IMPLEMENTATION OF INFORMATION SYSTEMS FOR SUPPLY CHAIN COLLABORATION WITH GEOGRAPHICALLY-DISPERSED PARTNERS

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ABSTRACT
In today’s globally competitive marketplaces, organizations in both private and public sectors are embedded in networks of supply chain relationships with their geographically-dispersed trading partners (i.e., the suppliers and customers). Increasingly, these relationships tend to be long-term arrangements, requiring organizations to engage in supply chain collaboration. While information systems are known to enable different types of interactions, there is not a systematic examination of the information systems infrastructures that promote supply chain collaboration between organizations and their trading partners. This research seeks to break new ground in the area of supply chain collaboration by highlighting: (a) the information systems infrastructure and capabilities that would enable supply chain collaboration between organizations and their trading partners, and (b) the organizational processes and routines that would allow for successfully exploiting the information systems infrastructure and capabilities for maximizing supply chain collaboration.

Keywords
Supply chains, collaboration, information systems

INTRODUCTION
Organizations typically deal with a number of suppliers (to procure raw materials or other goods) and customers (to sell their finished products and goods). Consequently, organizations participate in multiple supply chains, forming a network of supply chain relationships among their various partners, suppliers and customers alike. [This network is defined from the perspective of a single focal organization and includes partners in all tiers unlike prior conceptualizations that refer to either the Tier I partners of a focal organization or the Tier I partners of multiple focal organizations (e.g. Hall 1999).] Figure 1 shows a focal organization, X, which interacts with various Tier I and Tier II suppliers and with multiple resellers and customers. Thus, the focal organization is a member of multiple supply chains; for instance, one supply chain is represented by 2 – 1 – X – R – C; and another supply chain is represented by 1 – X – C. In Figure 1, the lines represent “communication” between the various organizations X, 1, 2, R, and C. The communication may encompass different business activities such as procurement, demand, planning, quality, etc.

In today’s globally competitive marketplaces and operating environments, a focal organization (X, in Figure 1) may be engaged in long-term relationships (i.e., enterprise partnerships, strategic alliances, and outsourcing arrangements) with Tier I and Tier II suppliers, resellers, and customers, located in different geographic regions (i.e., different time zones, languages, and cultures) (e.g., Lacity & Willcocks 2006). This business reality has two implications for supply chain collaboration: a) information systems used to enable such collaboration should transcend differences in languages and cultures between the trading partners; and b) trading partners may need to institute internal and external processes that exploit and maximize the capabilities provided by such information systems.

Supply chain collaboration is generally viewed as containing two distinct components (e.g., Sanders and Premus 2005): a) internal collaboration, which refers to activities between the various internal functions of the focal organization (such as procurement, logistics, distribution, product design, production, and marketing), encompasses utilization of an integrated database for information sharing between the various functions, and cross-functional collaboration in strategic planning; and b) external collaboration, which refers to activities between the focal organization and its trading partners, and comprises sharing of operations and planning information, sharing of cross-functional processes, sharing of cost information, and participation in collaborative networks with multiple suppliers. In this study, supply chain collaboration refers to only the external collaboration component; we assume that the focal organization has implemented internal information systems, such as enterprise resource planning (ERP) systems, for internal collaboration.
ORGANIZING FRAMEWORK

The organizing framework (Figure 2) for mapping information systems for supply chain collaboration is based on two dimensions, both from the perspective of the focal organization (X, in Figure 1).

- **Visibility.** This represents the extent of visibility of data, actions, and decisions desired by the focal organization. The term “visibility” refers to the availability of information outside of an organization’s boundaries. An organization may desire to achieve visibility with a partner (i.e., customer and/or supplier), across a chain (i.e., from one end to another end of a supply chain), or within a network (i.e., across the collective of multiple supply chains).

