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Antecedents to Supply Chain Integration

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ABSTRACT

Although supply chain management and supply chain integration have become topics found within today's organization as well as topics for researchers from various disciplines, little research has been completed concerning the linkage between business strategy, supply chain strategy, and the resulting decision which an organization makes to enter into an integration initiative. This paper discusses the experience of one organization in formulating a supply chain strategy which is well aligned with its business strategy. The paper concludes with key elements driving the supply chain which emerge from this linkage.

Keywords (Required)

Supply Chain Integration, Strategy, Antecedents

INTRODUCTION

The literature on supply chain management has long extolled the virtues to be gained by organizations seeking to integrate their supply chain. These gains include greater data and information visibility, leaner and more efficient processes, vendor managed inventories, and higher profitability. *Globalization* and *global supply chain operation*, and *supply chain visibility* have become buzzwords for organizations in recent years. Customers demand more data concerning shipping, especially as businesses attempt to move toward just-in-time inventory management or to incorporate lean philosophies into their firms' practices.

This lack of data, or lack of information visibility, is a problem for many firms who trade with multiple supply chain partners in multiple locations. Many of these companies lack the information technology infrastructure necessary to collect the information from partners. Hence, visibility should be one of the greatest benefits to emerge from supply chain integration.

Yet little exists in the literature in terms of exploring what has led organizations to engage in the long and often arduous journey to achieve this integration. Thus, this paper examines organization and operational factors which are antecedents to an organization's integration initiative decision.

This paper proceeds as follows. We first review the literature concerning supply chain integration and antecedents to integration. Next, we overview the pre-integration state of a sample organization, paying close attention to the difficulties the firm experienced as problems constantly arose in meeting both internal and customer expectations. We conclude with a conceptual model which captures the experiences of the firm in driving top management decision making to engage in integration efforts.

LITERATURE REVIEW

Many organizations are facing the necessity of integrating their supply chains with those of suppliers and customers. Poirier (2002) notes that today's companies are devoting much energy and effort to teasing out the value that might otherwise remain hidden from sight in their supply chains. Yet, despite the benefits from integration and connectivity, this "passage to connectivity is not as smooth" as it is often portrayed (Poirier, 2002, p. 18).

Researchers continue to explore fully the supply chain, highlighting its importance to organizational operations, organizational competitiveness, and the achievement of competitive advantage. In particular, numerous researchers have focused on supply chain collaboration, and the amount and type of data, information, and knowledge necessary to effect such

collaboration. Anderson, Morrice and Lundeen (2005) use a model to test the impact of variations of lead-time (longer versus shorter lead-times) upon fluctuations in demand, and thus, lead-time variability and its impact upon the bullwhip effect. Viswanathan, Widiarta and Piplani (2007) examined forecasting and planning among members of a multi-tier, or multi-echelon, supply chain. They developed a simulation which indicated that members of a supply chain are best able to forecast demand when calculations take into account the historical demand of their supply chain partners. Additionally, the authors examined a “synchronized inventory replenishment” scheme between suppliers and retailers, and determined that synchronized inventory replenishment (the case in which a supplier ships based upon a fixed order interval established by a retailer) can assist in lowering costs for the retailers.

Other ordering schemes are considered by other researchers. Choudhury, Agarwal, Singh and Bandyopadhyay (2008) deploy a simulation to measure the value of information in a supply chain. They accomplish this under different conditions of known information. The researchers measure the difference between Retailer Managed Inventory (RMI) versus Traditional Information (TI) sharing, and between Vendor Managed Inventory (VMI) versus TI sharing. In their modeling both demand and inventory information was shared with the supplier. Their results indicate that VMI is most cost effective.

Different collaboration models are incorporated into some of the information sharing research. Kahn, Maltz and Mentzer (2006) examine the supply chain from a collaborative planning, forecasting, and replenishment (CPFR) perspective, noting that the literature predicts that utilization of CPFR principles to manage demand have had positive impacts upon the organization. The authors focus, in particular, upon the information technology (IT) dimensions of collaboration, and how collaboration between supply chain partners can lead to the possibility of knowledge creation throughout the supply chain. Alternately, Elofson and Robinson (2007) use simulation to test a Collective Customer Collaboration (C3) system (entails a group of customers taking part in product design as well as committing to product purchase). Their simulation indicates that supply chain performance is boosted through the C3 system.

