Supply chain management integration practices: some problems and solutions

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Abstract

Over the last decade, supply chain management (SCM) has been studied extensively, and its importance to practitioners and academics has received a high level of recognition. While there is enormous information on SCM, little is known concerning discussion by the executives about the supply chain management integration problems and possible solutions.

This paper presents the on-line forum results of 10 supply chain personnel in New Zealand about the SCM integration problems facing their organizations and possible solutions. The analysis reveals the major problems and the possible solutions, including: SC integration requires a holistic approach; two-way communication; written service level agreements; relationship management; use of new technologies and integrated software systems; strategic alliances and trust; integrated processes; effective partnership; and conduct cost/benefits analysis of SCM. The insights on the problems and solutions provide valuable information on business risks and uncertainty for sustainability in the global market environment.

Keywords: Supply chain management integration; supply chain problems and solutions; New Zealand.

1.0 Introduction

Supply chain management (SCM) links a firm with its customers, suppliers and other members of the supply chain system, including transportation and warehousing companies. Handfield and Nichols (2002, p. 8) state that supply chain involves all activities associated with the flow and transformation of goods from the raw materials stage (extraction), through to the end user, as well as the associated information flows. However, Mentzer, et al. (2001) define a supply chain as three or more of the flows of products, services, finances, and/or information from a source to a customer. The management of the supply chain is basically management of the relationships and activities among the members of organisations (system). The goal of supply chain management is for members in the organisations to work together and build a partnership with each other to increase the competitive advantage of the supply chain as a whole (Mentzer et al. 2001). The concept of SCM is also addressed by Themistocleous et al. (2004) who define SCM as the integrated management of business links, information flows and people. Bowersox et al. (1999) have classified integration in supply chain context into six different types: customer integration, internal integration, material and service supplier integration, measurement integration, technology and planning integration, and relationship integration. Recent SCM literature has been emphasizing the importance of SCI (e.g., Lee, 2000; Lee and Wolfe 2000
and 2003) and the cost of supply chain (Delaney, 2000). All these researchers are focusing on a particular area(s) or function.

The information regarding discussion online of SCM integration (SCMI) problems and solutions by the supply chain personnel is scarce in the literature. Furthermore, in the context of New Zealand (NZ) few researches have been done on SCI (Campbell, 2002; Campbell and Sankaran, 2005). Although SCI research has been conducted in NZ, but little is known about supply chain management integration (SCMI) issues in NZ companies. This research gap shows that the study of SCMI is very important in NZ.

2.0 SUPPLY CHAIN MANAGEMENT

Supply chain management (SCM) has received a great deal of attention over the past decade as a means for increasing national wealth and corporate competitiveness. Studies conducted in the U.S reveal that the costs of logistics services, including transportation, inventory holding as well as related administrative charges account for 10-13 percent of gross domestic product (GDP) in most developed countries and regions around the world (Delaney, 1999). Stank, et al. (2001) confirms that supply chain integration creates value through improved customer service levels and reduced costs.

There are many good examples of companies in the literature that have benefited from SCM. Companies such as Dell, General Electric, Cisco and Ford have reported significant benefits in the implementation of SCM concept (Lee, H. and Whang, 1999). Recent estimates of European supply chain highlighted that only 10% of supply chains are well integrated (Towill et al., 2000). Furthermore, Simchi-Levi et al., (2003, p. 10) provide three examples of companies implementing supply chain and state that "the National Semiconductor, Wal-Mart, and Procter & Gamble success stories demonstrate not only that integrating the supply chain is possible, but it can have a huge impact on the company's performance and market share."

3.0 SUPPLY CHAIN INTEGRATION

The importance of supply chain integration (SCI) has been acknowledged in literature. Lambert et al. (1998) define SCM as “integration of business”. The National Research Council (2000, p. 27) provides a comprehensive definition of SCI as “an association of customers and suppliers who, using management techniques, work together to optimize their collective performance in the creation, distribution, and support of an end product manufacturer”. They also stress that supply chain integration is a continuous process that can be optimized only when OEMs (original equipment manufacturers), customers and suppliers work together to improve their relationships and when all participants are aware of key activities at all levels in the chain.
A study conducted by Basnet et al. (2003) reported that the situation is no better in New Zealand and confirms that NZ is lagging behind the US and Europe. Basnet et al. (2003, p. 63) noted that in NZ, “… there has not been much progress when it comes to more advanced ideas such as supply chain teams, or information sharing, or use of EDI, etc.” They concluded from their survey data that future research opportunities existed in the identification and validation of SCM technique and practices that are particularly suited to manufacturing industries in NZ.