- **Automation.** This represents the extent of automation desired by the focal organization. The term “automation” describes the transmission and capture of data, actions, and decisions to/by internal information systems without human intervention. An organization may choose to have no (i.e., traditional methods such as fax, email, etc.), simplex (i.e., one-way transmission or capture), and duplex (i.e., two-way transmission and capture) automation.

The foregoing yields a 3x3 matrix of possible configurations of information systems infrastructures for supply chain collaboration. Organizations in each cell are likely to exhibit different characteristics and implement different information systems infrastructures for supply chain collaboration. Whereas the three cells on the partner level of visibility can be mapped based on extant research and the three cells on the no automation level can be surmised, the remaining four cells are less straightforward.

Such difficulty is compounded by our knowledge that organizations may have implemented various types of technologies that call for different capabilities and routines. An example of this can be the implementation of a traditional system at one organization and a web-based system in another organization. Further, the systems at the two organizations may not be compatible with each other, which require organizations to adopt standards that overcome or cater to the compatibility issues between the systems. Finally, organizations may have adopted supply chain information systems due to a variety of reasons such as mandates, capabilities, efficiencies, or bandwagons (Rogers 1995; Jeyaraj et al. 2006).
RESEARCH ON SUPPLY CHAIN INFORMATION SYSTEMS

Supply chain information systems are typically viewed as technologies for mediating supplier-buyer transactions (Subramani 2004) in the areas of transaction processing, order tracking and coordination, and supply chain collaboration (Kärkkäinen et al. 2007). A variety of information systems such as electronic data interchange (EDI), inter-organizational systems (IOS), and business-to-business (B2B) systems (Son and Benbasat 2007; Iskander et al. 2001; Grover and Saeed 2007) have been used for these purposes. Extant research has examined organizations’ intention to adopt, adoption, and integration of supply chain information systems (e.g., Chwelos et al. 2001; Neo et al. 1994; Zhu et al. 2006), and also attended to the different stages of adoption (e.g., Grover and Goslar 1993). Studies have examined these phenomena across a variety of industries such as finance, manufacturing, engineering, telecommunications, retail, wholesale, automotive, and pharmaceuticals.

Despite the considerable research (e.g. Elgarah et al. 2005), however, our understanding of supply chain information systems for collaboration is constrained. Prior research has generally been limited to the partner level of visibility (see Figure 2), where a focal organization is invited to report on the extent to which information systems enable collaboration with partners. This presents two related problems. First, this method does not capture the communications between the immediate partners of the focal organization and the partners of the partners. Thus, parts of the supply chain and even the entire network remain outside the scope of the research. Second, this method does not describe the specific information systems infrastructures that support supply chain collaboration with partners. Thus, the details of how organizations manage such infrastructures are outside the scope of the research. To resolve these gaps in extant research, we take the network of supply chain relationships (Figure 1) as the unit of analysis and pursue the following research questions:

- What are the information systems infrastructure and capabilities required for successful supply chain collaboration between the focal organization and its geographically-dispersed trading partners?
- What are the organizational processes and routines required to successfully exploit the information systems infrastructure and capabilities to maximize supply chain collaboration between the focal organization and its geographically-dispersed trading partners?
To answer these research questions, data will be gathered in two stages. First, field interviews of several key individuals from the focal organization and selected trading partners will be conducted. This will enable us to gain insights on the levels of visibility and automation desired and achieved by the focal organization and its partners on the chain and the network, the information systems infrastructures that enable supply chain collaboration between the focal organization and its partners, and the organizational processes and routines in place. Second, surveys will be administered to key individuals of multiple focal organizations and their trading partners. The surveys will be informed by insights from field interviews regarding the information systems capabilities and infrastructures for supply chain collaboration. This will enable us to generalize our findings to a larger population of supply chain networks involving multiple focal organizations and their partners.

CONCLUSION

This is a research-in-progress paper. We are currently engaged in data collection at multiple organizations. We will present preliminary findings at the conference.

REFERENCES