ISSN 1816-6075 (Print), 1818-0523 (Online)
Journal of System and Management Sciences
Vol. 1 (2011) No. 1, pp. 1-17

An empirical examination of global supply chain management practices in U.S. textile and apparel industry

Jin Su[1], Vidyaranya B. Gargeya[2]

[1] Department of Human Development and Environmental Studies, Indiana University of Pennsylvania, Indiana, PA 15705, USA

[2] Department of Information Systems and Operations Management, University of North Carolina at Greensboro, Greensboro, NC 27402, USA

jinsu96@gmail.com, sinbazhu@163.com

Abstract: The increasing level of firm competition and changes in business management functions in the dynamic business environment appear to have created the opportunity and necessity for implementing global supply chain management. This study provides an empirical investigation of global supply chain management practices of the firms in the U.S. textile and apparel industry. The results demonstrate the changing supply market, the need for supplier evaluation systems, supplier selection practices, and the effects of supplier selection practices on buyer firm's competitive position. Survey results show overall supplier evaluation systems and supplier selection based on communication and product quality, supplier capability, strategic consideration, and the ability to meet buyer firm's need positively impact buyer firm's competitiveness in the marketplace. Implications and directions for future research are provided based on the results.

Keywords: Global Supply Chain Management, Survey, Textile and Apparel Industry, U.S.

1. Introduction

The global market, fueled by the explosion of new products and new technologies, especially the revolution in transportation and information technology has permitted manufacturers and retailers alike to establish international production and trade networks that cover vast geographical distances (Gereffi, 1999).

As markets for products and services become global, international competition becomes more intense. Companies and industries face these competitive realities worldwide. To successfully compete, firms must meet or exceed the pace of rapidly changing technology while also lowering costs, increasing quality, and improving customer service at all stages of the value chain.

The textile and apparel supply chain is global and complex. The intricate nature of the sector is reflected in the numerous steps in the chain, the diversity of activities, the fragmentation of the market, and the varying product and quality specifications being managed. Success in the marketplace requires firms to find suppliers who can produce quality products at a low cost in a timely manner. Globalization brought about more challenges for the U.S. firms in the textile and apparel industry with having more and more off-shore suppliers involved in the U.S. textile and apparel supply chain. Quick response for the U.S. textile-apparel-retail supply chain combines technology and collaboration in the network, which in turn creates requirements for vendors and increases the need to manage suppliers in a strategic way.

Supply chain integration and management has been receiving a great deal of attention from researchers and practitioners alike. Supply chain management (SCM) has been viewed as a viable initiative to enhance sustainable competitive advantage under the increased national and international competition.

The increasing interdependency of the textile-apparel-retail supply network to achieve innovation, efficiency, flexibility, and high quality will support stronger strategic approaches which emphasize stronger partnership-based alliances rather than the traditional adversary-based approaches. Therefore, it is important to know the supply chain management practices in the textile and apparel industry and to explore firm’s perceptions of the business environment.

The current situation of the U.S. textile and apparel industry functions as the stimulus to investigate the new opportunities which new managerial approaches can bring about. The U.S. textile and apparel industry has been experiencing many challenges and is still experiencing radical and continuous change in their product, process, and business (Kilduff, 2001; Su, Dyer, & Gargeya, 2009). The textile and apparel industry is truly global in nature and U.S. textile and apparel firms have been actively involved in global supply chain management since the last decade. This study examines global supply chain management practices in the U.S. textile and apparel industry, which provides valuable information and insights for industrial practitioners to sustain competitive advantage in global textile and apparel market.

The remaining part of this paper is structured as follows. Following this introduction, the next section presents relevant literature review including supply chain management, the key characteristics of the U.S. textile and apparel supply chain, and the factors driving global textile and apparel supply chain. The third section provides research methodology used in the study including research instrument, sample, and data collection. The fourth section offers the results of the data analysis. Finally, the article concludes with implications for managerial practice and future research.