Much of the information sharing research, has been undertaken against a knowledge management (KM) backdrop. Addressing the topic of building supply chain excellence while maintaining flexibility, Wadhwa and Saxena (2007) note that some decision making is possible among partners, even though the partners would be considered as autonomous firms when viewed outside of the supply chain context. Given the importance of these decisions, the authors utilize the KM perspective in encouraging managers to share information, and ultimately knowledge, throughout the supply chain. In a separate article, Wadhwa, Ducq, Saxena and Prakash (2008) employ a knowledge management perspective to explore and define Decision Knowledge Sharing (DKS) within the supply chain as a means to attaining greater performance.

Further, the benefits to be gained from information sharing present a strong incentive for businesses to move toward integration. Benefits include efficiency and lower cost, an even flow of goods and services through the supply chain, and minimizing distortions caused by the bullwhip effect (Campbell and Sankaran, 2005; Lee, Padmanabhan and Whang, 1997a, 1997b; Lee, So and Tang, 2000; Poirier, 2002). However, despite many assertions that integration and information sharing within the supply chain may address or alleviate the imbalance between supply and demand (Campbell and Sankaran, 2005; Marabotti, 2002), other researchers are less optimistic, noting that these results are not guaranteed.

When higher levels of information are shared, the payoff from information sharing may extend far beyond a simple exchange of data. In addition, some researchers (Chen, Yang, and Yen, 2007; Premus and Sanders, 2008) propose an information sharing hierarchy. At the top of this hierarchy, not only is information shared within the supply chain, but financial performance is also impacted through this sharing.

Notwithstanding the body of work concerning various aspects of the supply chain and its behavior, there is little in the literature to draw upon when examining why companies undertake integration initiatives, and how companies prepare for integration. Before beginning a glimpse of the efforts of one company prior to entering into a supply chain integration initiative, we examine the literature on antecedents to integration.

There is much research available concerning the supply chain in its many aspects (i.e., VMI, bullwhip effect, integration, upstream versus downstream, and so forth), yet there is little research available concerning the antecedents of supply chain integration. Chen et al. (2009) perform research aimed at testing a model of supply chain process integration (SCPI) capabilities (Chen, Fan and Farn, 2009, p. 191). Their research is aimed at a sample of managers drawn from manufacturers in Taiwan. They note that SCPI capabilities have a positive impact upon a firm’s performance with regard to supply chain management. Govindarajulu and Daily (2009) examine the flexibility of firms in relation to demand driven supply chains, as flexibility has been shown to be a significant factor in firm performance in prior studies.

Grover and Saeed (2007) examine integrated supply chain systems (or, interorganizational systems) to gauge whether characteristics of the transaction itself are motivating factors pushing firms toward integration. Patnayakuni, Rai, and Seth (2006) center their research among the types of information flows among partner organizations, i.e., formal and informal, as

well as whether such flows require a longer time period to establish. Gattiker and Carter (2010) look at ways in which project champions within an organization gain buy-in for interorganizational systems within their home organization. Seggie, Kim, and Cavusgil (2006), and Kim and Cavusgil (2009) focus on supply chain integration as a means to impact the brand of a focal firm. Braunscheidel and Suresh (2009) concentrate on firm culture (through market orientation and learning orientation) in understanding supply chain agility.

Green, Whitten, and Inman (2008) look toward supply chain strategy as a driver of organizational and logistical performance. Hsu, Kannan, Tan, and Leong (2008) examine information sharing capability as it impacts firm performance and relationships which the firm engages in with partner organizations. Lawson, Tyler and Cousins (2008) view social capital as a factor which impacts strategic relationships within the firm, as they construct a model of factors impacting performance improvement. Koufteros, Cheng, and Lai (2007) focus on supplier integration and its impacts upon product development in their research on supply chain integration antecedents. Vickery, Jayaram, Droge, and Calantone (2003) examine the relationship between supply chain integration and firm variables such as customer service and financial performance. These excellent studies draw upon the importance of business strategy and supply chain strategy in informing their research. Yet, we are unable to find an abundance of studies which focus more specifically on the way in which an organization crafts its supply chain strategy to ensure that it is aligned with the firm's business strategy. Hence, we focus in this paper on the work in which one firm engaged to carefully produce a supply chain strategy which was aligned with the goals and objectives of the business while also guarding against obsolescence in the future.

