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Mapping the future of supply chain management: a Delphi study

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Supply chain management, a field that developed from business practice and research, is undergoing a major transformation. It is changing from tactical in nature (where the major focus is on cost and delivery) to a field that is strategic in nature. However, the future issues and challenges facing managers and executives are just now becoming understood. This paper reports these issues by drawing on the findings generated by a three-phase study consisting of a literature review, a two-round Delphi study, and a workshop. Unique in this Delphi study is that it brings together leading practitioners in supply chain management with leading supply chain management researchers. The findings show that while the focus of the current tactical supply chain view is relatively limited to issues of delivery, risk, and leadership, the supply chain view of the future (i.e., five years from now) is more complex and demanding. The findings also show that there is generally no difference between researchers and practitioners in terms of how they view the issues. Finally, the study uncovers major obstacles that must be resolved before the strategic potential of future-state supply chains can be realised.

Keywords: supply chain management; Delphi study; strategic supply chain; future of supply chain management

1. Introduction

Supply chain management (SCM) is now a business 'fact of life'. Increasingly, managers, researchers, and educators recognise the importance of effective and efficient SCM and its impact on functional performance (as measured in terms of lead time, cost, quality, and flexibility) and on corporate performance (e.g., Carter and Narasimhan 1996, Carr and Smeltzer 1999, Carr and Pearson 2002, Elmuti 2002, Goebel *et al*. 2003, Ogden *et al*. 2005, Giunipero *et al*. 2006). Our view of the supply chain and how it is managed is changing. In the past, SCM was viewed as a system primarily responsible for placing buys and managing the flow of orders and information with immediate suppliers. Today, supply chain managers are being asked to improve customer service, enhance continuity of supply, reduce the exposure of the firm to unanticipated risks in the supply chain, improve the new product design process, reduce environmental waste, improve

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environmental performance, and contribute to enhanced product and service quality (e.g., Handfield *et al*. 1999, Goebel *et al*. 2003, Sheffi 2005). To achieve these objectives, managers must turn to a new supply chain – a supply chain that is more complex and that continues to evolve.

In this new era of supply chain management, managers and researchers must recognise two inherent features. First, SCM is a field that is rapidly changing. These changes are driven by new technology, greater customer demands, competitive initiatives, and government actions (e.g., Fisher 1997). Second, SCM is a field where the academic literature relative to the experiential knowledge developed by practitioners is comparatively limited (Akkermans *et al*. 2003). More importantly, there is a lag between the time that a significant change in supply chain management takes place and when that change is reported in relevant research outlets. In light of these conditions, it becomes important to assess the impact of these changes both on the firm and on the theory and practice of SCM. That is the goal of this study.

It is important to note that this is not the first study to explore the nature of the future supply chain. Ogden *et al*. (2005), for example, undertook a Delphi study that looked at procurement and supply management strategies that might lead to significant improvements over the next ten years. They examined 80 predictions and through a three-round Delphi study assessed the likelihood and impact of each prediction. Among the high likelihood/high confidence strategies were: increased integration, information sharing, globalisation, and collaboration. Other research institutes have undertaken studies to predict the future of supply chains. MIT's Center for Transportation and Logistics has undertaken a multi-year supply chain study called Supply Chain 2020. Multiple researchers identified organisations involved in successful supply chains and are working with the companies to understand successful supply chain strategies. CAPS Research, A.T. Kearney, and the Institute for Supply Management (ISM) have completed a research study entitled 'Succeeding in a Dynamic World: Supply Management in the Decade Ahead' (Monczka and Markham 2007). They worked with supply management executives to examine future expectations in supply management.

The study presented in this paper looks beyond the supply side of SCM and focuses on the entire supply chain, beginning with the supplier through the firm to the customers and ending with the consumers. It attempts to determine the obstacles or gaps that must be resolved before organisations can hope to transition to the supply chain of the future and to realise the potential benefits offered. It also brings together the perspectives of both expert supply chain practitioners and academics with established research and teaching experience in supply chain management.

To better understand this new strategic supply chain and the factors affecting its use and realisation, a multi-stage study was undertaken to address the following questions:

- What differentiates the current view of supply chain management ('current supply chain') from the supply chain of the future ('future supply chain')?
- What are the gaps/obstacles that are preventing firms and their managers from making the transition from the current to the future supply chain and from realising the potential benefits offered by the future supply chain?
- To what extent is there consensus between academicians and practitioners regarding the preceding issues?

Similar to Ogden *et al*. (2005), the goal of this study is to assist supply chain management practitioners and researchers in developing a better understanding of the

challenges, demands, and factors that are shaping the evolution of supply chain management from today's view to the view of SCM that can be expected five years from now. To address these questions, this study draws on a three-stage research methodology that brings together a comprehensive literature review of the relevant literature to identify potential issues and trends, a multiple round Delphi study, and a focus group workshop to review and extend the findings generated from the Delphi study. Consistent with the admonition made by Gibson *et al*. (2005) that academicians and practitioners need to play an important role in studying issues relevant to SCM, this study brings together leading academic researchers and practitioners who work at firms recognised to be at the 'leading edge' in the theory and practice of supply chain management. By bringing together these two groups and assessing how they react to the issues raised by the Delphi study, the workshop assessed the extent to which there is agreement between the two groups – whether academicians and practitioners see the same supply chain issues in the same way.

These questions and objectives are addressed in the next five sections: (1) a discussion of the transition taking place in supply chain management; (2) the research methodology used in this study (including a literature review, the Delphi study, and practitioner/academic workshop); (3) major findings reported; (4) discussion of the findings; and, (5) limitations and future research avenues.

2. Supply chain management: understanding the transition

Although supply chains have existed since ancient times, supply chain management as both a business development and an academic field of study and research is relatively new (Gibson *et al*. 2005, Storey *et al*. 2006). Its origins can be traced to the work of Forrester (1958) and system dynamics theory and his attempts to understand the product delivery system as a whole and model the system. Follow-on work by Sterman (1989) used the beer distribution game as a prime example of empirically-based, observed managerial behaviour and attributed the bullwhip effect, in addition to other managerial difficulties, to a lack of 'system thinking' by management. Supply chain management appeared as a term in the early 1980s (Oliver and Webber 1982), and since then has rapidly evolved (Lummus and Vokurka 1999). During this evolution, several supply chain management traits have emerged.

First, as a relatively new concept, SCM has been the subject of disagreement regarding what it is and what it is not. One indication of this confusion can be seen in the breadth and variety of definitions offered for this construct. In a recent GOOGLE search (2007) for 'supply chain management definition', some 2,680,000 hits were returned. Some researchers define supply chain management as being synonymous with other functions e.g., Stuart (1997) used supply chain management and purchasing interchangeably. Others have begun to recognise that supply chain management is something broader and believe that it involves more than integration of operations, purchasing, and logistics. They see it involving issues such as strategic partnerships (Storey *et al*. 2006), relationship building and management (Giunipero *et al*. 2006), and concern with all processes from sourcing to manufacture and through selling to the consumer (Davis 1993). As these studies indicate, there is little agreement on what SCM is and what activities fall under its purview. There is also disagreement on what external factors, enablers, and inhibitors

influence the shape of supply chain management, both today and in the future (Storey *et al*. 2006).