2. Literature Review

2.1. Supply Chain Management

Supply chain management (SCM) is recognized for achieving benefits of both operational and strategic natures. According to Gunasekaran, Patel and McGaughey2004, at the strategic level, SCM is a relatively new and rapidly expanding discipline that is transforming the way for improving organizational competitiveness in both manufacturing and services.

Many scholars discuss SCM in terms of both upstream and downstream relationships. SCM is seen as management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole (Lambert & Cooper, 2000; Larson & Halldorsson, 2002). In Mentzer, DeWitt, Keebler, Min, Nix, Smith and Zacharia2001 and in Tan, Lyman and Wisner 2002, the management philosophy of SCM, viewed as a viable initiative to enhance competitive advantage, has the following characteristics: a system approach to viewing the supply chain as a whole and to managing the total flow of goods inventory from the supplier to the ultimate customer; a strategic orientation toward cooperative efforts to synchronize and converge intrafirm and interfirm operational and strategic capabilities into a unified whole; and a customer focus to create unique and individualized sources of customer value, leading to customer satisfaction. SCM focuses on how firms utilize their suppliers' processes, technology, and capability to enhance competitive advantage. When all strategic suppliers in the chain integrate and act as a single entity, performance is enhanced throughout the chain (Tan, Kannan, & Handfield, 1998; Gonzalez-Benito, 2010).

In the past, many firms viewed purchasing and supply management as a cost-cutting rather than a profit-generating function. This was due primarily to the stable nature of supply markets, and to the slowly changing technology as well as the competitive situation of the company. However, the evolving nature of the supply market along with the increasing level of firm competition has fostered a reevaluation of the nature and characteristics of the purchasing function. Top managers are realizing the importance and the contributions purchasing could provide to the business, and are starting to commit resources to purchasing development. This development includes a shift in focus from cost cutting to profit generating with an increased concern for a new set of supplier performance measures.

2.2. The U.S. Textile and Apparel Supply Chain

The textile and apparel manufacturing is one of the oldest manufacturing industries in the world and one in which the production process is truly global. The comprehensive textiles-apparel-retail supply chain encompasses all of the activities of the textile-apparel complex as well as the functions of distribution and retail operations to the end users/consumers (Dickerson, 1999).

The U.S. textile and apparel industry is large and highly fragmented. In the past, each segment in the U.S. textile-apparel complex operated more or less separately, producing intermediate products for the next stage of the production chain. Fragmentation has made the U.S. textile and apparel industry more vulnerable in facing global competition (Dickerson, 1999). The U.S. textile and apparel manufacturing industry is especially vulnerable to off-shore competition because historically the production cost is significant lower in many other countries.

Traditionally in the textile-apparel-retail supply chain, each chain member runs its business based upon separate concerns and interests, sometimes causing conflicts in the relationships with chain partners. In the apparel industry, very little coordination exists among companies. Lack of information sharing on actual demand between chain members creates long lead-times and high levels of inventory with consequent risks of obsolescence at each segment (Kincade, Vass, & Cassill, 2001).

Apparel manufacturing is labor intensive with companies historically competing on price. In the apparel industry, the upper end of the supply chain contains an abundant supply of available manufacturers and low-wage workers from various countries. Manufacturers compete for retail business, and retailers select vendors, primarily on a cost basis. Retailers can use this competition among manufacturers to their own advantage in demanding lower costs and improved quality for goods and services. However, over the last ten years, the multiple criteria of cost, quality, delivery speed, and delivery reliability, are becoming critical for the textile and apparel industries (Su, Dyer, & Gargeya, 2009).

Over the last two decades, the U.S. textiles-apparel complex has experienced and is still experiencing radical and continuous change in their product, process, and business. In some ways, companies seek to reduce the impact of those challenges and difficulties, reflecting the need to increase flexibility and to excel on core activities through greater specialization by focusing resources and expertise. They have sought lower levels of diversity by focusing on core customers, products or activities. They have reduced complexity by focusing on core competencies and contracting-out special tasks. They have also reduced hostility by establishing stronger, more stable and congenial supply chain relationships (Kilduff, 2001).