THE ORGANIZATIONAL SETTING

XYZ Company (XYZ)¹ has experienced growth, and has recently expanded its production facilities and supply base worldwide. This growth has led to the opening of new plants not only in its U.S. base, but in Asia and Europe as well. While the increase in global production capacity has required expansion of the company's supply base around the world. Yet the company continues to operate with diverse production and planning systems that were designed mainly for communication with local suppliers. As a result, company and supplier communications exceed the communication capability of their present systems. The lack of information connectivity and visibility has cost millions in premium freight charges as well as other non-value-added activities. Integrating the supply chain is expected to offer improved communication between XYZ and suppliers through an internet-based supplier portal. The first step in the integration project has allowed for purchase order release information to be pushed through this portal. The next step is to capture shipment (advance ship notice, or ASN) and in-transit data and integrate that information with XYZ's material requirement planning system leading to improved decision making and reduced costs.

XYZ Company experienced a number of difficulties and deficiencies with the state of its systems prior to beginning work on the information system that would serve to formalize the information chain. (Difficulties encountered with these systems are noted throughout.)

The ERP legacy system used by XYZ Company within its plants in the U.S., Thailand, China, and the Philippines has had several limitations that affect the way its suppliers communicate and respond to purchase order releases.

First, all PO (purchase order) releases remain open until the product is received by the purchasing plant. This means that releases remain open and visible on the supplier portal after shipment from the supplier. The status of releases has become an issue because releases that are in transit to the purchasing plant must be deducted from the total open releases shown on the portal in order to determine the quantity of product still required by the XYZ plant. Through the use of the advanced ship notice (ASN) module on the supplier portal, international suppliers to XYZ's U.S. plants can have in-transit calculations done for them. When an ASN is created by selecting a specific release for shipment, the portal maintains the shipment history and calculates the 'balance-to-ship' information for each release on the open PO summary download.

A second limitation is that the XYZ legacy system does not have unique release identifiers and cannot distinguish one release from another in the receiving process. When product is received at the purchasing plant, the system always applies this quantity to the release with the earliest due date regardless of which release the supplier intended to satisfy with that shipment – even if the release was created after the shipment was made.

When releases are changed (as described above) and show earlier request dates than the supplier had originally planned, the supplier must re-confirm based upon the new sequence of releases – again showing the earliest confirmation and shipment

¹The company was promised anonymity in order to protect its competitive advantage. Thus, while XYZ Company exists, details of its identity have been changed. A portion of this agreement stipulates that details concerning respondents (interviewees) were to be omitted.

planned to satisfy the release with the earliest request date. The supplier can use the ‘comments’ section of the supplier portal to show any relevant history of confirmation adjustments due to changes made by XYZ.

Because of the limitations outlined above, all shipment planning and subsequent in-transit tracking must be applied against the earliest requested release. Suppliers must verify current release information and ship the earliest requested, confirmed release with a ‘balance-to-ship’ greater than zero. Note that this may require a supplier to reconfirm.

XYZ has undertaken a project to modify its legacy system to eliminate these ongoing issues. Each release will receive a unique identifier, thereby allowing communication between the supplier and the XYZ system to be specific to it so that the receiving process can apply receipts to specific releases. The unique identifier will accompany the material on a bar-coded label. Along with this change XYZ will enable real-time, 2-way communication between the supplier portal and the legacy system so that confirmed releases can be blocked from additional changes, which could be made only by contacting the supplier directly and requesting that the confirmation be removed.

The integration project was begun in order to address these system difficulties. The next section of the paper details more specific goals of the project, goals and work on the project to date. Finally, we list the company’s future goals and next steps to conclude the project.

