfer (GTT) process, *Information Systems Frontiers*, 3 (2), pp. 185-197.
- Bunker, D., Cecez-Kecmanovic, D., Campbell, J. and Arnotts, D. (2004), *Research Direction – Epistemology panel*, 15th Australasian Conference on Information Systems (ACIS), 1st-3rd December, Hobart, Australia.
- Chin, W. (1998), Issues and opinions on structural equation modelling, *MIS Quarterly*, 22 (1), pp. 7-16.
- Chwelos, P., Benbasat, I. and Dexter, A. (2001), Research Report: Empirical Test of an EDI Adoption Model, *Information Systems Research*, 12 (3), pp. 304-321.
- Clemons, E. and Row, M. (1992), Information technology and industrial cooperation: the changing economics of coordination and ownership, *Journal of Management Information Systems*, 9 (2), pp. 9-28.
- Cook, J. S., DeBree, K. and Feroletto, A. (2001), From raw materials to customers: supply chain management in the service industry, *SAM Advanced Management Journal*, 66 (1), pp. 14-21.
- Corty, M. (1998), The foundations of social research: meaning and perspective in the research process, 1st edition, Allen & Unwin Pty Ltd, Sydney.
- Cox, A. (2001), Understanding buyer and supplier power: a framework for procurement and supply competence, *Journal of Supply Chain Management*, 37 (2), pp. 8-15.
- Cox, A., Sanderson, J. and Watson, G. (2001), Supply chains and power regimes: toward an analytic framework for managing extended networks of buyer and supplier relationships, *Journal of Supply Chain Management*, 37 (2), pp. 28-35.
- Crum, C. and Palmatier, G. E. (2004), Demand collaboration: what's holding us back?, *Supply Chain Management Review*, 8 (1), pp. 54-61.
- Davenport, T. H. and Short, J. E. 1990, "The new industrial engineering: information Technology and business process redesign", *Sloan Management Review* 31 (4), pp. 11-27.
- Deshpande, P. B. (2001), *India, inc., and six sigma: if Dabbawallahs can do it, you can too!*, viewed 20th December 2003, <http://www.sixsigmaquality.com/India_Inc_and_Six_Sigma.pdf>.
- Fawcett, S. E. and Magnan, G. M. (2002), The rhetoric and reality of supply chain integration, *International Journal of Physical Distribution & Logistics Management*, 32 (5), pp. 339-361.
- Fleisher, C. (1991), Using an agency-based approach to analyze collaborative federated interorganizational relationships, *the Journal of Applied Behavioral Science*, 27 (1), pp.116-130.
- Frohlich, M. and Westbrook, R. (2001), Arcs of integration: an international study of SC strategies, *Journal of Operations Management*, 19 (2), pp. 185-200.
- Frohlich, M. T. and Westbrook, R. (2002), Demand chain management in manufacturing and services: web-based integration, drivers and performance, *Journal of Operations Management*, 20 (6), pp. 729-745.
- Galliers, R. D. (1992), Choosing Information Systems Research Approach, *Information systems research: issues, methods and practical guidelines*, Blackwell Scientific Publications, Oxford.
- Garcia-Dastugue, S. J. and Lambert, D. M. (2003), Internet-enabled coordination in the supply chain, *Industrial Marketing Management*, 32 (3), pp. 251-263.
- Geary, S., Childerhouse, P. and Towill, D. (2002), Uncertainty and the seamless supply chain, *Supply Chain Management Review*, 6 (4), pp. 52-61.
- Gilbert, A. (2000), *E-Procurement: Problems behind the promise*, Information Week.
- Golich, V. (1991), A multilateral negotiations challenge: international management of the communications commons, *the Journal of Applied Behavioral Science*, 27 (2), pp. 228-250.
- Grover, V. (1993), An empirically derived model for the adoption of customer-based interorganizational systems, *Decision Science*, 24 (3), pp. 603-640.
- Gunasekaran, A. and Ngai, E. W. T. (2004), Information systems in supply chain integration and management, *European Journal of Operational Research*, 159 (1), pp. 269-295.