The sample study by Power (2005) of the literature review relating to the integration and implementation of SCM practices revealed that “an important emergent theme from the literature is the importance of taking a holistic view and the systemic nature of interactions between the participants” in the supply chain. A study conducted by Pagell (2004) on the drivers of internal integration revealed that internal integration is a complex issue driven by a number of factors including the structure and culture at the plant, reward systems and the amount of formal and informal communication across the functions. Although internet-based supply chain integration has been praised in the literature, Fronhlish (2002) found the following from the study:

(i) A positive link between e-integration and performance; and
(ii) Internal barriers impeded e-integration more than either upstream supplier, barriers or downstream customer barriers.

Sahay and Mohan (2003) argue that “an increase of uncertainty or supply networks, globalization of businesses, proliferation of product variety and shortening of product life cycles have forced Indian organizations to look beyond their four walls for collaboration with supply chain partners”. They recommended that “the Indian industry should align supply chain strategy with the business strategy, streamline processes for supply integration, form partnership for minimizing inventory and focus on infrastructure and technology deployment to build an Indian specific supply chain”. Ho and Chi (2005) state that applying e-commerce solutions to the SC can increase the efficiency of coordination and resource integration among partners, and emphasize that there is an need to monitor and assess supply-chain performance to ensure that the objective of supply chain integration is met. Shen (2005, p. 58) proposes that “in a growing complexity but abundant opportunities accelerated by globalization and information technologies, companies need to closely integrate themselves into the supply network, carefully manage the complexity that ensues, align their business strategy with supply chain operation, leverage information technology with process improvement, and pioneer operational innovation for superior firm performance”. The study of logistics and supply chain practices of Australian and NZ firms by Mollenkopf and Dapiran (2005) reveals that the majority of the firms still focus their efforts on internal logistics integration issues. However, Donk and Vaart (2005) argue that uncertainty enhances the need for more integration, while shared resources limit the chances of reaching a high level of integration.
The problems of SCI have been highlighted by many researchers in the literature. The recent study by Bagchi and Chun (2005) found that supply chain integration influences operational performance and the extent of integration also have impact on cost and efficiency.

4.0 The main purpose of research

The competition in the global market environment has forced companies to examine their corporate strategies regarding SCMI in order to enhance companies’ performance. The main purpose of this study is:

- to identify supply chain management integration problems in the NZ companies; and
- to explore the SCM integration solutions from the supply chain personnel.

The research question is “What are supply chain management integration problems and possible solutions in an organization?”

5.0 Research methodology

This research was an exploratory part of the on-going research and therefore, a case study methodology was appropriate, using a grounded theory (Glaser and Strauss, 1967), as the theoretical basis. “The grounded theory approach is a general methodology of analysis linked with data collection that uses a systematically applied set of methods to generate an inductive theory about a substantive area” (Glaser, 1992, p. 16). The study concentrated on part of the conceptual research model (Figure 1). The focus of this study was limited to general SCMI practices, with emphasis on problems and solutions.

The aim of this paper is not to generate theory concerning the SCMI. The main purpose is to generate a preliminary model of major problems and solutions affecting the SCMI and an organization’s performance (Figure 2).

5.1 Selection of participants

Information was obtained from the on-line forum participants using a structured discussion format. The purchasing and supply chain personnel were full-time employees, and they studied part-time at The Open Polytechnic of New Zealand. Fourteen participants were invited to participate in the forum, but only 10 participants provided in-depth responses to the question.
5.1 Data collection

Online Internet forum discussion was the primary data collection method. The participants were asked to discuss the nature of SCMI in their companies, cite the problems facing their companies, and propose solutions to enhance SCMI in their companies.

5.1 Data analysis

A lot of information was collected from the forum. In order to make sure that all the important information concerning SCMI was captured and sorted, the process of open coding was used (Strauss and Corbin 1998). The most important in the analysis was to identify common themes in the forum relating to SCMI practices, problems and solutions.

6.0 Findings

The results of this study show that the critical SCMI problems in the organizations are as follows:

(i) Insufficient training and competence levels required to maintaining existing SC operations, and to support implementation of new technologies/efficiencies (50% of respondents);

(ii) Communication breakdown: lack of effective communication between SC members, especially primary members (40% of respondents);

(iii) Lack of internal cost efficiency and speed of delivery in the areas of ordering, inventory, marketing, and logistics (40% of respondents); and

(iv) Some members of the supply chain are dominant in the business relationship. Lack of trust, communication is limited or formal, and information sharing becomes secretive. This leads to quality problems (40% of respondents).