The textile-apparel-retail supply chain is global and complex in nature. The intricate nature of the sector is reflected in the numerous steps in the chain, the diversity of activities, the fragmentation of the market, and the varying product and quality specifications being managed. From the point of the U.S. textile and apparel supply chain, there is increasing tendency for each type of organizational buyer in the textile-apparel-retail supply chain to become more actively involved in offshore sourcing (Gereffi, 1999). The globalization of the U.S. textile and apparel industry has been significantly spurred by the North American Free Trade Agreement (NAFTA) and the Caribbean Basin Initiative (CBI), and it has been influenced by the trade regulations such as the elimination of quotas on January 1, 2005.

While supply chain management efforts in some industries (automotive, computer, chemical industries) and at some companies have resulted in improved competitiveness (Leenders, Nollet, & Ellram, 1994), similar results in other industries and in other organizations have remained elusive. A careful review of existing research articles appearing in the professional journals reveals that very little publication space has been devoted to the subject about the textile-apparel-retail supply chain. It is very necessary to examine the supply chain management practices in textile and apparel industry, which is an important, dynamic, and global industry.

2.3. Factors Driving Global Textile and Apparel Supply Chain

The textile and apparel industries are among a select number of industries with true globalization, both in terms of players participating and the complexity of the supply chain. The classical perspective of the firm in the strategy literature emphasized the link between strategy and the external environment (Porter, 1980). Many studies have indicated that gaining competitive advantage was the company's primary corporate goal and that a global supply chain strategy was the key to accomplishing that goal (Carter & Narasimhan, 1996; Leung, 2000; Petersen, Frayer, & Scannell, 2000). Birou and Fawcett (1993), Monczka and Trent (1991), Watts, Kim and Hahn (1995), and Su, Dyer and Gargeya (2009) identified the major reasons for supply chain management as achieving improvements in the critical areas of cost reduction, quality, and availability.

Most firms want to acquire high quality products at a low cost. For firms selling in mature markets where there is little or no product differentiation, cost reduction provides a competitive advantage in the market (Barbee, 1998; Cho & Kang, 2001). In 1981, the apparel imports comprised only 15.4% of the American apparel market, and while by 1996, the market share of apparel imports was about 40% of the apparel products sold in the USA (Cho & Kang, 2001). In 2003, the apparel imports accounted for over 65% of the U.S. apparel market (Dickerson, 2003). The main reason for this growth was the cost advantage that foreign sources offered. The apparel industry is one of the most highly labor-intensive industries and wages constitute a large part of the production costs. Since wages are often significantly lower in developing countries than in the US, apparel products can be procured at relatively lower prices from these countries than from domestic sources (Barbee, 1998; Cho & Kang, 2001).

Providing quality products to consumers is very important to survive in today's competitive business environment. Today's consumers are more quality conscious and more willing to pay a higher price for good quality products. For apparel products, there are many companies importing from Europe, especially from England and Italy, to satisfy consumers who are highly quality and brand name conscious and do not mind paying higher prices for those products.

Four fundamental changes have occurred in the competitive market environment that are likely to increase the level of flexibility required by a company: rapid technological shifts, higher risk levels, increased globalization, and greater customization pressures. These developments have led to the emergence of flexibility as a key global sourcing strategy. Carter and Narasimhan (1996) and Narasimhan and Das 1999 found that strategic sourcing can be used to target specific manufacturing flexibilities and that inter-flexibility synergies need to be considered while formulating the buying firm's flexibility-based manufacturing strategies. Lao, Hong and Rao (2010) showed strong, positive and direct relationships between supply management practices and supply flexibility, and between supply flexibility and supply chain performance. Similarly, Leung 2000 indicated that quick response time and flexibilities are enhanced through best-in-class supplier capabilities. In addition, availability is also a critical factor that motivates global sourcing. Domestic buyers often rely on foreign sources simply because the desired products are not available in the USA. For example, some textile materials are sourced from other countries because of domestic resource limitation; some apparel or textile products for specific functions or with specific cultural characteristics are imported. Other benefits that motivate global sourcing include the shortening of the product development time, improving company image, satisfying counter-trade obligations, and improving international competitiveness.

