

A Survey of Supply Chain Management Practice in New Zealand

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Abstract

Supply chain management (SCM) is a new concept involving the integration of all the value-creating elements in the supply, manufacturing, and distribution processes, from raw material extraction, through the transformation process, to end user consumption. The purpose of this paper is to explore the SCM activities carried out by manufacturing organisations in New Zealand. A postal survey was carried out to identify the status of SCM in New Zealand, and determine the issues in SCM that are significant for New Zealand manufacturers. The paper presents preliminary findings from this study.

1 Introduction

Supply chain management (SCM) is a new concept involving the integration of all the value-creating elements in the supply, manufacturing, and distribution processes, from raw material extraction, through the transformation process, to end user consumption. SCM activities are motivated by the ideals of customer service, compression of lead time, and inventory reduction. SCM is facilitated greatly by the latest in communication technologies, such as the electronic data interchange (EDI) and the internet. This permits quick communication of end-consumer demand to the upstream stages of the supply chain.

Numerous articles have been published in the research literature advocating the principles of supply chain management [3, 15, 16, 17, 21]. Many case studies [2, 5, 9, 10, 14, 18] have been published, evidencing the benefits of SCM. The question arises as to how much of this message has reached the practitioners. The research described in this article was carried out to assess the adoption of SCM practices in New Zealand. A

brief literature review is presented in the next section. This is followed by preliminary findings of the study. In the final section some concluding remarks are presented.

2 Literature Review

New and Payne [19] have described an empirical study investigating the power interplay in supply chain partnerships. They found that the relationships were asymmetrical, depending on whether it was with upstream or downstream organisations. Watts and Hahn [22] reported on a survey carried out to assess the extent and success of supplier development programs. They found these programs to be broad in scope and quite prevalent (63%), specially among the larger firms surveyed. The aim of these programs was more to improve the purchased products than to improve the capability of the supplier. Krause [12] carried out a survey of firms on the extent of supplier development activities and on the benefits accrued from the activities. The responding firms participated more often in limited involvement such as supplier evaluation and feedback, site visits, requests from improved performance, and promises of increased present or future business, than in extensive involvement such as training/education of suppliers' personnel or investment in suppliers' operations. While the supplier development efforts were generally fruitful, the buying firms were not very satisfied with the results. From this study, Krause [12] suggested a three-pronged approach of competition, business incentives, and direct involvement in supplier's operations.

Galt and Dale [8] studied ten organisations in the U.K., and found that they were working to reduce their supplier base, and to improve their communications with the suppliers urgently. Fernie [7] carried out an international comparison of supply chain management in grocery retailing industries. He found significant differences in inventory held in the supply chain by the U.S. and European grocery retailers, which could be explained by their SCM adoption. In a similar vein, Tan *et al.* [20] sought a relationship between firms' SCM practice and their performance. They were able to show positive and significant correlation between certain SCM practices and performances of their respondent firms. Kwan [13] investigated the use of information technology (IT) in SCM in Singapore electronics and chemical industries, and found that the top two SCM strategies were: 1) to position logistics as one of the core competencies within the company, 2) to produce to demand rather than to forecast. The top barrier to the use of IT was a lack of education and training.

Even though there is plenty of published literature that explains or preaches supply chain management, there is a relative lack of empirical studies examining SCM practices and their effects. To our knowledge, there is no published study of supply chain management practice in New Zealand. However, previous studies [1] have found that New Zealand manufacturers were generally lagging behind in the application of new concepts in manufacturing. Corbett and Bayly [6] surveyed just-in-time (JIT) implementers in New Zealand to determine the perceived benefits, success factors, and problems related to JIT implementation. The respondents did not find JIT implementation suitable for all manufacturing operations, specially where overseas suppliers were involved. Hyde *et al.* [11] concluded from their survey of New Zealand manufacturers that the prevalence of world class manufacturing practice was low, although some exceptions existed. The low educational levels of the work force and their supervisors, and the isolation of New Zealand were seen as formidable barriers to the diffusion of world class practices in manufacturing. From these studies, the

prevalence of supply chain management in New Zealand is not very promising, but it is certainly of interest to examine how well New Zealand firms are doing in this area.

3 Survey

The primary goal of the research reported in this paper was to benchmark supply chain management practices in New Zealand. A survey methodology was adopted.

3.1 The Respondents

A survey questionnaire was sent in May 1999 to the 627 largest New Zealand manufacturing organisations drawn from a commercial database (KOMPASS), with a request to forward it to the person in charge of logistics in that organisation. Eventually 69 usable responses were received (11% response rate). Almost half (48%) of the respondents were regional/national business operations competing primarily in New Zealand. Global business operations competing world wide constituted 45% of the sample. The remainder (4%) were local/city business operations competing among only local businesses. In terms of their position in the supply chain, the distribution of the respondents is given in Table 1. The proportion of the respondents professing to practice some form of supply chain management was 90%. These respondents reported including the following components of the supply chain in their SCM activities as given in Table 2. The highest proportion is involved with final products manufacturers. Consistent with the largest group of the respondents (final product manufacturing), most of our respondents are involved in supply chain activities immediately upstream or downstream of their position in supply chain. Very few of the respondents are involved in recycling.