- Hart, P. and Saunders, C. (1997), Power and trust: critical factors in the adoption and use of electronic data interchange, *Organization Science: A Journal of the Institute of Management Science*, 8 (1), pp. 23-42.
- Humphreys, P. K., Lai, M. K. and Sculli, D. (2001), An inter-organizational information system for supply chain management, *International Journal of Production Economics*, 70 (3), pp. 245-255.
- Iacovou, C. L., Benbasat I. and Dexter, A. S. (1995), Electronic data interchange and small organizations: adoption and impact of technology, *MIS Quarterly*, 19 (4), pp. 465-485.
- Johnston, D. A., McCutcheon, D. M., Stuart, F. I. and Kerwood, H. (2004), Effects of supplier trust on performance of cooperative supplier relationships, *Journal of Operations Management*, 22 (1), pp. 23-38.
- Johnston, H. R. and Vitale, M. R. (1988), Creating competitive advantage with interorganizational systems, *MIS Quarterly*, 12 (2), pp. 153-165.
- Kanter, R. M. (1994), Collaborative Advantage: Successful partnerships manage the relationships, not just the deal, *Harvard Business Review*, 72 (4), pp. 96-108.
- Kautz, K. and Henriksen, H. Z. (2002), Brilliant Idea? But it didn't do the trick: the role of a designed project in the adoption and diffusion process of inter-organizational information systems, in Bunker, D., Wilson, D. and Elliot, S. (eds), *The Adoption and Diffusion of IT in an Environment of Critical Change IFIP WG8.6*, Pearson Publishing, Australia.
- Keen, P., Ballance, C., Chan, S. and Schrupp, S. (2000), *Electronic commerce relationships: trust by design*, Prentice Hall PTR, New Jersey.
- Keskinocak, P. and Tayur, S. (2001), Quantitative analysis for internet-enabled supply chains, *Interfaces*, 31 (2), pp. 70-89.
- Lambert, D. M., Cooper, M. C. and Pagh, J. D. (1998), Supply chain management: implementation issues and research opportunities, *The International Journal of Logistics Management*, 9 (2), pp. 1-19.
- Lee, H. L. and Whang, S. 1998, *Information sharing in supply chain*, Graduate School of Business, Stanford University, viewed 2nd August 04, <http://gobi.stanford.edu/researchpapers/detail.asp?Paper_No=1549>
- Lee, H. L., Padmanabhan, V. and Whang, S. (1997), Information distortion in a supply chain: the bullwhip effect, *Management Science*, 43 (4), pp. 546-558.
- Leidner, D. E. (2003), Understanding information culture: integrating knowledge management systems into organizations, *Strategic Information Management: challenges and strategies in managing information systems*, 3rd edition, Butterworth-Heinemann, Oxford
- Logsdon, J. (1991), Interests and interdependence in the formation of social problem-solving collaborations, *the Journal of Applied Behavioral Science*, 27 (1), pp. 23-37.
- Love, P. E. D. and Gunasekaran, A. (1997), Process reengineering: a review of enablers, *International Journal of Production Economics*, 50 (2-3), pp. 183-197.
- Magretta, J. (1998), The power of virtual integration: an interview with Dell computer's Michael Dell, *Harvard Business Review*, 76 (2), pp. 72-85.
- Mahadeshwar, K. (2003), *Making a reliable global supply chain a reality*, Australian and New Zealand Supply Chain World Conference Sydney, 02-04 December 2003.
- Mingers, J. (2001), Combining IS research methods: towards a pluralist methodology, *Information Systems Research*, 12 (3), pp. 240-259.
- More, E. and McGrath, M. (2000), Health & industry collaboration: the PeCC story, viewed 20th December 2003, <<http://www.dcita.gov.au/ie/publications/2000>>.
- Mukhopadhyay, T., Kekre, S. and Kalathur, S. (1995), Business value of information technology: a study of electronic data interchange, *MIS Quarterly*, 19 (2), pp. 137-156.
- Newell, S. and Swan, J. (2000), Trust and inter-organizational networking, *Human Relations*, 53 (10), pp. 1287-1328.
- Oxford English Dictionary, (2004), "collaboration noun", *The Oxford Dictionary of English*. Ed. Catherine Soanes and Angus Stevenson. Oxford University Press, 2003. *Oxford Reference Online*, viewed 19th July 2004, <<http://www.oxfordreference.com/views/ENTRY.html?subview=Main&entry=t140.e15031>>.
- Parasuraman, A. and Grewal D. (2000), The Impact of Technology on the Quality-Value-Loyalty Chain: A Research Agenda, *Journal of the Academy of Marketing Science*, 28 (1), pp. 168-174.
- Porter, M. E. (2001), Strategy and the Internet, *Harvard Business Review*, 79 (3), pp. 63-78.
- Porter, M. E. and Millar, V. E. (1985), How Information gives you competitive advantage, *Harvard Business Review*, 63 (4), pp. 149-160.
- Premkumar, G. and Ramamurthy, K. (1995), The role of interorganizational and organizational factors on the decision mode for adoption of interorganizational systems, *Decision Sciences*, 26 (3), pp. 303 – 336.
- Premkumar, G., Ramamurthy, K. and Crum, M. (1997), Determinants of EDI adoption in the transportation industry, *European Journal of Information Systems*, 6 (2), pp. 107-122.
- Premkumar, G., Ramamurthy, K. and Nilakanta, S. (1994), Implementation of electronic data interchange: An innovation diffusion perspective, *Journal of Management Information Systems*, 11 (2), pp. 157-186.