3. Methodology

A survey instrument was developed to collect data for this study. A survey instrument in the form of a structured questionnaire was designed based on the literature review of previous research and discussions with industrial practitioners. All questions were designed to be answered from the buyer's perspective. All scales were measured on a five-point Likert-type scale (for example, one = not at all important, five = extremely important). Twenty-four supplier selection criteria were included in this study based on literature review and the researchers' discussions with industrial practitioners. To elicit information on firm business competitive position, respondents were asked to indicate their company's competitive position in term of product cost, quality, delivery dependability, flexibility, and response time over the past three years. In addition, respondents were asked to indicate their firms' organizational structure of sourcing function, sourcing performance, their firms' supplier evaluation systems and the situation of the firm's supply market, using a similar five-point Liker scale. Several demographic questions were also presented in the questionnaire to provide insights of the respondents' operations. The survey instrument was pre-tested for content validity by nine purchasing managers. Where necessary, questions were reworded to improve validity and clarity.

Mail survey was sent to a random sample of 660 firms in the U.S. textile and apparel industry. Data collection followed Dillman's2000 "tailored survey methodology" to increase response rate. In all, one mailing, 3 follow-up telephone call contacts, and the corresponding follow-up replacement of research surveys by mailing or e-mailing were implemented for each company in order to help the researchers increase the response rate and know the real circumstance of the firms and the respondents. One hundred and eighty-one responses were received at the end of the data collection, representing 38.2% response rate. Of the all returned responses, 152 firms indicated that they implement global supply chain management practices. Therefore, this study focuses on analyzing global supply chain management practices of these 152 firms.

4. Analysis and Results

4.1. Demographic Statistics

The survey results show approximately 40.8% of responses came from textile industry, 40.1% from apparel manufacturers, and 18.4% from apparel retailers/wholesalers. The titles of the respondents are mainly Director of Purchasing/Sourcing (28.3%), Vice President of Sourcing/Purchasing, Manufacturing, or Logistics/Operations (29.0%), CEO/President (12.5%), General Manager (7.2%), Supply Chain Manager (3.3%), and buyer/purchasing agent (5.9%). Companies with less than 100, 100-249, 250-499, 500-1000, and over 1000 employees represented 15.1%, 22.4%, 13.2%, 18.4%, and 29.6% of the responses respectively. Forty-nine percent of the companies had annual gross sales (in US$) less than 100 million. Companies with annual gross sales (in US$) 100-500 million and over 500 million represented about 27.6% and 15.8% of the companies surveyed respectively. About 7.9 percent of companies didn’t provide annual gross sales information.

4.2. Global Supply Chain Management Practices

In terms of the organizational structure of sourcing function, about 40.8% of the firms implemented centralized structure, while only 6.6% had decentralized structure. For 50% of the firms surveyed, their sourcing function is the combination of centralized and decentralized structure.

Almost all of the firms (94.8% of the firms surveyed) agreed or strongly agreed that sourcing/purchasing function is very important to the overall success of their companies and the sourcing function adds value to the firm in the area of production/operations/logistics. About 98.7% of the firms surveyed agreed/strongly agreed that sourcing contributes to the firm’s bottom-line profit.

In terms of the global sourcing areas, Mainland China and Hong Kong, South Asia (India, Thailand, Bangladesh, Turkey, etc.), Northeast Asia (Taiwan, Korea, Japan, etc.), and Mexico were identified as the top global sourcing areas. These areas are also the major regions in the world for textile and apparel manufacturing and distribution.

Many changes in the supply market have been reported by the respondents in the study. Over 63% of the respondents indicated that the supplier’s methods used to produce products or services have changed to some extent or to great extent. Over 90% of the respondents indicated that the geographic location from which they procure products or services is more dispersed. Over 66% of the respondents reported that the number of suppliers offering materials that meet their specification requirements has increased to some extent or to great extent. Over 56% of the respondents reported that the availability of substitute materials has increased to some extent or to great extent.