ANTECEDENTS TO INTEGRATION AT XYZ COMPANY

Data gathered from our work with XYZ Company indicated that a number of organizational factors, touching upon all levels of the organization, came into play in the decision to integrate the supply chain. We categorize these factors as strategic, or mission, issues (issues related to top-level management within XYZ), technology issues, and information and data visibility issues. The issues, considered as a whole, paint a portrait of an organization stymied by constraints imposed upon it. XYZ faced an inability to conduct its operations in a seamless fashion, and found itself unable to escape mounting, frequent, premium freight charges paid to overcome inventory and materials shortages despite having received assurance of planned capacity fulfillment. Hence, XYZ’s goal, through its integration initiative, was to reach and maintain a state of business readiness.

XYZ began its integration initiative by examining the positioning of strategy within the organization. Top management at XYZ evaluated how the corporate mission drove all other components of the firm. Importantly, they decided that a new norm governing the company would be that business strategy must go in front of supply chain strategy, and that supply chain strategy must go in front of supply chain structure. This served to insure that all operations in within the organization would be driven by the firm’s overarching mission. Too, management came to the realization that it would be haphazard to construct a supply chain and then attempt to fit business and supply chain strategies to this structure. In short, they realized that a supply chain built in the absence of corporate direction would result in a structure lacking the resilience to face new, arising, initiatives. They realized that strategy should drive the formulation of supply chain strategy, and that, in turn, supply chain strategy must be constructed to withstand current and (possibly) changing business conditions such as capacity and bottlenecks, labor availability, regulations (environmental, security, and transportation, as well as regulations which might arise in the future), changes to supply chain costs (such as sourcing and fuel), and other risks and threats to company performance. By informing the process in this fashion, XYZ sought to insure that supply chain management became an organizational concern, rather than being delegated to the responsibility of IT or being perceived as an operational issue.

Once a mission statement was in place, XYZ turned its attention to crafting their supply chain strategy. They conducted an exercise aimed at eliciting from participants a vision of how the future supply chain should look. The state of the future supply chain needed to present an integrated organization, an organization where silos cease to exist. Hence, interconnectivity and information sharing were of huge importance to the firm. In addition, electronic connectivity was to be present throughout the organization. This connectivity would be facilitated through a transaction hub. Alternately, connectivity could also be achieved by the organization’s portal. The goal remained, however, one of linking all organizational divisions, all trading partners, and all suppliers. An important enabler of connectivity would be the requirement of common data transactions and standards. Common data and standards would facilitate easy transmissions through the system, as well as promote a common language with all entities of the partnership. Hence, a part would be referenced by a single product code throughout the system, rather than possibly requiring translation as information moved from one partner to another. An underlying goal of common data and standards was to increase data visibility in the supply chain, which in turn would define better the job of the system’s exception management tools. The organization believed that a focus on consistency of supply chain data and metrics would force a new organizational focus. This focus would be directed at improving and operations and customer satisfaction in both the inbound and outbound portions of the supply chain.

The result of this careful planning became designated as XYZ's Supply Chain Initiative. The initiative identified key elements of the firm's emerging supply chain strategy. It included the need to organize to drive supply chain programs throughout the business, to eliminate root causes that stress the supply chain, to simplify and leverage their logistics network, to digitize the supply chain, to optimize, through their usage of tools and process, the supply chain, to drive the supply chain programs using new products as catalysts, and to proactively manage trade compliance. Each of the key elements of the strategy were firmly rooted in the firm's driving principles and values of arriving at a single, integrated company, and eliminating communication barriers. In short, XYZ believed that good information equated to good decision making. In turn, good decision making equated to good supply chain management. XYZ wished to strive for supply chains that are predictable, visible and secure, and would permit, at all levels and locations of the supply chain, the use of standard metrics to drive both performance and corrective actions as needed.

Because of the number of suppliers comprising XYZ's supply chain, the total supply chain was extremely complex. In recognition of this complexity, XYZ sought to translate its supply chain vision into a series of high level enablers. Management thought at XYZ was that the incorporation of high level enablers to drive the supply chain would achieve greater buy-in from its numerous supply chain partners. The following key enablers, then, were included into the vision of the future supply chain.