In this paper, we view supply chain management as an integrated system that brings together the supply base (the upstream portion including the supply network), the firm, and its customers (the downstream portion including the distributive network). It is a system that involves resources and relationships in order to design and deliver goods and services that provide the target customer(s) with the highest levels of value relative to that provided by the competition. This supply chain system design is not static nor is there one supply chain design for every company. As Aitken *et al*. (2005) describe, there may be a portfolio of different supply chain solutions for different customers and careful analysis is required to determine the design that is appropriate to a particular business strategy.

Over time, the theory and practice of supply chain management has experienced a transition from a tactical to a strategic focus. SCM involves more than simply making a 'better' buy; it affects the ability of the firm to make and maintain a sustainable competitive advantage. Other researchers have summarised the impact of improved relationships, supplier evaluation, globalisation, collaboration, outsourcing, technology, and partnerships on corporate performance (see Ogden *et al*. 2005). The strategic view recognises the need to align the supply chain and its structure with the strategic needs of the firm and avoid the adverse impact of misaligned supply management on corporate performance (e.g., Mehltretter 1996, Lee 2002, Randall *et al*. 2003, Cigolini *et al*. 2004). This evolution is still on-going and the shape and structure of supply chain management in the future has yet to be determined. For managers and researchers, identifying this 'future state' is critical. Actions can be taken now that will influence the ability of the firm to realise the strategic potential in this future state. This point leads to the third trait – the potential difference in perspectives between academicians and practitioners.

This study of supply chain management brings together two different groups – academicians and practitioners. Both groups recognise that supply chain management is an emergent field. For academicians, it is an emergent field of study, where the primary outputs are theory, insights, and research. For practitioners, it is an emergent field of practice where the outputs involve new relationships, new developments, and new practices. While both groups are potentially interested in the same issues, they do not always see these issues in the same way. Storey *et al*. (2006, p. 769) believe their research 'reveals the substantial gaps between theory and practice'. Hayes *et al*. (2005) noted that many of the current skills taught to managers do not work well in the new environment characterised by networks of semi-independent players; relationships between customers, suppliers and the firm; ever-changing processes and networks; emphasis on project management; and collaboration. This discussion raises the issue of whether current researchers understand the new realities facing the supply chain manager. This gap between perceptions has yet to be empirically evaluated.

This review of the development of supply chain management establishes the theoretical foundations for this study. As noted, there is a transition going on from the tactical to the strategic supply chain. Further, the nature of supply chain management is still emerging and has yet to be clearly defined. The resolution of this issue involves academicians and practitioners, who may see these issues very differently. Both perspectives must be considered. Finally, it is not enough to identify the important issues; we also need to identify how priorities change over time.

3. Research methodology

To address the research questions posed at the beginning of this paper, a three-phase research methodology was developed:

Phase 1 – Background work aimed at identifying critical issues pertaining to supply chain management, identifying leading academic researchers and supply chain practitioners from firms considered to be on the leading edge of supply chain management.

Phase 2 – A Delphi study administered to all participants to identify and prioritise the issues facing supply chain managers today, and the issues they expect to face in five years and beyond.

Phase 3 – A workshop held at a major Midwestern university to bring together supply chain experts from both the academic and practitioner domains to discuss, refine, and extend the findings and insights gained from the Delphi study.

The primary focus of this paper is the second phase – the Delphi study. The first phase was used as input to the Delphi study, while the third phase is used to provide closure on the Delphi study.

3.1 *The literature review – identifying the critical issues*

The first stage of the project involved undertaking a literature review of the supply chain management related body of knowledge. In developing this review, literature from both the academic and practitioner fields were examined. The journals selected for this review were the following: *Journal of Operations Management*, *International Journal of Production Research*, *Decision Sciences Journal*, *Harvard Business Review*, *Strategic Management Journal*, *Academy of Management Journal*, *Sloan Management Review*, *California Management Review*, *International Journal of Operations and Production Management*, *Journal of Business Logistics*, *Journal of Supply Chain Management*, and *International Journal of Production Economics*. In addition, a thorough review of relevant information available through the Center for Advanced Purchasing Studies and on the Internet was undertaken.

The review covered a time period from 1998 to 2006. The purpose of the review was four-fold:

(1) To identify major issues and concerns pertaining to the continued evolution and growth of supply chain management (to form the foundation for the Delphi study).
(2) To identify researchers who were active in the study of issues pertaining to supply chain management.
(3) To identify practitioners and consultants who were active in the study and reporting of issues pertaining to supply chain management.
(4) To identify companies that were considered to be at the leading edge of the theory and practice of strategic supply chain management (i.e., where the supply chain played a critical role in helping the firm develop and/or attain its strategic objectives).

The information generated was reviewed by the members of the research team. When no new issues or concerns could be identified from additional review of the literature, it was decided to move to the second stage: the Delphi study.

3.2 *The Delphi study*

The second stage of the project was to administer a Delphi questionnaire to a group of academic researchers and practitioners to obtain a better focus on the issues and concerns of interest. To this end, the beginning of the Delphi phase consisted of two elements: (1) understanding and developing the Delphi; and, (2) identifying the list of academic and industry experts.

3.2.1 *Overview of the Delphi technique*

The Delphi technique is a method used to obtain a reliable consensus of opinion of a group of experts by means of a series of questionnaires combined with controlled feedback (McKenna 1994, p. 1221). As a technique, it is well designed to handle opinions rather than objective facts (Schmidt 1997). A Delphi study is an appropriate research design for structuring a group communication process for allowing individuals to deal with complex problems (Delbecq *et al.* 1975, Akkermans *et al.* 2003). It is appropriate for exploratory theory building (Meredith *et al.* 1989, Akkermans *et al.* 2003) on interdisciplinary issues involving a number of new or future trends (Klassen and Whybark 1994, Akkermans *et al.* 1999). The Delphi study is a widely used technique, having been used in over 1000 published research studies since its introduction during the late 1940s (McKenna 1994). Finally, it has been applied successfully to problems similar to that addressed by this study (e.g., Croom 2000, Schmidt *et al.* 2001, Akkermans *et al.* 2003, Ogden *et al.* 2005, Giunipero *et al.* 2006).

The Delphi technique is appropriate when the research problem does not lend itself to precise analytical techniques but can benefit from subjective judgments on a collective basis and time, cost, and logistics would make frequent meetings of all the subjects unfeasible (Linstone and Turoff 1975). Further characteristics of the Delphi technique can be found in Loughlin and Moore (1979), Whitman (1990), and Chocholik *et al.* (1999).