In terms of supplier evaluation systems, about 35% of the respondents reported that they agreed or strongly agreed that they had a formal supplier certification program, while 48.1% strongly disagreed or disagreed with the statement that they had a formal supplier certification program. About 56% agreed or strongly agreed that their company had a formal system to track the performance of the suppliers. Only about 37% agreed or strongly agreed that their company had a formal program for evaluating and recognizing suppliers. The results clearly show that many firms in textile and apparel industry didn't formally implement supplier evaluation system.

For the 24 supplier selection practices which were included in the survey, results show that quality level (M=4.57, SD=0.617), on-time delivery (4.46, SD=0.671), trust (M=4.46, SD=0.708), price/cost of product (M=4.38, SD=0.681), honest and frequent communications (M=4.25, SD=0.732), communication openness (M=4.23, SD=0.776), customer service (M=4.19, SD=0.769), and quick response time (M=4.16, SD=0.825) are the most important supplier evaluation criteria, with the highest mean values and relatively small standard deviations (Table 1). Not surprisingly, quality, on-time delivery, price/cost of product and quick response time are among the most common criteria, and this study is consistent with previous research. However, this study identified that honest, trust, and communication openness are also critical supplier selection criteria in business transaction. This study provides empirical support that more and more firms are realizing the importance of honest communication and trust, which help build the good buyer-supplier relationship and lead to higher performance for buyer and supplier firms. However, geographical compatibility/proximity (M=2.75, SD=1.097) and business culture match between the companies (M=2.95, SD=1.012) are the two least important criteria. The results also show firms laid less emphasis on presence of certification (M=3.31, SD=1.250), trade regulations (M=3.51, SD=1.113), and profitability of suppliers (M=3.34, SD=0.953), which have smaller mean values.

4.3. Reliability Analysis and Factor Analysis

Reliability analysis provides a measure of the ability of the survey instrument to produce consistent results from one administration to the next, or the degree to which measures are free from random error. One commonly used measure of reliability is Cronbach's alpha. The value of alpha for the 24 supplier selection criteria is 0.927, which exceed the minimum generally acceptable value of alpha 0.70 (Nunnally, 1978).

Factor analysis was carried out to reduce a scale to a smaller number of underlying factors. Principal component analysis was used to extract factors (eigen value > 1) and Varimax rotation was used to obtain a more interpretable factor matrix. The 24 supplier selection items were reduced to four underlying factors (Table 2). The Bartlett Test of Sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy were used to validate the use of factor analysis (Sharma, 1996). An overall KMO measure of 0.908 is high suggesting that the data are appropriate for factor analysis. The Bartlett's test statistic is highly significant ($p<0.000$), implying that the correlation matrix is appropriate for factoring. The four underlying factors from the factor analysis include communication and quality, strategic consideration, supplier capability, ability to meet buyer's needs. These four factors accounted for 58.3% of the total variance in the data.

4.4. Correlation Analysis of Supplier Selection, Supplier Evaluation Systems and Buyer Firm's Competitive Position

Correlation analysis was used to study the relations between the supplier selection practices, supplier evaluation systems, and firm competitive position which includes cost, quality, delivery dependability, flexibility, and response time (Table 3). Supply selection practices consists of the four factors identified in the previous section, including communication and quality, strategic consideration, supplier capability, and the ability to meet buyer's need. In this study, the mean scores of relative supplier selection practice items were used to represent respective factors.

Correlation results show that supplier capability and strategic consideration have positive and strong relationship with buyer firm's competitive position in terms of quality, delivery dependability, flexibility, and response time at $\alpha = 0.01$ level. These two factors have some positive relationships with buyer firm's cost competitiveness (p-value = 0.061 and p-value = 0.065 respectively for supplier capability and strategic consideration), although the relationship is not significant enough $\alpha = 0.05$ level. Communication and quality factor has strong and positive relationship with buyer firm's competitive position in terms of quality, delivery dependability and response time at α = 0.01 level, with flexibility at α = 0.05 level. Suppliers' ability to meet buyer firm's need, which includes price/cost of product, quick response time, flexibility to respond to unexpected demand changes, communication skills/systems, on-time delivery, and correct quantity, significantly impacts the buyer firm's competitiveness in terms of cost, quality, delivery dependability, and response time at α = 0.01 level.