1. Align internal priorities and goals: XYZ, in its quest to eliminate silos throughout the organization, wanted to focus on aligning all areas to a commonly agreed-upon set of performance metrics and targets.
2. Enable financial fluidity: XYZ wanted to secure commitment to reducing total supply chain costs as well as to establish enterprise-level mechanisms to recognize, and potentially offset, shifts in costs and savings.
3. Identify Organizational "homes" for initiatives: Rather than house the supply chain initiative on partners throughout the world, XYZ sought to require a *single touch-point responsible* for coordination of and measurement of results achieved through implementation efforts. Accomplishing this feat would permit XYZ to maintain the responsibility of continually refining and institutionalizing recommendations after initial implementation.
4. Support the transition to a "*service-based supply chain*": XYZ sought to move from customers choosing how their order is fulfilled at a very granular level to global optimization of supply chain. This would allow a customer to specify his/her required service levels and cost criteria. In turn, an optimal supply chain would dynamically select the channel, route, and carrier to best meet the customer's requirements
5. Sharing: XYZ embraced the realization that the key to enterprise improvement is a *shared view of goals and collaboration and cooperation* between the partner organizations across functional boundaries. In particular, XYZ noted that work underlying the Supply Chain Operation Reference model (SCOR) *enables such collaboration* because of the standard language, definitions, metrics and hierarchies that different organizations use to work towards shared goals. These goals were in-keeping with XYZ's new mission and supply chain strategy.

The final step in which top management wished to engage was to identify different opportunities which were identified by the partnership toward an integrated, fully visible supply chain. The opportunities included the ability to address their distribution process, with an eye toward improvement and deployment of a tighter process. XYZ saw an opportunity to optimize both surface as well as airlift aspects of the manner in which the supply chain operated. Finally, they could concentrate on both supply alignment, as well as strategic network optimization. Supply alignment would allow for the strategic placement of selected material in forward inventory locations to minimize the use of high-cost air transportation, as well as serving to increase distribution. Strategic network optimization would define the optimal location for key distribution modes, such as inventory locations, sources of supply, consolidation and deconsolidation for all locations, as well as transportation hubs and ports.

All of this work enabled XYZ to set guidelines for the metrics which would emerge to drive their future supply chain. They developed five guidelines to inform selection of all metrics to be used within the supply chain, as follows:

1. Metrics should be developed in an outcome-based process, a process explicitly driven by the organization's goals.
2. Metrics must fit a clear and purposeful hierarchy.
3. Targets must be set – and monitored – for each metric.
4. Metrics should be appropriately balanced across all aspects of supply chain performance.
5. Metrics must be acknowledged and shared among the partner organizations.

The work which top management undertook in its decision to promote integration of their entire supply chain can be seen in the following figure (Figure 1), which focuses organizational attention on the key elements of the supply chain strategy of promoting a focus on electronic communications and connectivity. A move toward continuous improvement has been formalized through the way in which the key elements fit together, as the path through the figure revisit each element in an unbroken and unending fashion.