The Delphi survey (see Appendix 1) was developed by drawing on the findings of the literature review. The initial questionnaire was subjected to thorough pre-testing. It was submitted to 45 executives and managers within the Executive Development Program at Michigan State University who were involved in supply chain management activities. Based on feedback received from these individuals, the initial Delphi survey was revised. The topics selected for the Delphi survey are listed in Table 1. Once revised, the survey instrument was hosted on an internet website controlled by the research team for online participant access.

3.2.2 *Identifying the panel of experts*

Critical to the success of the Delphi is the selection of the panel of experts. The panel selected consisted of both academic supply chain experts and representatives from firms that are acknowledged experts in the practice of supply chain management. To identify these 'experts', the research team drew on a variety of sources including:

- The literature review;
- Lists of leading supply chain firms, such as those published annually by AMR Research www.amrresearch.com/supplychaintop25/);
- Academics/researchers working at North American universities with established supply chain management programmes (e.g., Michigan State University);

Table 1. Major SCM issues included in Delphi survey.

Question	Issue
1	Leadership within the supply chain
2	Power relationships within the supply chain
3	Supply chain disruptions and supply chain risk
4	Rapid redesign of supply chains to meet changing customer needs
5	Identifying and managing channel conflict
6	Governance within the supply chain
7	Managing and structuring relationships within the supply chain
8	Managing and improving environmental performance within the supply chain
9	Developing and implementing strategic segmentation/spend analysis on the supply side
10	Developing and implementing strategic segmentation/spend analysis on the customer side of the supply chain
11	Measuring performance across activities and partners within the supply chain
12	Sharing rewards and financial risk within the supply chain
13	Changing/re-aligning performance measurement across activities and partners within the supply chain
14	Co-locating key stakeholders within the supply chain
15	Managing product innovation by drawing on the capabilities of the supply chain
16	Responding to the 'China Price' syndrome (i.e., a competitor who emphasises and delivers low cost)
17	Managing confidentiality within the supply chain
18	Protecting intellectual property within the supply chain
19	Maintaining visibility and control within the supply chain
20	Maintaining and protecting security within the supply chain
21	Using the resources of the supply chain to identify new and unique solutions to existing and new problems
22	Developing, changing and maintaining the appropriate organisational cultures within the critical partners of the supply chain
23	Developing and maintaining appropriate communication and connectivity within the supply chain
24	Developing trust between supply chain members
25	Implementing appropriate technology to allow seamless exchange of information within the supply chain
26	Managing the timely delivery of goods and services

- Representatives from three supply chain management professional societies; and,
- Consultants involved with supply chain management.

The participants not only had to be recognised and validated as domain experts, they also had to be willing to participate in the third part of the study – the on-site workshop. This process yielded a list consisting of 29 potential participants. These participants received the resulting Delphi survey.

3.2.3 *Administering the Delphi survey*

All items in the Delphi survey were evaluated by the respondents using a five point Likert scale, where '1' denoted that the item was of no/low relevancy, '3' indicated that the item was to be regarded as somewhat important, while '5' denoted that the item was to be regarded as 'critical/essential'. Consistent with the theme of this study, the experts were

requested to assess each trait at two time periods: *importance today* (2006) and *importance five* (5) *years from today* (2011).

Information about the composition of the panels between the two rounds is provided in Table 2. Using a χ^2 test ($\chi^2 = 0.1922$, $\Pr = 0.661$), there was no statistically significant difference detected in the panel composition between rounds 1 and 2.

The first round of the Delphi study ran from 22 May to 9 June, 2006. These were summarised and included as part of the second round of the Delphi (which ran from 15 July to 10 August). The results of the first round can be found in Table 3. The results generated from the second round were collected and summarised for presentation during the first session of the workshop.

3.3 *Analysis of Delphi results*

Before discussing the statistical analysis of the data generated from the two-round Delphi survey, it is important to recognise that this is a small sample data set (as is evident in Table 1). Consequently, this limited the range of statistical tools that could be applied. To analyse the impact of each round on the respondents and the differences between respondents (academic researchers versus supply chain practitioners) on the 26 items in the Delphi study, a series of χ^2 tests were used. For example, the study tested whether there was a difference in the ratings assigned by practitioners between the two rounds. The χ^2 test, being a non-parametric test, is appropriate for use with small samples; the major limitation of this approach is that we cannot test for interaction effects. Significance was assessed at $\alpha = 0.05$.

3.4 *Workshop – bringing integration and closure*

The goal of the third-stage of the research, an on-site workshop, was to bring together the participants to: review the findings of the Delphi study, identify the current and future states of supply chain management, and uncover the major issues and gaps affecting the movement of supply chains between the current and future states. Achieving these objectives required an on-site workshop, since face-to-face discussion and the dynamic interchange of ideas and comments was seen as critical to understanding the differences between perceptions of current and future supply chains and how the gap between the two could be closed. The workshop took place over two days in September 2006. Those participating were also respondents in the two rounds of the Delphi study.

Table 2. Compositions of the Delphi panels.

	Respondents		
Round	Academicians	Practitioners	Total
1	11	13	24
2	11	10	21
Total	22	23	45

Table 3. Delphi results: importance now vs. importance five years from now (sorted by five years from now).

	Round 1 items	Importance now			Importance 5 years from now			
Q	Issue	RD 1 mean	RD 2 mean	R1 to R2 Δ	RD 1 mean	RD 2 mean	R1 to R2 Δ	Δ RD 2 (2006 to 2011)
3	Supply chain disruptions and supply chain risk	**4.25**	**4.29**	0.04	**4.58**	**4.86**	0.28	0.571*
1	Leadership within the supply chain	**4.00**	**4.24**	0.24	**4.38**	**4.72**	0.34	0.571*
26	Managing the timely delivery of goods and services	**4.25**	**4.33**	0.08	**4.58**	**4.57**	−0.01	0.238*
15	Managing product innovation by drawing on the capabilities of the supply chain	3.29	3.48	0.19	**4.33**	**4.52**	0.19	1.048*
25	Implementing appropriate technology to allow seamless exchange of information within the supply chain	3.67	3.76	0.09	**4.46**	**4.48**	0.02	0.714*
24	Developing trust between supply chain members	3.92	3.89	−0.03	**4.42**	**4.40**	−0.02	0.500*
11	Measuring performance across activities and partners within the supply chain	3.58	3.76	0.18	**4.33**	**4.38**	0.05	0.619*
18	Protecting intellectual property within the supply chain	3.75	3.90	0.15	**4.29**	**4.38**	0.09	0.476*
7	Managing and structuring relationships within the supply chain	3.92	3.81	−0.11	**4.20**	**4.33**	0.13	0.524*
2	Power relationships within the supply chain	3.79	3.81	0.02	**4.08**	**4.29**	0.21	0.476*
19	Maintaining visibility and control within the supply chain	3.88	3.95	0.07	**4.29**	**4.29**	0.00	0.333*
13	Changing/re-aligning performance measurement across activities and partners within the supply chain	3.50	3.33	−0.17	**4.08**	**4.19**	0.11	0.857*
20	Maintaining and protecting security within the supply chain	3.63	3.90	0.27	**4.17**	**4.15**	−0.02	0.300*
8	Managing and improving environmental performance within the supply chain	3.13	3.20	0.07	**4.00**	**4.05**	0.05	0.850*
23	Developing and maintaining appropriate communication and connectivity within the supply chain	3.75	3.75	0.00	**4.25**	**4.05**	−0.02	0.316*
21	Using the resources of the supply chain to identify new and unique solutions to existing and new problems	3.17	3.45	0.28	**4.13**	**4.00**	−0.13	0.550*
4	Rapid redesign of supply chains to meet changing customer needs	3.67	3.38	−0.29	**4.21**	3.9	−0.31	0.524*
12	Sharing rewards and financial risk within the supply chain	3.13	3.19	0.06	**4.00**	3.86	−0.14	0.667*
17	Managing confidentiality within the supply chain	3.63	3.62	−0.01	3.83	3.86	0.03	0.238
10	Developing and implementing strategic segmentation/spend analysis on the customer side of the supply chains	3.46	3.38	−0.08	3.96	3.76	−0.20	0.381*