Strategic consideration which consists of relationship between supplier and buyer, strategic importance of suppliers, business culture, profitability of suppliers, supplier's willingness to improve, and geographic proximity, although not viewed as the top supply chain management issue by the firms surveyed (these criteria have smaller mean values, Table 1), was positively correlated to buyer firms competitive advantage in terms of quality, delivery dependability, flexibility, and quick response time at α = 0.01 level. The managerial implication is that strategic consideration of suppliers has positive and strong influence on buyer firm's competitive advantage, although our respondents did not rate them as important practices.

The study results support the previous study by demonstrating that communication and quality level, supplier capability and ability to meet buyer's need do positively and significantly impact buyer firm's competitive advantage. It is interesting that our study didn't find a significant relationship between supplier's ability to meet buyer's need and buyer's flexibility at α = 0.05 level (p = 0.074). Future research needs to address this issue more closely.

The results also show supplier evaluation systems positively and strongly impact buyer firm's competitiveness in cost at α = 0.01 level, quality, and flexibility at α = 0.05 level. Companies which have formal program for evaluating and recognizing suppliers and which have a formal system to track the supplier performance will have competitiveness in cost, quality and flexibility.

5. Conclusions

This study demonstrates the global supply chain management practices of the firms in the U.S. textile and apparel industry and their perceptions of supply market and supplier evaluation systems. Textile and apparel industry is a classical representative of long and complex supply chain. With the globalization of textile and apparel business, it is meaningful to explore their global supply chain management practices.

It is evident that the supply market of the U.S. textile and apparel industry changed and is still changing. The evolving nature of the supply market along with the increasing level of firm competition has fostered a reevaluation of the nature and characteristics of the purchasing function. Top managers are realizing the importance and the contributions purchasing/sourcing could provide to the business, and are starting to commit resources to purchasing/sourcing development. This development includes a shift in focus from cost cutting to profit generating with an increased concern for a new set of supplier performance measures. However, for firms in the U.S. textile and apparel industry, formal supplier evaluation systems are not emphasized to a great extent. Many firms still evaluate the suppliers informally, having no formal supplier certification program or no formal tracking system. Correlation analysis demonstrates that supplier evaluation systems positively and strongly impact firm's competitiveness in cost, quality and flexibility. There is a need that more firms should realize the importance of supplier evaluation systems in the management of suppliers and their effects on buyer firm performance.

This research revealed that quality level, on-time delivery, trust, price/cost of product, honest and frequent communications, communication openness, customer service, and quick response time have been regarded as the most important supplier selection criteria among the 24 criteria examined. Supplier selection criteria could be categorized into four aspects, addressing communication and quality, strategic consideration, supplier capability, and the ability to meet buyer's needs.

The research further showed that the supplier selection practices identified in this study correlated positively with buyer firm's competitive advantages. Supplier selection criteria, including communication and quality level, supplier capability, strategic consideration, and supplier's ability to meet buyer's need, are strongly and positively correlated to buyer firm's competitive advantages in terms of cost, quality, delivery dependability, flexibility and quick response time. By focusing on these relationships, practitioners can better understand how specific policies influence firm competitive position in the marketplace. The study also reinforces the need to view suppliers as extensions of the buying firm itself and not as independent entities to be dealt with at arm's length.

It is also evident that a need exists for some firms to reassess their supplier management tactics. While there is support for a wide variety of tactics, the observation that those not considered most important have great impact on firm competitive advantages represents an opportunity for buyers.

Future research is needed to extend these findings. Considering this study was based on the survey results of 152 firms in the U.S. textile and apparel industry, future research in global supply chain management should be done by using larger sample, including more apparel/fashion retailers, because apparel/fashion retailers are active participants and important driving forces in global supply chain of textile and apparel industry. Research also needs to be conducted to examine the changing focus of global supply chain management as companies in the U.S. textile and apparel industry expand their scope and requirements. In addition, future research should also continue to investigate how to measure the firm's business performance effectively in the dynamic and competitive business environment. Specifically, more work is needed to further explore the impact of global supply chain management practices on performance by studying the performance of both supplier firms and buyer firms.