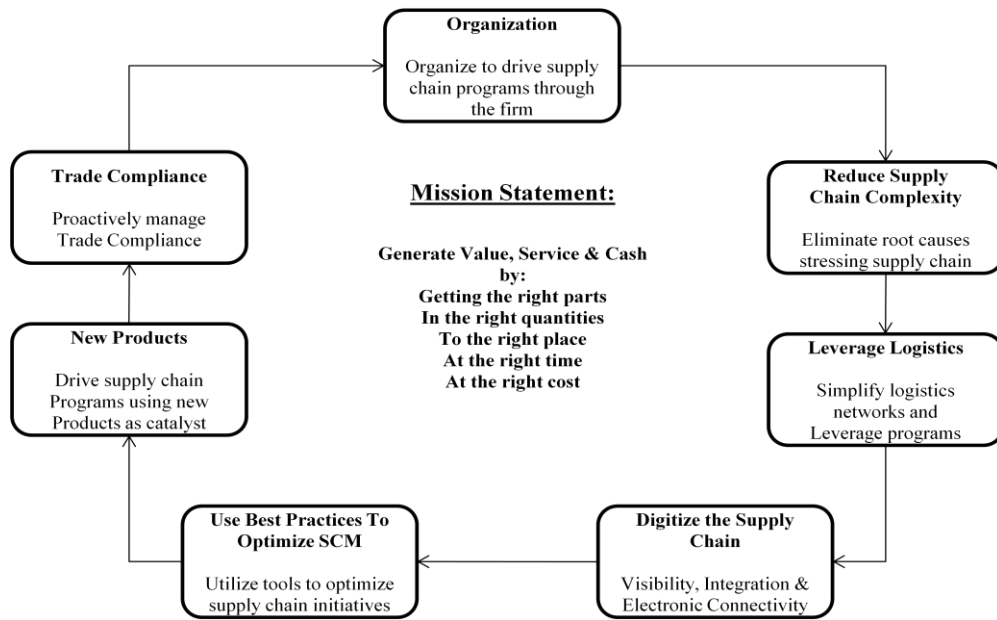


Figure 1. Key Elements of the Supply Chain Strategy: Focus on Electronic Communications & Connectivity

On the basis of the different steps which XYZ Company engaged in during the steps leading up to their supply chain integration initiative, we present the following conceptual model (Figure 2).

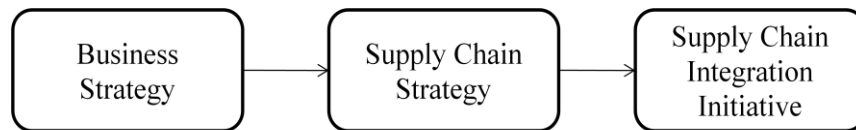


Figure 2: A Conceptual Model for Integration Antecedents

CONCLUSION

This paper has examined the work undertaken by one company, XYZ Company, to re-craft and revitalize its supply chain. The company had been facing a variety of issues (including excessive costs and poor customer service) because of inefficiencies in its supply chain. When the company examined its supply chain, they focused on a means to establish end-to-end digital communication throughout the supply chain. In doing so, they adopted standards and data definitions throughout the supply chain. Prior to beginning work on the supply chain, the company’s top management conducted an investigation of its strategy at various levels. The goal in looking at its strategy was to ensure that the supply chain was drawn in accordance with the strategy, and that the resulting supply chain would be flexible enough to adapt to and adjust to changing business conditions over time. XYZ company wanted to create supply chain linkages which would last into the future.

Organizations are struggling with their supply chains in order to overcome a number of deficiencies which they have discovered in today’s business environment which has focused attention on efficient supply chains and data and information visibility. The level at which initial work was being done at XYZ Company, i.e., the top management level, indicates the importance of today’s supply chain as a concern for the entire organization.