(*continued*)

Table 3. Continued.

Q	Round 1 items: Issue	Importance now: RD 1 mean	RD 2 mean	R1 to R2 Δ	Importance 5 years from now: RD 1 mean	RD 2 mean	R1 to R2 Δ	Δ RD 2 (2006 to 2011)
9	Developing and implementing strategic segmentation/spend analysis on the supply side	3.46	3.71	0.25	3.92	3.67	−0.25	−0.048
22	Developing, changing and maintaining the appropriate organisational cultures within the critical partners of the supply chain	3.29	3.00	−0.29	3.67	3.62	−0.05	0.619*
16	Responding to the 'China Price' syndrome (i.e., a competitor who emphasises and delivers low cost)	3.75	3.81	0.06	3.38	3.52	0.14	−0.286
5	Identifying and managing channel conflict	3.50	3.05	−0.45	3.67	3.43	−0.24	0.381*
6	Governance within the supply chain	3.33	3.38	0.05	3.58	3.38	−0.20	0.000
14	Co-locating key stakeholders within the supply chain	3.00	3.14	0.14	3.25	3.24	−0.01	0.095

Note: '1' = no/low relevancy, '3' = somewhat important, and '5' = critical/essential.
* indicates statistical significance at $\alpha = 0.05$.

4. Study findings

4.1 *Delphi results*

The Delphi study was administered for two rounds. The overall results for these rounds are summarised in Table 3. In reviewing these results, the final column of Table 3 must be explained. Paired t-tests were applied to the difference in Round 2 results (Δ RD2) – between the ratings assigned to the issues as they pertain to today (*importance now*) and as they pertain to *importance five years from now*. Consequently, the result reported for the first row is 0.571. The * indicates that this difference is significant at the 0.05 level. It is interesting to note that out of the 26 issues evaluated by the participants, significant differences between Round 1 (2006) and Round 2 (2011) were observed for 21 (80.8%) issues.

In reviewing this data, it was decided that any issue with an average rating of 4.0 or higher, would be regarded as critical. In Table 3, these 'critical' results are bolded for emphasis. Using this criterion, the data presented in Table 3 paints a picture of increasing supply chain complexity from 2006 to 2011. When viewed in terms of *importance today*, only three issues (Q1, Q3, and Q26) were perceived as critical. The findings for *five years from now* indicate an increase to 16 critical issues. The differences between the current and future supply chains are discussed in greater detail later on in this paper.

To better understand the nature of the changes in views surrounding the current and future supply chains, it was decided to focus on the differences in assessments. These differences are summarised graphically in Figure 1. As can be seen from this figure (in which the differences are arranged in descending order), of the 26 traits explored, positive differences (i.e., the value of the traits was perceived as greater in the future than it is currently) were observed for 23 of the 26 traits. What was interesting was the greatest differences were observed for the following traits:

- Managing product innovation **(Q15)**;
- Changing performance measurement across SC **(Q13)**;
- Managing and improving environmental performance **(Q8)**;
- Using technology to allow info exchange **(Q25)**; and,
- Sharing rewards and risks **(Q12)**.

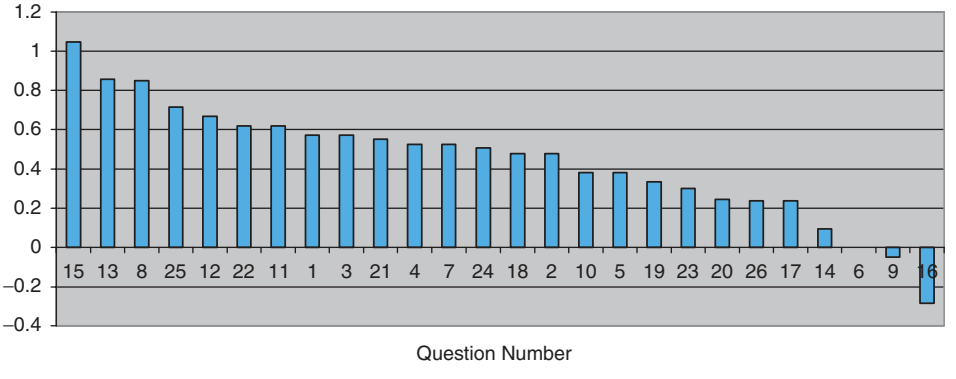

Figure 1. Differences in supply chain traits: 2006 vs. 2011.

4.2 *Practitioners vs. academics ratings*

To determine if the ratings assigned to the 26 supply chain traits were influenced by either the round or the nature of the experts involved, it was decided to use the Pearson χ^2 test. This test, which is appropriate for small samples, is used to assess the independence of two categorical variables. In this study, two sets of categorical variables were assessed: (1) the impact of the round (i.e., for a given respondent, did the ratings significantly change between Rounds 1 and 2 of the Delphi study?), and (2) the type of respondent (i.e., for a given round, were the ratings assigned to a given SC trait significantly influenced by whether we were dealing with a practitioner or an academician?). The results of the various χ^2 tests are summarised in Table 4.

As can be seen, out of the 208 tests, only 13 significant differences were observed (6.25% of the total – the significant results are denoted by *). Of these 13 differences, there were differences between the two groups of respondents for only six traits (Q24 today/Round 1; Q3 and Q19 today/Round 1; Q5 and Q19 Five Years From Now/Round 1; Q22 Five Years From Now/Round 2). In general, the results do not support the assertion noted in the literature review that academicians and practitioners view the same issues differently. This assertion apparently does not apply when contributors are active researchers and practitioners involved in 'leading edge' supply chain systems.

4.3 *Workshop findings – obstacles*

The workshop began by reviewing the descriptive statistical results (Table 3) generated from the Delphi study. The subsequent statistical analysis was not discussed with the participants prior to or during the workshop. The first task addressed by the group of 25 attendees was to review the data and identify any common issues or themes (some of the Delphi respondents were not able to attend the on-site meeting because of other commitments). As a result of this discussion, the participants categorised the issues into six major groups of obstacles: 1. strategic visibility and alignment, 2. talent management and leadership, 3. supply chain models (including optimisation, risk, and cost), 4. process orientation (including measures, information, and integration), 5. relationships and trust, and 6. supply chain architecture and structure.