Table 1. Supply chain positioning of the respondents

Position in the supply chain	Percentage
Raw Material Manufacturing	7%
Component Manufacturing	9%
Final Product Manufacturing	55%
Distribution	26%

Table 2. Supply chain management activities of the respondents

Supply chain components	Percentage
Final products manufacturers	87%
Physical distribution	81%
Wholesalers	71%
Component manufacturers	65%
Retailers	60%
Raw material manufacturers	48%
Final consumers	37%
Recycling	18%
Miners/raw material extractors	15%
Extraction from the Earth	5%

4 Survey Findings

The respondents used a Likert scale (1 = Low, 5 = High) to evaluate most of the items in the survey. The average of the responses is presented in the discussions below.

4.1 Corporate strategy and supply chain management issues

The respondents were presented with 25 issues in supply chain management activities, and asked to evaluate their importance. The top ten issues identified by the respondents are given in Table 3. It appears that time compression and interfirm communications aspects of SCM are of the most importance to the respondents.

Table 3. Top ten issues in supply chain management activities

Supply chain management issue	Average importance rating
On-time delivery of the firm's products directly to the customers' points of use	4.70
On-time delivery of the purchased materials directly to the firm's points of use	4.56
Determining customers' future needs	4.53
Increasing the firm's Just-In-Time (JIT) capabilities	4.03
Improving the integration of activities across the supply chain	4.03
Contacting the end users of own products to get feedback on performance and customer service	3.95
Reducing response time across the supply chain	3.94
Establishing more frequent contact with members of own supply chain	3.92
Creating a greater level of trust among the supply chain members	3.89
Communicating the firm's future strategic needs to the suppliers	3.87

The seven issues of the lowest importance are presented in Table 4. Obviously, there is not much desire to relocate in order to facilitate supply chain management. Supply chain management efforts also appear limited to the immediately close members of the supply chain.

Table 4. Issues of least importance in supply chain management activities

Supply chain management issue	Average importance rating
Requiring suppliers to locate closer to own firm	1.75
Use of a third-party supply chain management specialist	1.95
Locating closer to own customers	2.27
Extending own supply chain to include members beyond immediate suppliers and customers	2.56
Creating supply chain management teams that include members from different companies	2.68
Participating in the sourcing decisions of own suppliers	2.76
Involving all members of own firm's supply chain in own product/service/marketing plans	3.16

Table 5 shows respondents' perception of the barriers to achieving the full potential or benefit of SCM in the respondent's firms. As can be expected, New Zealand's isolation from the rest of the world is seen as the top barrier in attaining supply chain management.

Table 5. Issues hindering supply chain management

Hindrance to Supply chain management	Average importance rating
Suppliers' geographical distance from firm's facilities	3.02
Lack of sophisticated information system for information sharing among supply chain members	2.98
Lack of ability in managing inventories throughout the entire supply chain	2.89
Firm's lack of leverage within the supply chain	2.72
Lack of trust among supply chain member	2.67
Lack of cooperation among supply chain members	2.56
Lack of interest among own suppliers or customers to participate in the supply chain	2.53
Competition from other supply chains	2.47
Customers' geographical distance from own facilities	2.38

4.2 Supply/Materials management issues

The percentage of the respondents who outsource primary materials, components, sub-assemblies and services is 52%. In average, there has been a 13% increase in outsourcing activities in the last three years. Similarly, the percentage of respondents involved in outsourcing of maintenance, repair and operating supplies (MRO) stands at 42%, with only a 9% increase in the last three years. Outsourcing does not seem to have taken hold yet in New Zealand.

52% of the respondents had a partnership or strategic alliance with their suppliers, and these respondents reported an average of 41% increase in the number of strategic alliance programmes in the last 3 years. The percentage of respondents with a supplier certification programme is 49%: 10% certifying the suppliers' products, 1% certifying the processes, and 38% certifying both the products and the processes. In certifying the suppliers, the suppliers' own self-certification was used by 7% of the respondents, ISO 9000 quality standards were used by 34%, and 27% of the respondents used their firms' own in-house certification programme. The top ten issues identified by the respondents in assuring that their suppliers' products and services conform to the specifications are given in Table 6.

Table 6. Top ten requirements for suppliers

Supplier conformance issue	Average importance rating
Compliance with all requirements of the purchasing firm	4.31
Investigating causes of non-conformance & taking corrective actions	4.29
Ensuring that the suppliers' purchased product and materials conform to their specifications	4.09
Ensuring that their quality policy is understood, implemented and maintained	4.01
Maintenance of adequate records of all inspections & tests performed	4.0
Ensuring that crucial processes are carried out under controlled conditions	3.91
Maintaining procedures to control & verify design of the product	3.85
Maintaining adequate gauging and testing devices for inspection and testing	3.82
Establishing and documenting their quality system	3.63
Providing their personnel with written inspection & testing instructions	3.49

The respondents evaluated 30 factors for their importance in the selection of a key/distinguished supplier. The top ten factors and their average importance rating is given in Table 7.