References

Barbee, G. (1998).Product costing to win profit margin. *Bobbin*, 39, 26-27.

Birou, L. M., & Fawcett, S. E. (1993). International purchasing: benefits, requirements, and challenges. *International Journal of Purchasing and Materials Management*, 29, 28-37.

Carter, J. R., & Narasiman, R. (1996). Is purchasing really strategic? *International Journal of Purchasing and Materials Management*, 32, 20-28.

Cho, J., & Kang, J. (2001). Benefits and challenges of global sourcing: perceptions of US apparel retail firms. *International Marketing Review*, 18, 542-561.

Dickerson, K. G. (1999). *Textiles and apparel in the global economy (3rd ed.)*.Prentice-Hall, Inc., New Jersey.

Dillman, D. A. (2000).*Mail and internet surveys: The tailored design method (2nd ed.)*.John Wiley & Sons, Inc., New York.

Gereffi, G. (1999). International trade and industrial upgrading in the apparel commodity chain. *Journal of International Economics*, 48, 37-70.

Gonzalez-Benito, J. (2010). Supply strategy and business performance: An analysis based on the relative importance assigned to generic competitive objectives. *International Journal of Operations & Production Management*, 30, 774-797.

Gunasekaran, A., Patel, C., & McGaughey, R. E. (2004).A framework for supply chain performance measurement. *International Journal of Production Economics*, 87, 333-347.

Kilduff, P. (2001). Evolving strategies, structures and relationships in complex and turbulent business environments: The textile and apparel industries of the new millennium. *Journal of Textile and Apparel, Technology and Management*, 1, 1-10.

Kincade, D. H., Vass, D., & Cassill, N. L. (2001). Implementation of technology and relationships to supply chain performance: apparel manufacturers' perspectives. *The International Review of Retail, Distribution and Consumer Research*, 11, 301-327.

Lambert, D. M., & Cooper, M. C. (2000). Issues in supply chain management. *Industrial Marketing Management*, 29, 65-83.

Lao, Y., Hong, P., & Rao, S. S. (2010). Supply management, supply flexibility, and performance outcomes: An empirical investigation of manufacturing firms. *The Journal of Supply Chain Management*, 46, 6-22.

Larson, P. D., &Halldorsson, A. (2002). What is SCM? And, where is it? *The Journal of Supply Chain Management*, 38, 36-44.

Leenders, M. R., Nollet, J., & Ellram, L. M. (1994).Adapting purchasing to supply chain management. *International Journal of Physical Distribution & Logistics Management*, 24, 40-42.

Leung, S. Y. S. (2000). World-class apparel-sourcing enterprises and the restructuring of existing global supply chains. *The Journal of Textile Institute*, 91, 73-93.

Mentzer, J. T., DeWitt, W., & Keebler, J. S., Min, S., Nix, N. W., Smith, C. D., & Zacharia, Z. G. (2001). Defining supply chain management. *Journal of Business Logistics*, 22, 1-25.

Monczka, R. M., & Trent, R. J. (1991). Global sourcing: A development approach. *International Journal of Purchasing and Materials Managemen*t, 27, 2-8.

Narasimhan, R., & Das, A. (1999). An empirical investigation of the contribution of strategic sourcing to manufacturing flexibilities and performance. *Decision Sciences*, 30, 683-718.

Nunnally, J. C. (1978).*Psychometric theory (2nd ed.)*.McGraw-Hill,New York

Petersen, K. J., Frayer, D. J., & Scannell, T. V. (2000). An empirical investigation of global sourcing strategy effectiveness. *The Journal of Supply Chain Management*, 36, 29-38.

Porter, M. E. (1980). *Competitive strategy: Techniques for analyzing industries and competitors*.The Free Press,New York.