- Pulapaka, M. (2001), Factors in the adoption of electronic procurement systems, Honours Thesis, University of New South Wales.
- Ragatz, G., Handfield, R. B. and Scannell, T. V. (1997), Success factors for integrating suppliers into new product development, *Journal Product Innovation Management*, 14 (3), pp. 190-202.
- Rahim, M., Shanks, G. and Johnston, R. (2002), Motivations for inter-organisational systems adoption: a tale of two organisations, in Bunker, D., Wilson, D. and Elliot, S. (eds), *The Adoption and Diffusion of IT in an Environment of Critical Change IFIP WG8.6*, Pearson Publishing Service, Australia.
- Reich, B. H. and Benbasat, I. (2000), Factors that influence the social dimension of alignment between business and information technology objectives, *MIS Quarterly*, 24 (1), pp. 81-113.
- Riggins, F. J. and Mukhopadhyay, T. (1999), Overcoming EDI Adoption and Implementation Risks, *International Journal of Electronic Commerce*, 3 (4), pp. 103-123.
- Serour, M. and Henderson-Sellers, B. (2002), The role of organizational culture on the adoption and diffusion of software engineering process: an empirical study, in Bunker, D., Wilson, D. and Elliot, S. (eds), *The Adoption and Diffusion of IT in an Environment of Critical Change IFIP WG8.6*, Pearson Publishing, Australia.
- Sharma, R. and Yetton, P. (2003), The Contingent Effects of Management Support and Task Interdependence on Successful Information Systems Implementation, *MIS Quarterly* 27 (4), pp. 533-555.
- Short, J. E. and Venkatraman, N. (1992), Beyond business process redesign: redefining Baxter's business network, *Sloan Management Review*, 34 (1), pp. 7-21.
- Subramani, M. (2004), How do suppliers benefit from information technology use in supply chain relationships?, *MIS Quarterly*, 28 (1), pp. 45-73.
- Subramaniam, C. and Shaw, H. J. (2002), A study of the value and impact of B2B e-commerce: the case of web-based procurement, *International Journal of Electronic Commerce*, 6 (4), pp. 19-40.
- Szulanski, G. (1993), Intra-firm transfer of best practice, appropriative capabilities, and organizational barriers to appropriation, *Academy of Management Proceedings*, pp. 47-51.
- Taylor-Cummings, A. (1998), Bridging the user-IS gap: a study of major systems projects, *Journal of Information Technology*, 13 (1), pp. 29-54.
- Teo, H. H., Wei, K. K. and Benbasat, I. (2003), Predicting intention to adopt interorganizational linkages: an institutional perspective, *MIS Quarterly*, 27 (1), pp. 19-49.
- Themistocleous, M. and Irani, Z. (2002), A model for adopting enterprise application integration technology, Motivations for inter-organisational systems adoption: a tale of two organisations, in Bunker, D., Wilson, D. and Elliot, S. (eds), *The Adoption and Diffusion of IT in an Environment of Critical Change IFIP WG8.6*, Pearson Publishing Service, Australia.
- Turban, E., King, D., Lee, J. & Viehland, D. (eds) 2004, *Electronic Commerce- A Managerial Perspective*, 2004 edition, Pearson Pentice Hall, New Jersey (USA).
- Vollmann, T. E., Cordon, C. and Heikkila, J. (2000), Teaching supply chain management to business executives, *Production and Operations Management*, 9 (1), pp. 81-90.
- Westley F. and Vredenburg H. (1991), Strategic bridging: the collaboration between environmentalists and business in the marketing of green products, *the Journal of Applied Behavioral Science*, 27 (1), pp. 65-90.
- Wood, D. J., and Gray, B. (1991), Toward a comprehensive theory of collaboration, *Journal of Applied Behavioral Science*, 27 (2), pp. 139-149.
- Yen, B. (2002), Electronic commerce front-end in apparel supply chain, *Computers & Industrial Engineering*, 42 (2-4), pp. 471-480.
- Yin, R. K. (2003), *Case Study Research: Design and Methods*, 3rd edition, Sage Publications, Thousands Oaks, California.

Acknowledgements

The author is deeply indebted to Dr Deborah Bunker, Prof. Karl Kautz and Jonathan Paul, and the anonymous reviewers for their helpful comments and advice on earlier version of the paper.

Copyright

Vincent Pang © 2005. The authors assign to ACIS and educational and non-profit institutions a non-exclusive licence to use this document for personal use and in courses of instruction provided that the article is used in full and this copyright statement is reproduced. The authors also grant a non-exclusive licence to ACIS to publish this document in full in the Conference Papers and Proceedings. Those documents may be published on the World Wide Web, CD-ROM, in printed form, and on mirror sites on the World Wide Web. Any other usage is prohibited without the express permission of the authors.