The major problems identified in the forum are indicated in Table 1. Although similar problems have been identified in the literature, most of the problems identified are discrete. The results of this study show that the critical SCMI problems in the organizations are bundled.

<<Include Table 1 about here>>

The respondents were also asked in the online forum to propose major SCMI solutions for their companies (see Table 2). The critical solutions proposed by the respondents are indicated below:

The respondents were also asked in the online forum to propose major SCMI solutions for their companies (see Table 2). The critical solutions proposed by the respondents are indicated below:
(i) Two-way communication is needed, and everyone involved in the SCMI must be aware of the structure and processes involved in the SC. Information sharing is important (60% of respondents);

(ii) Integrating key members of the supply chain requires a holistic approach and adoption from top executives to shop floor members for efficient and effective change (40% of respondents); and

(iii) Form strategic alliances with SC members, and foster an open and honest culture (30% of respondents).

The SCM personnel proposed that integrating key members of the SC requires a holistic approach (40% of the respondents). This supports the results of the cross-section literature review by Power (2005). Power states that “an important emergent theme from the literature is the importance of taking a holistic view, and the systemic nature of integrations between the participants” in the supply chain.

The insights on the problems and solutions provide valuable information on business risks and uncertainty for sustainability in the global market environment. For example, uncertain source of supply, uncertain demand caused by unknown requirements of the customers, and more importantly, other internal and external environmental factors which can affect the SCMI. Figure 2 provides a preliminary model of major problems and solutions to enhance an organization’s performance. The critical problems, critical solutions, and the organization’s corporate strategy on SCMI, have impact on performance. Also, demand and supply uncertainties, and other environmental factors, cause business risks and affect the organization’s corporate strategy.

The lesson learned from this study is that there is a SCMI domino effect between critical problems, critical solutions, organization’s performance, organization’s corporate strategy, and the environmental uncertainties/risks. For this paper, domino effect (DE) in SCMI is caused by adapting a critical solution, which if not properly implemented, then it causes critical problems, which affect the organization’s corporate strategy on SCMI. Unsolved problems cause other problems in the competitive global business environment. The appendices 1 and 2 indicate examples of the responses from the participants in the forum.
7.0 Conclusions

This study revealed important areas of concern in the organizations embarking on the implementation of the SCMI in their companies. The results from this study show that SCMI cannot be achieved easily before the effective adoption of the SCM concept, as a culture of the organization. The research highlighted the major problems indicated in Table 1, and the proposed solutions are shown in Table 2.

There is a need for an organization to align SCMI to the company’s corporate strategy, and the possible demand and supply uncertainties and other environmental factors causing business risks must be taken into consideration when planning the SCM. Critical problems and solutions should be handled carefully to avoid the SCMI domino effect on the organization’s performance. Decision-makers should consider costs, benefits, and risks in the market environment before adapting the SCMI strategy. Technology only cannot make a successful SCMI. There is a need to examine the big picture, especially difficult behavioral aspects and risks in implementing the SCMI. The inability to integrate SC members’ procedures will slow the growth of SCM. Therefore, the SCM should deal with the management of the entire supply chain.

Although SCM can provide many benefits to the organization, it requires reasonable investment and commitment. Thus, it is important to conduct a cost/benefit analysis, before adopting the SCMI strategy. There is a need for companies to align supply chain strategy with the corporate strategy, as recommended by Sahay, et al. (2003).

This study will be useful to the purchasing and supply chain management practitioners, as well as researchers interested in understanding the real state of SCMI in various companies or sectors, using online Internet discussion forum.

8.0 Future research

In order to obtain better results for generalization, there is a need to use a larger sample in the study of SCMI. Further research may be on the impact of SCMI on the corporate strategy and the business environment risks.
9.0 References


APPENDIX 1

CASE 1

PARTICIPANT X:

I am discussing a manufacturing firm that manufactures, assembles and distributes products to large reseller chains. There are approximately 100 employees who work for this organization. Technologically the organization I am discussing tries to be a leader in their industry, one major problem it faces involves the integration of the order fulfilment business process. The resellers this multinational manufacturer deals with tend to lack or resist the use of technological advancement, in particular the use of the Internet as an information source.