Sharma, S. (1996). *Applied Multivariate Techniques*. John Wiley & Sons, Inc.,Hoboken, NJ

Su, J., Dyer, C. L., & Gargeya, V. B. (2009). Strategic sourcing and supplier selection in the U.S. textile–apparel–retail supply network. *Clothing & Textiles Research Journal*, 27, 83-97.

Tan, K. C., Kannan, V. R., & Handfield, R. B. (1998). Supply chain management: supplier performance and firm performance. *International Journal of Purchasing and Materials Management*, 34, 2-9.

Tan, K. C., Lyman, S. B., & Wisner, J. D. (2002). Supply chain management: A strategic perspective. *International Journal of Operations & Production Management*, 22, 614-631.

Watts, C. A., Kim, K. Y., & Hahn, C. K. (1992).Linking purchasing to corporate competitive strategy. *International Journal of Purchasing and Materials Management*, 28, 2-8.

Appendix

Table 1: Descriptive statistics of supplier selection criteria.

Note: Valid N = 151

Supplier Selection Criteria	Mean	SD
Quality level	4.57	0.617
On-time delivery	4.46	0.671
Trust	4.46	0.708
Price/cost of product	4.38	0.681
Honest and frequent communication	4.25	0.732
Communication openness	4.23	0.776
Customer service	4.19	0.769
Quick response time	4.16	0.825
Financial stability and staying power	4.15	0.814
Willingness to continuously improve the product and process	4.04	0.799
Flexibility to respond to unexpected demand changes	4.01	0.748
Correct quantity	4.01	0.883
Past and current relationship with supplier	3.98	0.872
Availability of resources	3.98	0.796
Technical expertise/capability	3.98	0.868
Supplier has strategic importance to your firm	3.88	0.930
Industry knowledge	3.77	0.905
Communication skills/system (phone, fax, Internet)	3.76	0.877
Reputation of supplier	3.75	0.894
Trade regulations	3.51	1.113
Profitability of supplier	3.34	0.953
Presence of certification or other documentation	3.31	1.250
Business culture match between the companies	2.95	1.012
Geographical compatibility/proximity	2.75	1.097

Table 2: Factor analysis results of supplier selection criteria.

Factor	Supplier Selection Criteria	Factor Loadings
Communication and quality	Communication openness	0.731
	Trust	0.706
	Quality level	0.648
	Honest and frequent communication	0.622
	Customer service	0.607
	Reputation of supplier	0.529
	Financial stability and staying power	0.488
Strategic consideration	Past and current relationship with supplier	0.786
	Supplier has strategic importance to your firm	0.737
	Business culture	0.618
	Profitability of supplier	0.571
	Willingness to continuously improve the product and process	0.507
	Geographical compatibility/proximity	0.375
Supplier capability	Trade regulations	0.781
	Presence of certification or other documentation	0.675
	Technical expertise/capability	0.647
	Industry knowledge	0.628
	Availability of resources	0.414
Ability to meet buyer's needs	Price/cost of product	0.792
	Quick response time	0.639
	Flexibility to respond to unexpected demand changes	0.595
	Communication skills/system (phone, fax, Internet)	0.583
	On-time delivery	0.548
	Correct quantity	0.465

Kaiser-Meyer-Olkin (KMO): 0.908 Bartlett's test statistic: $p< 0.000$

Table 3: Correlation analysis of supplier selection criteria, supplier evaluation systems and buyer firm's competitive position

	Cost	Quality	Delivery Dependability	Flexibility	Response Time
Communication and Quality	0.089	0.384**	0.306**	0.178*	0.275**
Supplier Capability	0.153#	0.333**	0.212**	0.241**	0.229**
Strategic Consideration	0.151#	0.339**	0.225**	0.257**	0.224**
Ability to Meet Buyer's Needs	0.235**	0.254**	0.340*	0.146#	0.230**
Supplier Evaluation Systems	0.263**	0.199*	0.103	0.162*	0.101

Note:

a. ** Correlation is significant at the 0.01 level (2-tailed).

b. * Correlation is significant at the 0.05 level (2-tailed).

c. # Correlation is significant at the 0.1 level (2-tailed).