Table 7. Top ten factors in the selection of key suppliers

Supplier selection issue	Average importance rating
Ability to meet delivery due dates	4.70
Commitment to quality	4.68
Technical expertise	4.30
Price of materials, parts and services	4.30
Honest and frequent communications	4.16
Industry knowledge	4.15
Commitment to continuous improvement in product and process	4.09
Ethical standards	4.04
Financial stability and staying power	3.99
Supplier has strategic importance to the firm	3.95

4.3 Internal operations

Eighty one percent of the correspondents had specific written quality plans and policies, with 54% being ISO 9000 certified. Nine percent had ISO 14000 (Environmental Management Standards) certification. None of the respondents were using process capability index (C_{pk}) for quality assurance. The average importance ratings of eight product design and development issues for the respondents is shown in Table 8. Obviously the respondents are indifferent to the latest product design and development techniques, including early supplier involvement.

Table 8. Average rating of product design issues

Product design and development issue	Average importance rating
Use of quick product development and introduction time	3.32
Standardisation of component parts (trying to use more standard parts)	3.18
Early Supplier Involvement (in your firm's design efforts)	3.00
Simplification of component parts (trying to use fewer parts)	2.82
Use of Value Analysis/Value Engineering (deleting product parts and materials which don't add value to the product)	2.76
Use of concurrent engineering (concurrent design of prod./process)	2.72
The use of Quality Function Deployment (the House of Quality model)	2.50
Modular design of parts (for use in multiple product applications)	2.46

Table 9 displays the importance placed by the respondents on just-in-time principles. The supplier-related principles are relegated to the bottom of the list.

Table 9. Importance of just-in-time principles

JIT principle	Average importance rating
Reducing inventory, which in turn frees up capital investment	4.41
Reducing setup time	3.73
Increasing delivery frequencies	3.52
Reducing lot size	3.46
Preventive maintenance	3.44
Reducing inventory to expose manufacturing and scheduling problems	3.35
Reducing supplier base	3.29
Buying from JIT suppliers	3.17

The more technical quality assurance techniques, such as statistical process control and modular design of the products are not used much by New Zealand firms, as evidenced in Table 10.

Table 10. Importance of quality practices

Quality practice	Average importance rating
Process improvement (modification of process)	4.16
Top management communication of quality goals to the organisation	4.09
Designing quality into the product	4.00
Emphasis on quality instead of price in the supplier selection process	3.92
Employee training in quality management and control	3.91
Empowerment of shop operators to correct quality problems	3.91
Inspection	3.88
Using benchmark data	3.47
Considering manufacturability and assembly in product design	3.13
Statistical process control	3.12
Using standard component parts	3.08
Simplifying the product	3.00
Modular design of component parts	2.51

When it comes to their own relationship with customers, our respondents' importance rating of the top ten (out of 24) issues is as given in Table 11. Traditional concepts of delivery, quality, and customer handling are given the top billing.

Table 11. Importance of top ten customer service issues

Customer service issue	Average importance rating
The firm's ability to meet delivery due dates	4.83
Quality of the products and services	4.70
Successful resolution of customer complaints	4.58
Honest and frequent communications	4.41
Being flexible to meet the customers' changing needs	4.39
The firm's ethical standards	4.38
Making it easier for customers to seek assistance	4.30
Determination of future customer expectations	4.16
Understanding how the customers use products and services	4.12
Employing routine follow-up procedures for customer inquiries or complaints	4.12

Table 12 presents the five customer service issues perceived as the least important by the respondents. The ideas in this list are often strongly advocated by supply chain management pundits, but clearly they have not received sympathetic hearing in New Zealand.

Table 12. Least important customer service issues

Customer service issue	Average importance rating
ISO 9000 certification	2.51
The firm's geographical proximity to own supplier's facility	2.72
Use of Electronic Data Interchange (EDI) communications	2.79
Sharing of confidential information	2.82
Entering into long term contract arrangements	3.48

5 Conclusion

The proportion of the respondents in our survey professing to practice some form of supply chain management was quite high (90%), chiefly, it seems, with a view to improve on-time delivery. Information sharing with the suppliers, relocating closer to suppliers/customers, or involving all members of own firm's supply chain in product/service/marketing plans does not seem to be high on the agenda. As could be expected, the geographical isolation of New Zealand is seen as the greatest barrier to SCM implementation.

About half the respondents reported using outsourcing, strategic alliance with suppliers, or supplier certification programmes. Statistical quality control is not practised very much by the respondents, and is not a high requirement for the suppliers. In selecting suppliers, delivery and quality were high on the list of criteria, but their willingness or ability to follow SCM practices were not very high on the list.

It appears from this survey that New Zealand manufacturers are following many of the SCM concepts, chiefly where it impacts the ability to meet delivery dates. But 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.

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