These groups are important because ultimately they were viewed as the foundation for obstacles inhibiting the current tactical supply chain from transforming itself into the strategic supply chain of the future. This issue will be discussed in greater detail as part of the discussion section. The participants described each of the issues in greater detail:

(1) **Strategic visibility and alignment:** There is a lack of a strategic perspective of the supply chain in many organisations. Senior management does not fully understand the value of the supply chain field, and the benefits that SCM can generate need to be better measured and recognised. In some organisations, a more refined alignment of functional areas such as operations, logistics and supply management needs to take place to fully exploit the value of supply chain management. A true global perspective is needed.
(2) **Talent management and leadership:** There is a shortage of talent management in the field of supply chain management. An insufficient supply of competent, cross-functionally trained supply chain professionals exists. Competency models

Table 4. Delphi study – assessing differences in responses: academics vs. practitioners and Round 1 vs. Round 2.

	SCM today				SCM five years from now			
Q	Practitioner Rnd 1 – Rnd 2	Mgt vs. acad. Round 1	Academics Rnd 1 – Rnd 2	Mgt. vs. acad. Round 2	Practitioner Rnd 1 – Rnd 2	Mgt vs. acad. Round 1	Academics Rnd 1 – Rnd 2	Mgt. vs. acad. Round 2
1	0.667	0.244	0.083	0.146	1.000	0.074	0.117	0.537
2	0.904	0.217	0.189	0.435	0.287	0.494	0.168	0.313
3	0.158	0.476	0.071	0.013*	0.611	0.463	0.044*	0.074
4	0.400	0.275	0.424	0.425	0.377	0.486	0.503	0.732
5	0.016*	0.095	0.275	0.138	0.003*	0.002*	0.546	0.556
6	0.630	0.233	0.234	0.277	0.119	0.228	0.212	0.745
7	0.132	0.468	0.619	0.568	1.000	0.545	0.634	0.620
8	0.745	0.448	0.153	0.590	0.690	0.397	0.198	0.683
9	0.640	0.536	0.410	0.639	0.458	0.118	0.838	0.963
10	0.044*	0.401	0.290	0.050*	0.543	0.095	0.069	0.327
11	0.421	0.171	0.356	0.807	0.201	0.112	0.251	0.389
12	0.372	0.326	0.153	0.543	0.281	0.735	0.400	0.812
13	0.164	0.332	0.448	0.254	0.766	0.657	0.375	0.302
14	0.535	0.075	0.024*	0.332	0.108	0.721	0.436	0.164
15	0.308	0.102	0.309	0.590	0.665	0.123	0.151	0.835
16	0.486	0.430	0.470	0.330	0.607	0.217	0.423	0.754
17	0.468	0.832	0.577	0.793	0.968	0.363	0.483	0.586
18	0.693	0.486	0.719	0.732	0.475	0.341	0.929	0.561
19	0.270	0.262	0.467	0.475	0.107	0.028*	0.118	0.204
20	0.733	0.645	0.393	0.412	0.349	0.432	0.571	0.442
21	0.311	0.057	0.166	0.653	0.630	0.243	0.257	0.143
22	0.543	0.610	0.382	0.801	0.567	0.108	0.667	0.034*
23	0.221	0.445	0.463	0.200	0.593	0.657	0.322	0.308
24	0.018*	0.012*	0.127	0.102	0.269	0.071	0.042*	0.068
25	0.815	0.256	0.110	0.189	0.334	0.358	0.424	0.561
26	0.420	0.284	0.135	0.186	0.334	0.494	0.369	0.230
	3	1	1	2	1	2	2	1

Note: *Indicates statistical significance at $\alpha = 0.05$.

need to be developed to better identify and prepare individuals for key supply chain roles. Global business skills need to be developed as commerce today continues to expand across national borders. A better identification of the required body of knowledge at both the operational (undergraduate) and strategic (graduate) educational levels is needed. There are insufficient ties between educational institutions and industry, and more student and faculty internships would be valuable. Individuals need to advance through supply chain competencies, gaining cross-functional experience to become supply chain leaders.

(3) **Supply chain models including optimisation, risk, and cost:** There are insufficient validated models for supply chain optimisation, risk minimisation, and cost. Organisations are putting the pieces together, but more is needed in the way of defined supply chain models for evaluation and optimisation of the entire chain. Management needs better understanding of the risk drivers and strategic importance of risk management. This includes competitive and natural disaster disruptions as well as better awareness of risk's flip side – opportunity. The opportunity includes not only developing distinctive and sustainable cost advantage but also finding ways to better engage the supply base to drive top-line growth.

(4) **Process orientation including measures, information, and integration:** Supply chain activities are still often functionally-based. A process orientation is needed to fully extract the potential value of supply chain alignment. This requires measurements that cross functional boundaries and information to adequately monitor performance and improvements. Many measures used today are short-term and only used within the company. Inter-firm measures are needed for supply chain activities. Appropriate information is sometimes difficult to extract and there are incompatible IT systems between organisations.

(5) **Relationships and trust:** An integral part of effective supply chain management is development of personal relationships between people, across processes, and across organisations. Internally, this requires an appropriate reward structure and top management support. Externally, the prerequisites are goal congruency, trust, and integrated processes. Trust involves both internal and external supply chain relationships.

(6) **Supply chain architecture and structure:** There is a need for better methodologies of total supply chain network design, including optimisation and real time information and visibility. Value streams need to be mapped for value drivers using defined procedures and prioritisation mechanisms and rules. Tools for automatically mapping numerous supply networks would be useful, as well as the identification of choke points from the aggregation of supply chains.

These groups (categories) of strategic supply chain obstacles were identified by the workshop participants as critical to be overcome if supply chains are to be successful in coming years. While these may be new concepts when applied to supply chains, other researchers (e.g., Parnaby 1994, 2002) previously identified elements in manufacturing which must be integrated to create a competitive business. These results go beyond manufacturing related obstacles to those supply chain obstacles viewed as critical to the practitioner group and repeatedly emphasised during the subsequent workshop discussions.