The organisation offers EDI technology to the larger customers. This interface transfers a purchase order from the reseller’s system to a sales order on our system. Also, a website is available, customers have an account and can log in to the website at any time to check order status, stock availability, account status, product configurations etc. However there seems to be a real resistance in the use of Internet technology. Resellers instead prefer to phone the 0800 number and talk to a customer service representative. Despite having a large customer services team, delays can be experienced due to the quantity of calls received. It is expensive and unnecessary to employ more staff when the facility is there for the channel to easily access real time information, as they need it. The resellers do have access to the Internet and have been trained. I think we as an organisation have put everything in place for information to flow freely and it is now up to the resellers' management to encourage its staff to adopt the technology. What do other participants think? This resistance comes at a cost to our organisation, a cost that inevitably gets passed down the chain.
APPENDIX 2

CASE 2

PARTICIPANT Y:

[Participant X], I think the research results of the study conducted by Basnet et al. (2003) "Benchmarking Supply Chain Management Practice in New Zealand" was spot on from the experiences I have had. New Zealand (NZ) companies definitely seem to be slow in adopting SCM practices and integration. Your company is obviously forward thinking to have implemented the IT capabilities they have. Your difficulty lies in the adoption of these new practices by the resellers; your customers. My experience is similar but different in that the parts wholesaler, an employer of 100 individuals, I am discussing conducted a survey through the sales force to gauge the level of adoption there would be if they implemented ordering via the internet and the technology to log in to a website and check the prices of items including their personalised company discount. The response was an overwhelming "we are happy doing things the way we have been doing them for the last 30 years, leave us alone". Naturally the company was happy to save themselves the costs involved in the proposed new ordering innovation and moved on with other things, namely "on-time activities and determining customer's future needs (forecasting)" exactly described by Basnet et al. (2003). Perhaps your company would consider initial incentives for companies adopting your new ordering system. May be a discount at the end of the month. Conversely penalties for ordering via the customer service centre, maybe turning the 0800 number to a 0900 number. Would conducting a small customer survey to understand the lack of adoption be a possibility too?

The management culture within my organisation is old fashioned and very government department like. They see no need to change the way things have been done for the last 20 years like their customers do. The problem will lie in the not so near future when a couple of the competitors who have been bought out by large multinationals will begin to compete in ways they will not be able to match. The significant problems this organisation faces in integrating with their supply chain include most importantly the fact that the suppliers are offshore in China, Europe, and the USA. The time difference plays a big part in the inability to communicate. However, the fact that we are just a wee fish in a very big ocean of customers (geographically located far away in the middle of nowhere) must contribute to the no response to emails, faxes and answer phone messages. This issue also contributes to the ability in negotiating prices and discounts on large purchases. What is a large purchase to a NZ company is in many cases small to these large overseas suppliers.

The geographical location of NZ introduces problems long held by NZ companies in that planning and forecasting is extremely important due to the long lead times to get product into the country (often as long as three months). Airfreight costs often prove too costly and leave the margins for our company eroded. Inventory levels for these reasons are
vital as our customers may win major projects, and clear us out of product, and we will gain a bad name in the market place if we are out of these products for the remainder of the customers (2000 customer base nationwide). As raised by Basnet et al. (2003), outsourcing has not taken hold in NZ, I observe this perhaps inherent NZ trait that we can be all things and will give everything and anything a go. Even when it is proved financially in our better interests to outsource it is seen as safer to keep everything in house. I observe that a strategic alliance in one area of the core business area would be largely beneficial rather than consuming large sums of money in stocking inventory in a line we are not considered experts in, and that has struggled for 10 years in which we make lower and lower margins because we continue to cut prices aiming to compete where perhaps we shouldn't bother.
Figure 1: A Conceptual Model for Studying Supply Chain Management Integration (SCMI) in an organization

- Company’s Corporate Strategy
  - Company’s SCM Philosophy
    - Supply Chain Integration
    - SCM Integration
      - SC & SCM Integration Problems
        - Company’s SCMI Strategy
          - Company’s SCMI Solutions
            - Enhanced performance – productivity, cost reduction, service level, and improved commercial relationships
Figure 2: A preliminary model of major problems and solutions to enhance an organization’s performance

Demand and supply uncertainties and other environmental factors causing business risks

Critical problems

Organization’s corporate strategy on SCMI

Critical solutions

Organization’s critical solutions

Organization’s performance

SCMI domino effect
Table 1: Major SCM integration problems identified in the Forum