REFERENCES

1. Anderson Jr., E.G.; Morrice, D.J.; and Lundeen, G. (2005) The 'Physics' of Capacity and Backlog Management in Service and Custom Manufacturing Supply Chains, *System Dynamics Review*, 21, 3, 217-247.
2. Braunscheidel, M.J., and Suresh, N.C. (2009) The organizational antecedents of a firm's supply chain agility for risk mitigation and response, *Journal of Operations Management*, 27, Issue 2, 119-140.
3. Campbell, J. and Sankaran, J. (2005) An inductive framework for enhancing supply chain integration, *International Journal of Production Research*, 43, 16, 3321-3351.
4. Chen, C.-D.; Fan, Y.-W.; and Farn, C.-K. (2009) Cultivating focal firm's supply chain process integration capabilities: The investigation of critical determinants and consequences, *Proceedings of World Academy of Science, Engineering and Technology*, 41, 191-198.
5. Chen, M.-C.; Yang, T.; and Yen, C.-T. (2007) Investigating the value of information sharing in multi-echelon supply chains, *Quality and Quantity*, 41, 3, 497-511.
6. Choudhury, B.; Agarwal, Y.K.; Singh, K.N.; and Bandyopadhyay, D.K. (2008) Value of Information in a Capacitated Supply Chain, *INFOR*, 46, 2, 117-127.
7. Elofson, G. and Robinson, W.N. (2007) Collective Customer Collaboration Impacts on Supply-Chain Performance, *International Journal of Production Research*, 45, 11, 2567-2594.
8. Gattiker, T.F., and Carter, C.R. (2010) Understanding project champions' ability to gain intra-organizational commitment for environmental projects, *Journal of Operations Management*, 28, 1, 72-85.
9. Govindarajulu, N., and Daily, B.F. (2009) Exploring the antecedents of externally-driven flexibilities, *Journal of Management Research*, 9, 2, 83-99.
10. Green, Jr., K.W.; Whitten, D.; and Inman, R.A. (2008) The impact of logistics performance on organizational performance in a supply chain context, *Supply Chain Management: An International Journal*, 13, 4, 317-327.
11. Grover, V., and Saeed, K.A. (2007) The impact of product, market, and relationship characteristics on interorganizational system integration in manufacturer-supplier dyads, *Journal of Management Information Systems*, 23, 4, 185-216.
12. Hsu, C.-C.; Kannan, V.R.; Tan, K.-C.; and Leong, G.K. (2008) Information sharing, buyer-supplier relationships, and firm performance: A multi-region analysis, *International Journal of Physical Distribution & Logistics Management*, 38, 4, 296-310.
13. Kahn, K.B.; Maltz, E.N.; and Mentzer, J.T. (2006) Demand Collaboration: Effects on Knowledge Creation, Relationships, and Supply Chain Performance, *Journal of Business Logistics*, 27, 2, 191-221.
14. Kim, D., and Cavusgil, E. (2009) The impact of supply chain integration on brand equity, *Journal of Business and Industrial Marketing*, 24, 7, 496-505.
15. Koufteros, X.A.; Cheng, T.C.E.; and Lai, K.-H. (2007) "Black-box" and "gray-box" supplier integration in product development: Antecedents, consequences and the moderating role of firm size, *Journal of Operations Management*, 25, 4, 847-870.
16. Lawson, B.; Tyler, B.B.; and Cousins, P.D. (2008) Antecedents and consequences of social capital on buyer performance improvement, *Journal of Operations Management*, 26, 3, 446-460.
17. Lee, H.L.; Padmanabhan, V.; and Whang, S. (1997a) Information distortion in a supply chain: The bullwhip effect, *Management Science*, 43, 4, 546-558.
18. Lee, H.L.; Padmanabhan, V.; and Whang, S. (1997b) The bullwhip effect in supply chains, *Sloan Management Review*, 38, 3, 93-102.
19. Lee, H.L.; So, K.C.; and Tang, C.S. (2000) The value of information sharing in a two-level supply chain, *Management Science*, 46, 5, 626-643.
20. Marabotti, D. (2002) What is supply chain event management technology all about? *Inventory Management Report*, 2, 12, 2-3.
21. Patnayakuni, R.; Rai, A.; and Seth, N. (2006) Relational Antecedents of Information Flow Integration for Supply Chain Coordination, *Journal of Management Information Systems*, 23, 1, 13-49.
22. Poirier, C. (2002) Achieving supply chain connectivity, *Supply Chain Management Review*, 6, 6, 16-22.

23. Premus, R. and Sanders, N.R. (2008) Information sharing in global supply chain alliances, *Journal of Asia-Pacific Business*, 9, 2, 174-192.
24. Seggie, S.H.; Kim, D.; and Cavusgil, S.T. (2006) Do supply chain IT alignment and supply chain interfirm system integration impact upon brand equity and firm performance? *Journal of Business Research*, 59, 8, 887-895.
25. Vickery, S.K.; Jayaram, J.; Droge, C.; and Calantone, R. (2003) The effects of an integrative supply chain strategy on customer service and financial performance: An analysis of direct versus indirect relationships, *Journal of Operations Management*, 21, 5, 523-539.
26. Viswanathan, S.; Widiarta, H.; and Piplani, R. (2007) Value of Information Exchange and Synchronization in a Multi-Tier Supply Chain, *International Journal of Production Research*, 45, 21, 5057-5074.
27. Wadhwa, S. and Saxena, A. (2007) Decision Knowledge Sharing: Flexible Supply Chains in KM Context, *Production Planning and Control*, 18, 5, 436-452.
28. Wadhwa, S.; Ducq, Y.; Saxena, A.; and Prakash, A. (2008) Supply Chain as a Flexible System: A KM Focused Competence, *Global Journal of Flexible Systems Management*, 9, 2/3, 15-30.