5. Discussion

5.1 *The changing nature of supply chain management*

The first research question examined what differentiates the current supply chain from the supply chain of the future (i.e., SCM 2011). To address this question, it is necessary to review the findings contained in Table 3. During the workshop, the participants decided that any item that received an average rating of 4.0 or above would be deemed to be critical. This criterion is arbitrary, but is a useful benchmark in identifying the changing nature of supply chain management. Using this criterion, only three issues *today* are critical. In *five years from now*, 16 issues (out of 26) are seen as critical. This implies that dealing with future supply chains will be a more difficult task. There will be more requirements placed on supply chain managers. More importantly, the expectation is that managers will be required to deal with all of these issues simultaneously. As one practitioner stated, 'it will not be this *or* that; it will be this *and* that'. In the future we can expect supply chain managers to focus on designing, implementing and managing supply chains that not only deliver goods and services efficiently and effectively but also to focus on product and process design. They will be expected to do so by involving the entire supply chain (both upstream and downstream) and working together collaboratively with secure and timely information flows between the parties. This is a supply chain where performance measures are aligned to ensure that each party manages its own self-interest while also working to attain the overall objectives of the supply chain. Finally, this is a supply chain where environmental responsibility is more than a desire; it is becoming a mandate. The difference between what is important *now* and what is important *five years from now* illustrates the differences between the *price-driven/strategically-decoupled supply chain of today* and the *value-driven/strategically-coupled supply chain of tomorrow*.

The difference between what is important now and what is important five years from now illustrates the differences between the tactical and the strategic supply chain. The focus of today's supply chain is primarily on maintaining the flow of goods and services through the supply chain. Issues, such as managing supply chain risk, are critical in that they jeopardise this flow. Yet, the future of supply chain management is strategic. It deals with not only execution but also with product design; it is strongly global in nature; it is highly adaptive to changes in both supply and in demand; it focuses on cost avoidance not only cost savings; it recognises the presence of risk (and that risk is more than simply supply chain disruption) and it plans for and manages risk appropriately.

This future supply chain is viewed as a strategic asset and in many cases a core competency. Its focus is on creating systems that encourage and foster collaboration and trust. It evaluates performance along multiple dimensions – lead time, cost, quality, risk exposure, consistency with strategic objectives, and environmental considerations. Ideally, these new capabilities should enable the firm to develop and maintain a sustainable competitive advantage. While the current supply chain has reached the upper limits of its performance potential, this new supply chain has yet to reach its full potential. The transition between these supply chain stages is best summarised in Figure 2.

This figure builds on the work of Stevens (1989) to describe the stages of achieving the strategic integrated supply chain of the future. This future supply chain is linked to and driven by strategy. The goal of this future supply chain is not simply efficiency (doing things for less); it is effectiveness (doing the right things). It has become a strategic asset, not simply a function for storing boxes and moving products. It is a supply chain where

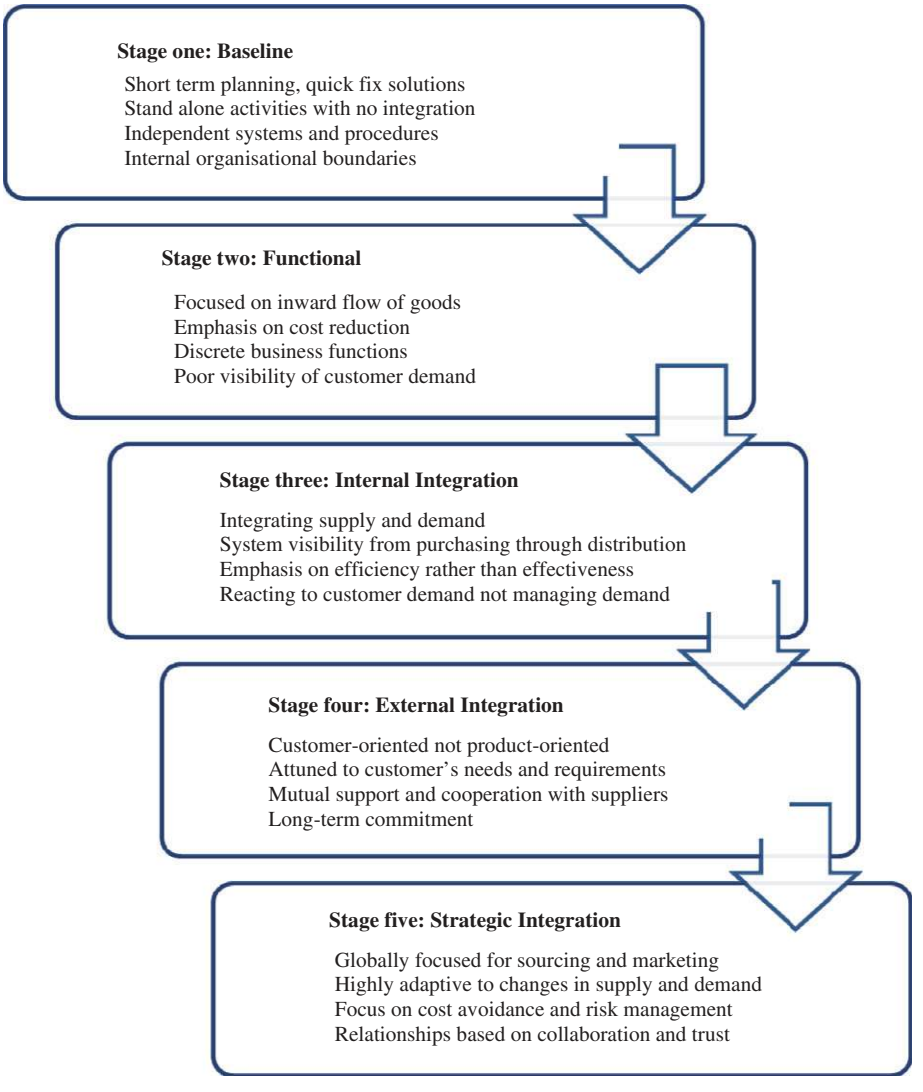

Figure 2. Achieving the strategic integrated supply chain of the future.

managers recognise that supply chain management can be a core competency and where one of the goals is to develop a supply chain where its capabilities support current strategic objective and enable the firm to better serve its critical customers.

The challenges facing supply chain managers, researchers, and educators as they evolve to the strategic integrated supply chain of the future are significant. One of the major paradoxes they face is that while there is a pressing need for strategic supply chain leaders who understand the importance of the supply chain as a strategic asset and who can demonstrate this capability to both top management and to the marketplace, both groups are best acquainted with tactical supply chain management. The current supply chain education system is best suited to teaching the functional skills of buying, selling, scheduling, and transportation associated with tactical supply chain management.

Today's supply chain managers recognise the need for cost avoidance but know they are judged on cost savings. The result is that while cost avoidance encourages managers to design their supply chains 'right', the reward and measurement system inadvertently provides an incentive for these managers to worry less about design and focus on improving the supply chain over time to do well on the metrics.

One issue that was identified in the Delphi study and extensively discussed during the workshop involved the increasing importance of both product and process innovation. Not only was product innovation considered the fourth most important issue, many of the other critical issues (such as protecting intellectual property, developing trust, maintaining and protecting security within the supply chain, and changing/re-aligning performance measures across activities and partners) could be viewed as providing conditions that facilitate or encourage innovation. Innovation was perceived as being the next 'frontier' in supply chain management. That is, the emphasis is shifting from cost minimisation and product delivery to generating value through designing and delivering products and services that satisfy new and emerging demands (e.g., latent demand as discussed in Earl and Potts (2000)). Companies such as Proctor & Gamble and Apple are viewed as masters at using the supply chain to enable them to compete on product innovation.