<table>
<thead>
<tr>
<th>Nature of problem</th>
<th>Percentage of participants who commented on the problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Insufficient training and competency levels required to maintain existing SC operations and to support implementation of new technologies/efficiencies communication between supply chain (SC) members, especially primary members</td>
<td>50</td>
</tr>
<tr>
<td>• Some members in the supply chain are dominant in the business relationship. Lack of trust, communication is limited or formal, and information sharing becomes secretive. This leads to quality problems</td>
<td>40</td>
</tr>
<tr>
<td>• Lack of internal cost efficiency and speed of delivery in the areas: ordering, inventory, marketing, and logistics</td>
<td>40</td>
</tr>
<tr>
<td>• Inadequate distribution channel design and structure i.e. balance of power in contractual relations</td>
<td>30</td>
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<tr>
<td>• Lack of a strong organizational culture committed to SCMI</td>
<td>30</td>
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<tr>
<td>• SC channel members view themselves as a collection of individual companies, not as a holistic system</td>
<td>20</td>
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<tr>
<td>• The supply chain decision makers are usually not near the action i.e. the sales arena. Decisions are based on inaccurate information</td>
<td>20</td>
</tr>
<tr>
<td>• Supply chain process implementation is often hindered by technology overshadowing the human resource and change management aspect</td>
<td>20</td>
</tr>
<tr>
<td>• Trade barriers between countries and government policies</td>
<td>20</td>
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<tr>
<td>• SC channel members do not share the same values</td>
<td>20</td>
</tr>
<tr>
<td>• Company’s suppliers serve their competitors and secret information could be revealed to the wrong party</td>
<td>20</td>
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<tr>
<td>• The flow of data between businesses is often insufficient or recorded on incompatible databases</td>
<td>10</td>
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<tr>
<td>• It is hard to have total control over the third party service provider’s actions</td>
<td>10</td>
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<tr>
<td>• Poor internal communication of company objectives Communication breakdown: lack of effective</td>
<td>10</td>
</tr>
<tr>
<td>• SC channel members fail to realize their contribution to customer satisfaction</td>
<td>10</td>
</tr>
<tr>
<td>• Inadequate technology and lack of an integrated logistics System to support infrastructure requirements and inter-channel commitments</td>
<td>10</td>
</tr>
<tr>
<td>• Under resourced (funding, technology, and personnel)</td>
<td>10</td>
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</tbody>
</table>
### Table 2: Major SCM integration solutions identified in the Forum

<table>
<thead>
<tr>
<th>Nature of solution</th>
<th>Percentage of participants who proposed this solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Two-way communication is needed, and everyone involved in the SCMI must be aware of the structure and processes involved in the SC. Information sharing is important</td>
<td>60</td>
</tr>
<tr>
<td>• Integrating key members of the supply chain requires a holistic approach and adoption from top executives to shop floor members for efficient and effective change</td>
<td>40</td>
</tr>
<tr>
<td>• Form strategic alliances with SC members, and foster an open and honest culture</td>
<td>30</td>
</tr>
<tr>
<td>• Members in the SC would benefit from integrating SCM software systems, using compatible operating systems and hardware</td>
<td>20</td>
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<tr>
<td>• There is a need to have integrated SCM processes, taking into account their impact on the operations of an organization</td>
<td>20</td>
</tr>
<tr>
<td>• There is a need to constantly monitor new technologies and software solutions, and conduct the cost/benefit analysis for the SC. The cost of change management must be examined</td>
<td>20</td>
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<tr>
<td>• There is a need to establish written service level agreements for third party suppliers, and review them on quarterly basis. Also, monthly client surveys must be carried out to monitor their level of professionalism and efficiency</td>
<td>10</td>
</tr>
<tr>
<td>• Relationship management is required to reinforce written service level agreements and company’s strategy</td>
<td>10</td>
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<tr>
<td>• Form strategic alliances where all SC parties can reap the benefits</td>
<td>10</td>
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<tr>
<td>• Develop standards and responsibilities for each SC member, have regular meetings, discuss problems and opportunities, and encourage two-way communication</td>
<td>10</td>
</tr>
<tr>
<td>• Define clear lines of responsibility and performance expectations in the SC</td>
<td>10</td>
</tr>
<tr>
<td>• Emphasize on relationship management, performance measurement, control of processes, and continuous improvement</td>
<td>10</td>
</tr>
<tr>
<td>• An organization must be innovative</td>
<td>10</td>
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