5.2 *Potential obstacles to strategic supply chains*

The second research question examined the gaps/obstacles that are preventing firms and their managers from making the transition from the current to the future supply chain and from realising the potential benefits offered by the future supply chain. As previously noted, during the workshop phase of the study six major obstacles were identified regarding transforming the tactical supply chain perspective into the strategic supply chain perspective: strategic visibility and alignment, talent management and leadership, supply chain models, process orientation, relationships and trust, and supply chain architecture and structure.

These six obstacles were further detailed in subsets of the major gaps. One of these subsets involves *strategic supply chain investment and improvements*. Specifically, the participants noted that management has to make significant investments in improving the supply chain if the potential of strategic SCM is to be realised. These investments are not simply in 'brick and mortar', but are investments in performance measurement systems, and linkages between supply chain design and management and the overall business plan. Monies must be spent on developing supply chain advocates and champions at the upper levels of corporate management who can shift the perspective of the supply chain from short term to long term.

Another subset identified under talent management and leadership includes *acquiring and developing exemplary supply chain talent and leaders*. Currently, there is a lack of a strategic supply chain perspective or orientation. Many organisations are faced with the problem of trying to determine where supply chain personnel fit within the organisational structure. All of these lead to a need to better identify and nurture talent in organisations to provide the supply chain leadership necessary for future success. Talent management and leadership are fundamental for transitioning supply chains to a more strategic focus. Leadership is necessary to focus the attention on these issues within the corporate structure to bring to bear the resources required to progress beyond these obstacles.

Consequently, there is a need to develop competency models for the types of talent that is needed now and into the future. Previous talent needs were more functional in nature, requiring training in a specific discipline. Supply chain employees are needed who are more generalists and can integrate with various disciplines. Today, there is a lack of sufficient supply chain graduates, and demand outstrips supply. There are insufficient ties between industry and educational institutions to foster the development of talent. Finally, there is a dearth of student and faculty internships to provide a training ground and experience base. There are too few students who understand strategic supply chain management and there are far too few faculties who can teach strategic supply chain management.

A third subset affecting the implementation of a strategic supply chain concerns is the lack of appropriate and meaningful *supply network measures*. Performance measures are critical within the firm since they form the communication and feedback system. Metrics communicate to top management the impact that systems such as the supply chain have on achieving overall financial and strategic objectives. Metrics are used to translate overall strategic objectives into operational terms (i.e., what a stockroom clerk has to do well for the firm to achieve its corporate objectives). If implemented correctly between supply chain partners, metrics facilitate the coordination of actions between partners. Supply chains should be managed through a process orientation with appropriate measures. Further work is needed on supply chain measures including: developing an understanding of what are the right measures, making information accessible, overcoming incompatible information technology systems, developing analysis tools that transform data into information, developing longer term measures, and designing and coordinating inter-firm measures.

Although supply chain measures are needed across the supply chain, they also must be linked to single firm financial and operational measures. The workshop participants expressed frustration with current supply chain metrics. Often, these metrics only evaluate the impact of the supply chain on the cost savings incurred by the firm. This approach emphasises cost savings at the expense of cost avoidance; it emphasises short-term gains at the expense of potentially higher long-term gains. It also contributes to a situation where it is acceptable for the firm to do better, but at the expense of its supply chain partners.

5.3 *Differences between academicians and practitioners perspectives*

The last research question examined the extent to which there is consensus between academicians and practitioners regarding the preceding issues. The literature review suggests a strong perception that there is a gap between theory and practice, as well as between the views of academicians and practitioners on supply chain management. The analysis of the Delphi data indicates that this is not the case as the responses given by the two groups were consistent. This finding can be accepted and understood given the nature of the academic participants. The academic researchers that were part of the Delphi study panel and the subsequent workshop were selected because they had demonstrated an active interest in researching and publishing articles pertaining to supply chain management. As supply chain management is a relatively new field of study and was pioneered primarily by practitioners, it can be argued that any researcher working in this area must 'be involved in actual supply chain operations'. Thus researchers receive first-hand exposure to the same issues and concerns facing practitioners. These researchers also use the case study/field study methodology and teach executive courses which expose them to

various practitioner issues. Consequently, it would not be unusual that, over time, these researchers develop a view of the issues that is shared with practitioners.

5.4 *Limitations and future research directions*

In reviewing the findings presented in this paper, it is important to recognise the limitations present in the study. First and foremost, there is the issue of the small sample size. By the very nature of the Delphi methodology, a small sample size of experts (i.e., $n < 30$) is typically used. Second, is the issue of how the practitioners and academics were selected to attend the workshop. An attempt was made to have broad participation in the types of industries represented. However, with a limited number of practitioners, some claim could be made that the group is not representative of all industries. Although some of the participants had broad geographical responsibilities, the same concern could be expressed regarding geographical coverage. And, although leading supply chain academics participated in the workshop, the breadth of academics could also be challenged.

Addressing this limitation uncovers some important directions for future research. First, the issue of having more representative samples needs to be addressed in future studies. This can be done along a number of different dimensions including: size, geographic focus, industry, and supply chain focus. To overcome the size concern, the protocol presented in this study can be replicated with different groups to increase the sample size. The geographic focus concern stems from the fact that the insights gained and reported within this paper are strongly influenced by the North American location of the experts. Some very different responses could have been gained had the study been carried out in another location such as Europe, South America, China, India, or South Africa. By replicating this study in these different settings, the research would identify those issues that are globally important and those issues that are important to managers working in specific geographic locations. The results may also have been impacted due to the specific industries of the practitioner expert companies. Again, the perspectives provided could be different had the participants been drawn from specific industries such as energy, petrochemical, automotive, consumer goods, and military/defence. Each industry brings with it its own specific challenges with supply chain management and the development/evolution of the supply chain. Finally, when examining the industrial participants in this study, it is important to note that many of them came from large firms. Different insights could have been gained had the participants been drawn primarily from market-oriented firms or from smaller firms. Again, it may be fruitful to replicate the study with experts drawn from smaller firms or from the market side, such as retail firms. Replicating the study along any one of these dimensions would greatly enhance the generalisation ability of the results.

A second important direction for future research deals with the group of issues, previously identified, that must be addressed before the potential of the future supply chain can be realised. Each of the six categories discussed in this paper could be the basis of further research studies. Further research into areas such as environmental performance and the supply chain, the role of supply chain design and redesign in improving competitiveness, the role of the supply chain in product/process/supply chain innovation, and realigning performance measures across the supply chain are needed. Based on the

reactions of the industrial participants in the workshop, such studies would not only be of interest academically but also in strong demand by industry. These areas mark a nexus where academic, educational, and industrial needs have meet; it is a window of opportunity.

6. Concluding comments

The field of supply chain management is indeed changing. Today's supply chain is evolving from one that is fundamentally order-oriented, cost-driven and execution-focused to one that is strategically-focused, design-oriented, dynamic, and driven by customer objectives. There are critical issues that firms and managers need to face in the coming years to realise the operational and financial performance improvements possible by transitioning to a more strategic approach to supply chain management. This research used a Delphi study as a mechanism to identify the most critical issues facing supply chain managers five years from now and beyond. The results of the study showed these five issues to be most important in the future:

(1) Supply chain disruptions and supply chain risk
(2) Leadership within the supply chain
(3) Managing the timely delivery of goods and services
(4) Managing product innovation by drawing on the capabilities of the supply chain
(5) Implementing appropriate technology to allow seamless exchange of information within the supply chain

In the second phase of the project, a workshop was held at Michigan State University bringing together experts in supply chain management from industry and academia. The group identified six strategic initiatives that should be focused on to close the gap between current capabilities and future requirements. Those organisations that are best at closing the gap will have a competitive advantage. Those who have not prepared for the future will face unacceptable risk and higher total cost. The difference between what is important *now* and what is important *five years from now* illustrates the differences between the *price-driven/strategically-decoupled supply chain of today* and the *value-driven/strategically-coupled supply chain of tomorrow*.

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Appendix 1. Delphi form, Round 1

SCM 2011 AND BEYOND
IDENTIFYING THE FUTURE DIRECTIONS OF
STRATEGIC SUPPLY CHAIN MANAGEMENT

Overview

First of all, thank you again for participating in this first round of the Delphi Study on Strategic Supply Chain Management. After you have finished reading this introduction, you will be directed to the Delphi Study itself. Please remember that you are being asked for your assessment – there is

no right or wrong answer. Rather, there is only your answer. Please complete all portions. It is also important that you provide any comments or insights that you feel are appropriate in responding to the questions. When you have completed the survey, the results will be reviewed by the project leaders and returned to you in summarized form for the second round of the study.

From the time that this document has been sent out (May 22, 2006), you will have until June 9th to complete it. Should you have any questions, please feel free to contact xxxxxxxxxx. As always, all contributions will be anonymous in the summarized returns.

We look forward to receiving your responses.

SCM 2011 AND BEYOND
IDENTIFYING THE FUTURE DIRECTIONS OF
STRATEGIC SUPPLY CHAIN MANAGEMENT

Part One

The following section is necessary to establish the demographics of the respondents.

1. Select from the following list the one that best describes your current employment?

   a. Self-employed: _____
   b. Government Employee: _____
   c. Business Employee: _____
      Please identify the industry: _____
   d. University/College Faculty _____
   e. Other (Please describe): _____

2. What is your current job title?_____

3. How long have you been in your current position? _____ years.

4. How long have you been involved with supply chain management? _____ years.

Part Two: Defining Strategic Supply Chain Management

For the following section, please review and comment on the following definitions of (1) a supply chain, (2) supply chain management and (3) strategic supply chain management using the following scale:

1	2	3	4	5
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

1. Supply Chain:

A supply chain is defined by the entire network of organizations and activities involved in (1) designing a set of products or services and related processes, (2) acquiring and converting inputs into these products or services, (3) distributing and consuming these products or services, and, (4) disposing of these products or services.

Do you agree with this definition? 1 2 3 4 5

What changes would you make?

_____

2. Supply Chain Management

Supply Chain Management is the management of relationships, materials and flows that connect the parties and activities in a supply chain.

Do you agree with this definition? 1 2 3 4 5

What changes would you make?

_____

3. Strategic Supply Chain Management:

Strategic supply chain management involves the decisions that shape the long-term capabilities of the company's supply chain functions and their contribution to overall strategy through the on-going reconciliation of market requirements and supply chain resources …"

Do you agree with this definition? 1 2 3 4 5

What changes would you make?

_____

Part Three: Assessing the Importance of Supply Chain Trends and Developments

For each of the following issues, evaluate their importance in managing supply chains TODAY and FIVE YEARS FROM NOW. Please use the following scale:

1	2	3	4	5
Irrelevant	Minimal Importance	Some Importance	Important	Critical

Issue	***Importance NOW***					***Importance 5 years from now***				
Leadership within the supply chain	1	2	3	4	5	1	2	3	4	5
Power relationships within the supply chain	1	2	3	4	5	1	2	3	4	5
Supply chain disruptions and supply chain risk	1	2	3	4	5	1	2	3	4	5
Rapid redesign of supply chains to meet changing customer needs	1	2	3	4	5	1	2	3	4	5
Identifying and managing channel conflict	1	2	3	4	5	1	2	3	4	5
Governance within the supply chain	1	2	3	4	5	1	2	3	4	5
Managing and structuring relationships within the supply chain	1	2	3	4	5	1	2	3	4	5
Managing and improving environmental performance within the supply chain	1	2	3	4	5	1	2	3	4	5
Developing and implementing Strategic Segmentation/spend analysis on the supply side	1	2	3	4	5	1	2	3	4	5

Developing and implementing Strategic Segmentation/spend analysis on the customer side of the supply chain	1	2	3	4	5	1	2	3	4	5
Measuring performance across activities and partners within the supply chain	1	2	3	4	5	1	2	3	4	5
Sharing rewards and financial risk within the supply chain	1	2	3	4	5	1	2	3	4	5
Changing/re-aligning performance measurement across activities and partners within the supply chain	1	2	3	4	5	1	2	3	4	5
Co-locating key stakeholders within the supply chain	1	2	3	4	5	1	2	3	4	5
Managing product innovation by drawing on the capabilities of the supply chain	1	2	3	4	5	1	2	3	4	5
Responding to the "China Price" syndrome (i.e., a competitor who emphasizes and delivers low cost)	1	2	3	4	5	1	2	3	4	5
Managing confidentiality within the supply chain	1	2	3	4	5	1	2	3	4	5
Protecting intellectual property within the supply chain	1	2	3	4	5	1	2	3	4	5
Maintaining visibility and control within the supply chain	1	2	3	4	5	1	2	3	4	5
Maintaining and protecting security within the supply chain	1	2	3	4	5	1	2	3	4	5
Using the resources of the supply chain to identify new and unique solutions to existing and new problems	1	2	3	4	5	1	2	3	4	5
Developing, changing and maintaining the appropriate organizational cultures within the critical partners of the supply chain	1	2	3	4	5	1	2	3	4	5
Developing and maintaining appropriate communication and connectivity within the supply chain:	1	2	3	4	5	1	2	3	4	5
Developing trust between supply chain members	1	2	3	4	5	1	2	3	4	5
Implementing appropriate technology to allow seamless exchange of information within the supply chain	1	2	3	4	5	1	2	3	4	5
Managing the timely delivery of goods and services	1	2	3	4	5	1	2	3	4	5

Identify any other issues that are critical in supply chain management TODAY, but have not been included in the list above.

1.
2.
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6.

Identify any other issues that will be critical FIVE YEARS FROM NOW in supply chain management but have not been in included in the list above.

1.
2.
3.
4.
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6.

Please return the completed form to: