Strategic sourcing, sourcing capability and firm performance in the US textile and apparel industry

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Abstract:

Purpose
– With the intense competition in the global textile and apparel industry and the uncertainty of the global textile and apparel business environment, sourcing has increasingly assumed a pivotal strategic role in textile and apparel supply chain management. Strategic sourcing is crucial for firms to obtain or sustain competitiveness in world marketplace. The purpose of this paper is to examine empirically how strategic sourcing and sourcing capability impact firm performance in the US textile and apparel industry.

Design/methodology/approach
– Empirical survey-based research methodology was implemented to examine the research questions and model. Data were collected from the 152 firms in the US textile and apparel industry.

Findings
– The findings show that strategic sourcing leads to greater emphasis on sourcing capability and positively impacts firm performance.

Originality/value
– The study contributes to understanding of supply chain management using data from the US textile and apparel industry to investigate the relationships between strategic sourcing, sourcing capability, and firm performance and to test the research hypotheses by quantitative survey-based research method. The textile and apparel industry is dynamic, global, diverse, and

complex, and is a prime exemplifier of globalization. The study clearly demonstrates that strategic sourcing plays a vital role in a firm's business operations and puts greater emphasis on developing the sourcing manager's business capability.

Article:

1. Introduction

The dynamic supply environment, the increasing level of competition in the worldwide market, the uncertainty of global business environment, and the corresponding changes in firm's purchasing function indicate that sourcing should play a significant role in a company's strategic decision-making process. Strategic sourcing integrates different functions of a firm including engineering, purchasing, operations, logistics, marketing, etc. (Gottfredson et al., 2005). Strategic sourcing includes integration and coordination of a firm's different functions to the firm's strategic decision-making level. Strategic sourcing monitors the constant changing business conditions especially the supply trends that are developing in the marketplace, interprets the meaning of these trends, and offers valuable information to a firm's strategic decision-making process. Strategic sourcing also includes the selection, motivation and evaluation, and development of suppliers, through which a firm will be in a better position in national or international business environment. Research in a variety of industries has demonstrated that a firm's ability to obtain or sustain competitiveness should be enhanced by developing a sophisticated sourcing function that is integrated into the firm's strategic decision-making process (Dobrzykowski et al., 2010; Paulraj and Chen, 2007; Chen et al., 2004; Carr and Pearson, 2002).

The textile and apparel industry is an important contributor to the US and world economies. Despite the dramatic transition that has resulted in many structural changes, the US textile and apparel industry remain significant, with the industry employing a large number of workers (MacCarthy and Jayarathne, 2012; Abernathy et al., 2006). The textile and apparel industry supply chain includes all of the activities of textile and apparel manufacturing as well as the functions of distribution and retail operations to the end users/consumers (Dickerson, 1999). The comprehensive textile and apparel supply chain consists of the industry chain from fiber to textile components and processes, apparel industry operations, through the end uses of apparel, home furnishing, and industrial products.

The textile and apparel supply chain is global and complex in nature, which is reflected in the numerous steps and the diverse activities in the chain, the fragmentation of the market, and the varying product and quality specifications being managed and the volatility of consumer preferences for fashion apparel products (Bruce and Daly, 2011; Dickerson, 1999; Gereffi, 1999). The US textile and apparel supply chain is fed by an abundant number of textile and apparel component producers (employing low-wage workers) located in various countries across the globe (Kumar and Arbi, 2008; Abernathy et al., 2006; Gereffi and Memedovic, 2003). Textile and apparel imports to the US increased significantly since 1989. "From 1989 to 2004,

apparel imports to the USA rose from $21 billion to $65 billion, now representing over 60 percent of all apparel sold in the USA" (Abernathy et al., 2006, pp. 2210). For the US textile and apparel supply chain, one method of improving a firm's competitiveness is through the strategic approaches of worldwide suppliers (Kumar and Arbi, 2008). Customization demands from consumers and the need for "quick response" in rapidly changing markets are making more and more firms recognize the strategic role that sourcing can play in achieving sustainable competitive advantage and improving financial performance (Bruce and Daly, 2011; Kumar and Arbi, 2008; Jin, 2004).

The world marketplace for textile and apparel products is dynamic, considering continual changes and uncertainties in product availability, prices, and competition (Kumar and Arbi, 2008; Åkesson et al., 2007; Jin, 2004). Going far beyond cost considerations, sourcing decisions affect the production, marketing, and financial strategies that a firm can put into effect. A more proactive sourcing strategy can be developed and implemented by a firm to deal with environmental changes, risks and uncertainties when sourcing's strategic role is recognized, understood and supported by the company's top management. In the complex global business environment and under the extremely intense competition in the textile and apparel industry, one theme that consistently emerges in strategic sourcing is the importance of qualified personnel to support the sourcing process (Giunipero et al., 2006; Trent and Monczka, 2005; Handfield and Nichols, 2004). Implementing strategic sourcing lays more emphasis on building sourcing capabilities for sourcing practitioners. The sourcing manager's knowledge, skills and capabilities can supply critical information (e.g. information regarding supply market, opportunities or environmental uncertainties) which helps company's decision-making and can enhance the company's ability to maintain or achieve competitive position and therefore financial performance, enabling the firm to actively prepare for the future competition (Paulraj and Chen, 2007; Giunipero et al., 2006; Handfield and Nichols, 2004).

This study is aimed at examining the relationships among strategic sourcing, sourcing capability and firm performance by focusing on the US textile and apparel supply chain. The methodology used is an empirical survey with structural equation modeling technique. The remaining part of this paper is structured as follows. Following this introduction, the next section presents literature review and the development of the research hypotheses. Then 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, followed by discussion of the results in the fifth section. Finally, conclusion and limitations of the study are provided.

2. Literature review and hypothesis development

As mentioned in the preceding section, the objective of this research is to reveal the strategic role of sourcing by investigating the linkages among strategic sourcing, sourcing capability, and firm performance in the US textile and apparel industry. The US textile and apparel industry supply chain has been deemed ideal exemplifier of globalization with supply network extensively widespread across the globe. Strategic sourcing and sourcing capability are two important constructs impacting firm performance for textile and apparel industry. Following literature review leads to the development of the proposed conceptual model and construct variables of this study.

2.1 Resource-based view theory

The resource-based view of the firm is the theoretical background for the research. Supply chain capabilities and resources are the fundamental elements for supply chain strategy and the potential sources of successful business performance. Resource-based view theory highlights the relationship between firm strategies and firm capabilities, which is a major focus of this research.

The resource-based view theory (Barney, 1991, 1996; Wernerfelt, 1984, 1995) explains the linkage between firm competitiveness and resources/capabilities by arguing that how a firm develops and exploits unique resources is the key to a firm's superior performance. Resource-based theory maintains that firms are comprised of bundles of resources, namely (tangible and intangible) assets, input factors, and capabilities which are utilized to build firms' competitive advantage (Barney, 1996, 1991; Conner, 1991;Wernerfelt, 1984). Examples of resources include employment of skilled personnel, trade contacts, in-house knowledge of technology, efficient procedures, etc. (Wernerfelt, 1984). The resource-based view emphasizes the strategic importance of a firm's resources and capabilities to maintain competitive advantages (Sinha *et al.*, 2011; Dobrzykowski *et al.*, 2010; Shook *et al.*, 2009). "What a firm wants is to create a situation where its own resource position directly or indirectly makes it more difficult for others to catch up" (Wernerfelt, 1984, p. 173). Porter (1990) noted that resources are valuable because they allow the firm to achieve competitiveness in specific markets. Prahalad and Hamel (1990) introduced the concept of core competence (which can be viewed as a firm's unique resource/capability that is critical to the firm achieving competitiveness) and argued that a firm's competitive advantage is formed by building core competencies that are superior to the competitor's core competencies.

The resource-based view theory has been used to explain how purchasing and supplier involvement enhances a firm's unique capabilities and thus positively affects firm performance (Carr and Pearson, 2002), and how technologies can be an inimitable resource that has a significant impact on manufacturing, information flow, and performance (Tan *et al.*, 2010). Kim (2009) used this theory to examine the causal linkages among supply chain management practices, competition capability, the level of supply chain integration, and firm performance. Dobrzykowski *et al.* (2010) explained a firm's successful sourcing decisions by resource-based view which provides an internal view of the firm considering its core competencies. Lao *et al.* (2010) developed the concept of supply flexibility by recognizing the role of resources in supply flexibility. Resource-based view theory also helps to explain why firms lacking certain competitive capabilities will seek and promote collaborative relationships with supply chain partners to secure those capabilities (Oh and Rhee, 2008).

2.2 Strategic sourcing

Global supply chain has been identified as a powerful force within corporations and the world community (Giunipero *et al.*, 2008;Chandra and Kumar, 2000). Strategic sourcing is a critical component in global supply chain management (Barney and Hesterly, 2010; Chopra and Meindl, 2010). Strategic sourcing can be defined as the process of planning, implementing, controlling, and evaluating highly important sourcing decisions in an effort to meet a firm's long-range plans and goals (Carr and Pearson, 1999,2002; Carr and Smeltzer, 1999, 2000). Previous literature

addresses the need for sourcing to assume a more strategic role (Su and Gargeya, 2012; Kang *et al.*, 2009; Paulraj and Chen, 2007; Gottfredson *et al.*, 2005) in this age of ever-increasing world competition.Carr and Pearson (2002) argued that a non-strategic purchasing function is not viewed as an important element in the value chain by top management, and tends to be short-term oriented, clerical in nature, and reactive to firm's other business functions and supply environment. Sourcing manager's relevant purchasing skills with regard to planning and supplier management are not emphasized to great extent in traditional non-strategic sourcing.

A strategic use of purchasing links a company to its environment, especially because the environment affects a company's future procurement requirements and sourcing strategies accordingly. The greatly accelerated rate of changes in economic, political, social, and technology variables forces companies to monitor their environments constantly. The increasingly sharp focus on strategic sourcing from top management in many US companies is a direct result of the mounting internal and external pressures – such as increasingly rising costs of materials and rapidly changing competitive environment (Pressey *et al.*, 2007; Giunipero *et al.*, 2006). The principal objective of strategic sourcing is to reduce uncertainty and to improve flexibilities to better handle supply, demand, and competitiveness uncertainties (Sinha *et al.*, 2011; Paulraj and Chen, 2007; Kocabasoglu and Suresh, 2006;Narasimhan and Das, 1999). Sensible decisions about such requirements call for buyers and suppliers to share information. Strategic sourcing objectives grow out of a company's long-range planning process; at the same time, purchasing needs and realities such as critical information on new products, new technology, or the likely availability of materials may affect the choice of corporate objectives (Pressey *et al.*, 2007; Kocabasoglu and Suresh, 2006).

From a theoretical perspective, strategic sourcing is viewed by top management as an important resource of a firm which can be utilized to develop or support the firm's capabilities and increase the firm's competitiveness (Barney and Hesterly, 2010; Chen *et al.*, 2004; Carr and Pearson, 2002). Sourcing is involved in the firm's strategic planning process and sourcing is treated as important as other major functions in the firm (Kocabasoglu and Suresh, 2006; Carr and Pearson, 2002, 1999). Thus, strategic sourcing is now best recognized as a fundamental units of successful supply chain management (Chopra and Meindl, 2010), and the theoretical construct of strategic sourcing is conceptualized by its proactive as well as long-term focus, top management support, sourcing contributions to the firm's success, and strategically managed supplier relationships (Paulraj and Chen, 2007; Pressey *et al.*, 2007).

2.3 Sourcing capability

In the complex and dynamic global business environment, the question is no longer whether to source a capability or activity but rather how to source every single activity in the value chain and the sourcing manager's ability to control and make the most of critical capabilities. Forward-thinking companies are making their supply chains more elastic and their organizations more flexible by emphasizing greater sourcing business capabilities.

Trent and Monczka (2003) revealed the critical sourcing manager's capabilities such as advanced cost analytic skills, an understanding of worldwide supply markets, the ability to negotiate and develop global contracts, effective communication and presentation skills, an understanding of

the global sourcing strategy development process, the ability to think holistically beyond a site or region and working effectively with other cultures. The knowledge and skills required for strategic sourcing differ dramatically from those required for day-to-day operational purchasing. Mehra and Inman (2004) indicated that incoming technological and competitive challenges require purchasing professionals to learn about the strategic cost of doing business, understand market dynamics and customer expectation, keep up with newer information technologies and customer relations' management, involve in the strategic planning processes, and understand the ethical, legal, and social implications of doing business.

In the US textile and apparel industry, the supply network is extensively widespread across the globe. A primary difference between regional and global sourcing is a dramatic increase in communication complexity and various risks (Kumar and Schmitz, 2011;Kumar *et al.*, 2009). Strategic offshore outsourcing calls for greater emphasis on certain knowledge and skills and a distinct set of capabilities which are different from domestic sourcing (Jørgensen, 2010; Mehra and Inman, 2004) for the following reasons. Firstly, firms engaging in offshore sourcing encounter the multiplicities of languages, social and cultural issues, time zones, business practices, regulations and legal systems. Secondly, strategic offshore sourcing efforts could cause major changes to other business units more than domestic sourcing. Other business departments in a firm also face a challenging situation of working with partners that is culturally diverse and complex. Thirdly, offshore sourcing involves risks with respect to foreign exchange rate, economic and political uncertainty in foreign countries.

Identifying, developing and managing suppliers are key activities in a successful strategic sourcing effort. The dynamics of managing buyer-supplier relationships become even more fundamental in strategic offshore sourcing, since the relationship encounters greater challenges such as cultural and social differences and other geographical and demographic variations. Sourcing managers need to have appropriate knowledge and capability to skillfully scan and identify partnering opportunities with overseas suppliers and develop appropriate mechanisms to coordinate activities and manage the relationship. Successful long-term buyer-supplier relationship leads to satisfying business performance for both suppliers and buyers (Sinha *et al.*, 2011; Chen *et al.*, 2004; Carr and Pearson, 1999).

2.4 Firm performance

It is expected that a well-managed and integrated supply chain will lead to business benefits. Firms strive to enhance their competitive and financial performance. Lower costs, high quality, flexibility, improved delivery dependability, and quick response time, in turn, will lead to better competitive position and better sales and profits.

Subjective performance measures have been widely used in strategy related research and management research. The textile and apparel industry consists of many small and medium firms (US Small Business Administration (SBA), 2012; Dickerson, 1999); it is anticipated that it would be very difficult to extract adequate and reliable financial information from small and medium firms. Financial data for small or medium firms are also criticized for being unreliable and subject to varying accounting conventions or even to managerial manipulation for a variety of reasons (Caloghirou *et al.*, 2004; Spanos and Lioukas, 2001). For this study, the goals of

collecting data from respondents from a large sample through a survey questionnaire and obtaining an acceptable survey response rate lead to the conclusion that survey questions requesting specific financial figures would contravene those goals.

Previous research provided reasonable support for the use of managers' perceptual measures as a proxy for actual performance (Tan *et al.*, 2010; Caloghirou *et al.*, 2004; Carr and Pearson, 2002; Tan *et al.*, 2002; Carr and Smeltzer, 2000, 1999). Following the previous research to operationalize firm performance, this study chose to solicit respondents' perceptions of their firm's performance over the past three years on the survey.

2.5 Research hypotheses

At a macro level, strategic sourcing requires a sourcing manager to monitor the company's macro-environment, forecast changes in that environment, develop relationships with key suppliers, have active interaction with other business functions, and analyze the company's competitive advantages and disadvantages relative to its suppliers. At a micro level, strategic sourcing involves the identification of critical materials/components, the evaluation of possible supply uncertainty, risks and disruptions for each critical material or component, and the development of corresponding contingency plans for all identifiable supply problems. Strategic sourcing leads to an increasing emphasis on a distinct set of sourcing capabilities.

Giunipero *et al.* (2006) demonstrated the increased importance of sourcing managers' strategic skills and capabilities as leading firms recognize the role of strategic sourcing. Handfield and Nichols (2004) pointed out that the challenge of managing a global supply base engenders greater need for qualified and capable people that have significant global skills. Fawcett *et al.* (2008)demonstrated that people with the right skills are the key to successful supply chain collaboration. Interestingly, an earlier study found that a firm's global sourcing structures and processes has a large effect on the development of global sourcing capabilities (Petersen *et al.*, 2000) necessary for effective global sourcing. According to Trent and Monczka (2003) and Eltantawy (2008), top management must recognize that satisfying sourcing performance requires talented and well-trained sourcing personnel and successful sourcing strategy leads to higher level of importance in sourcing manager's business capabilities to manage international business and environmental uncertainty. Based on the above discussion we suggest the following hypothesis:

H1. Strategic sourcing leads to greater emphasis on sourcing capability.

Organizations have realized the benefits and competitive advantages brought about by integrating sourcing into firm's strategic planning (Sinha *et al.*, 2011; Kang *et al.*, 2009; Paulraj and Chen, 2007; Tan *et al.*, 2002). Based on the resource-based view theory, the sourcing function has access to its supply base, which is one of the largest resources for a firm. Buyers adopt a strategic approach to search for suppliers whose expertise and competence can contribute to their ability to be viable competitors (Lao *et al.*, 2010; Giunipero *et al.*, 2006). The knowledge of supplier markets, events, and technologies are critical to business success. Strategic sourcing helps a firm to obtain its competitive advantages by providing value in effective cost management, offering the firm valuable information regarding supply trends, and establishing

close relationship with key suppliers. Thus, firms use strategic sourcing to make better decisions and increase the firm's bottom line profits (Sinha *et al.*, 2011). The strategic contribution of sourcing to manufacturing and business goals has been highlighted in industry studies (Jin and Farr, 2010; Chen *et al.*, 2004; Carr and Pearson, 2002; Narasimhan and Das, 1999). Based on the above discussion, we bring forward the following hypothesis:

H2. Strategic sourcing has a positive impact on firm performance.

Trent and Monczka (2003) identified that qualified personnel with the right knowledge, skills, and abilities is the highest rated critical sourcing success factor, and a lack of qualified personnel to support the sourcing process emerges as the most serious of a dozen potential problem areas. Wright and Snell (1998) maintained that different strategies require different types of people for effective performance, that is, sourcing skills and behaviors are related to a firm's performance. According to resource-based view, a firm's resources include physical and financial assets as well as employees' skills, knowledge and capabilities and organizational processes. Hart (1995) and Wernerfelt (1984) indicated that valuable, costly-to-copy firm resources and capabilities provide the key sources of sustainable competitive advantage. By shaping the ways in which skills, knowledge, and resources are coordinated and managed, personnel capabilities fundamentally determine firm performance. Therefore, a greater emphasis on sourcing capabilities positively impacts a firm's performance, which is captured in the following hypothesis:

H3. Sourcing capability has a positive impact on firm performance.

The preceding sections provide a basis for including strategic sourcing, sourcing capability and firm performance in the proposed conceptual model, which is shown in Figure 1. The research conceptual model is based on the three hypotheses which include strategic sourcing leads to greater emphasis on sourcing capability and has a positive impact on firm performance, and sourcing capability has a positive impact on firm performance.

3. Research methodology

3.1 Research design

A survey instrument in the form of a structured questionnaire was designed based on a review of pertinent literature and interviews with practitioners and academics. The items tapping the theoretical constructs were developed based on an extensive literature review of the managerial and scholarly literature to establish the content validity of each construct and associated scales. Feedback on the initial design was then obtained from academics familiar with empirical research in study domain and senior operations managers. A revised survey instrument was finally pre-tested by nine purchasing managers for content validity. Where necessary, questions were reworded to improve validity and clarity.

The instrument incorporates three constructs: strategic sourcing, sourcing capability, and firm performance. The corresponding factors and the indicators in the model are shown in Table I. To increase measurement accuracy, multiple indicators were used to represent unobservable

constructs and existing scales were employed where possible. Specifically, the items of the strategic sourcing construct were determined using a synthesis of the items adopted in earlier studies (Chen *et al.*, 2004; Carr and Pearson, 1999, 2002; Carr and Smeltzer, 1999, 2000), consisting of three variables that address top management awareness and support, relationships development with key suppliers, and sourcing's active interaction with other functions. Sourcing capability construct was measured by employing Petersen *et al.*'s (2000) scale of business capabilities, including awareness of cross-cultural business practices, managing international risk or uncertainty, knowledge of sourcing locations, and international negotiation skills and abilities. The measures of firm performance were based on previous studies (Chen *et al.*, 2004; Carr and Pearson, 2002; Tan *et al.*, 2002; Tracey and Tan, 2001; Carr and Smeltzer, 2000), including return on assets, profit margin and market share. Several demographic questions were also presented in the questionnaire to provide insights of the respondents' operations. All the questions were designed to be answered from the buyer's perspective, using a five-point Likert-type scale. For example, for performance measures, the directions instruct the respondent to base his/her answers on his/her firm's performance over the past three-year period using a Likert scale (1=decrease significantly … 5=increase significantly).
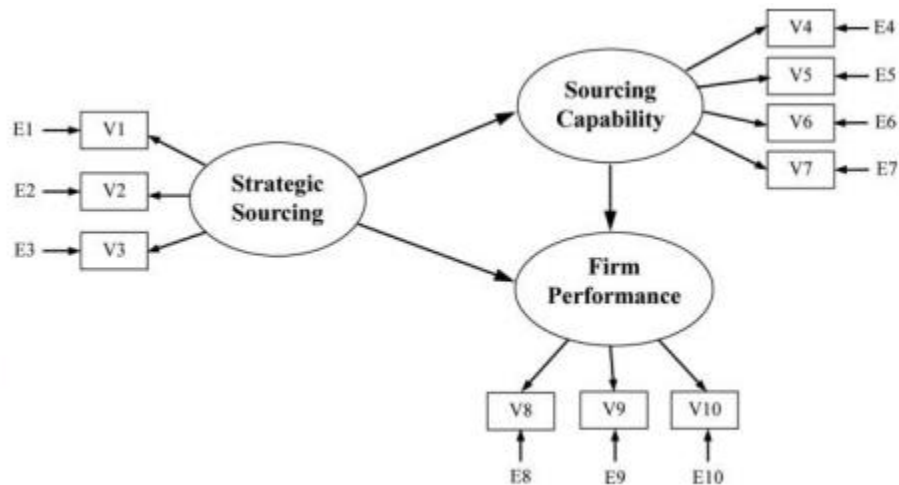
Figure 1.
Full latent variable path analysis model integrating the structural and measurement models – SEM representation

Constructs	Indicators
Strategic sourcing	V1 – Top management of the company emphasizes the strategic role of sourcing function V2 – Sourcing's long-range plan includes developing relationships with key suppliers V3 – Sourcing function has active interaction with other functions (e.g. manufacturing, marketing, etc.)
Sourcing capability	V4 – Awareness of cross-cultural business practices V5 – Managing international leadtime risk or uncertainty V6 – Knowledge of the sourcing location for critical purchased items V7 – International negotiation skills and abilities
Firm performance	V8 – Return on assets (ROA) V9 – Profit margin (net income as a percent of sales) V10 – Market share

Table I.
Factors and indicators in the structural equation model

3.2 Data collection

The different industrial sectors in textile and apparel industry interconnect and are all components of textile and apparel supply chain. Therefore, in this study, mail survey was sent to a random sample of 660 firms in the US textile and apparel industry. All the recipients of the survey were selected by the researchers carefully and were believed by the researchers to be the most knowledgeable about sourcing of textile or apparel products for their companies, with titles such as purchasing/sourcing manager, director of purchasing, vice president of purchasing, supply chain manager, and vice president of materials management, etc. In the cover letter which was sent with each survey, the purpose of the survey was provided and this helped determine whether the respondent was appropriate for the survey; and moreover, the cover letter requested that the most appropriate professionals fill out the survey by stating "If you feel that you are not the most qualified individual at your company to fill out the survey, please forward this to that person and encourage him or her to complete the survey." Therefore, all the respondents were the key informants for the study; they are sourcing professionals, purchasing textiles and apparel products for their firms' business operations.

Data collection followed Dillman's (2000) "tailored survey methodology" to increase response rate. In all, one mailing, three 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. A total of 152 firms returned the surveys with indication of implementing global strategic sourcing practices. Therefore, this study focuses on analyzing these 152 firms.

A test for non-response bias was performed at the conclusion of the data collection. A comparison was made between those respondents who responded immediately with those who responded after follow-up steps were implemented. Univariate t-tests were performed on the items included in the research model. The univariate t-tests yielded no statistically significant difference among the early and late respondents, suggesting that non-response bias was not a problem in this study.

4. Data analysis and results

The analysis addresses the research questions by examining the relationships between strategic sourcing, sourcing capability and firm performance. The two-step structural equation modeling approach was used. Firstly, the measurement model was evaluated using confirmatory factor analysis to demonstrate adequate model fit and to ensure a satisfactory level of measure reliability and validity for the underlying variables and their respective factors in the model. Secondly, the structural model was tested to examine the research hypotheses. Analysis based on the maximum likelihood estimation method was carried out using LISREL 8.8 (Joreskog and Sorbom, 2006).

4.1 Demographic statistics

The survey results show that for the 152 respondent firms, approximately 40.8 percent of responses came from textile industry, 40.1 percent from apparel manufacturers, and 18.4 percent from apparel retailers/wholesalers. The geographic areas of the 152 respondent firms were

widely across the 24 states in the US, with 43 firms from North Carolina, 22 from California, 14 from Georgia, and ten from Pennsylvania. The titles of the respondents are mainly director of purchasing/sourcing (28.3 percent), vice president of sourcing/purchasing, manufacturing, or logistics/operations (29.0 percent), CEO/president (12.5 percent), general manager (7.2 percent), supply chain manager (3.3 percent), and buyer/purchasing agent (5.9 percent). Table II shows the respondents profile based on the number of employees and the annual gross sales.

4.2 Evaluation of the measurement model

Of the 152 returned surveys, 146 contained completed responses and were used in structural equation modeling (SEM). Confirmatory factor analysis (CFA) was conducted using the measurement portion of the model, to examine the relationship between the indicator variables and their respective underlying factors. Table III shows the correlation matrix and the descriptive statistics of the variables used in the measurement model.

Characteristics	Frequency	Percentage
Number of employees		
Less than 100	23	15.1
100-249	34	22.4
250-499	20	13.2
500-1,000	28	18.4
Over 1,000	45	29.6
Missing	2	1.3
Annual gross sales (US$)		
Less than 5 million	10	6.6
5-24.9 million	27	17.8
25-49.9 million	16	10.5
50-99.9 million	21	13.8
100-500 million	42	27.6
Over 500 million	24	15.8
Missing	12	7.9
Total	152	100

Table II.
Profile of the respondent firms

VAR	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.000									
V2	0.622	1.000								
V3	0.419	0.391	1.000							
V4	0.286	0.184	0.243	1.000						
V5	0.116*	0.144*	0.123*	0.471	1.000					
V6	0.250	0.270	0.134*	0.548	0.631	1.000				
V7	0.299	0.163	0.153*	0.632	0.479	0.624	1.000			
V8	0.309	0.233	0.203	0.165	0.213	0.267	0.157*	1.000		
V9	0.308	0.221	0.179	0.179	0.194	0.232	0.158*	0.821	1.000	
V10	0.276	0.278	0.175	0.108*	0.155*	0.178	0.137*	0.644	0.581	1.000
Mean	4.02	4.27	4.40	3.32	3.99	4.00	3.71	3.42	3.32	3.46
SD	1.040	1.046	0.914	1.089	1.030	0.902	1.152	1.002	1.057	0.903

Notes: *Indicates the correlation is *not* statistically significant at $p < 0.05$; Valid $n=146$

Table III.
Correlation matrix and descriptive statistics for the manifest variables

In SEM, researchers are expected to report multiple measures of fit for assessing model fit (Hair *et al.*, 2009; Kelloway, 1998;Sharma, 1996). A satisfactory fit is achieved for the measurement model [The χ^2 (32)=37.38, non-significant (p=0.24); the root mean squared error of approximation (RMSEA)=0.034; the goodness-of-fit index (GFI)=0.95; non-normed fit index

(NNFI)=0.99; comparative fit index (CFI)=1.00] (Table IV). All the fit indices indicate a very good fit for the measurement model.

Table V shows the factor loadings, standard errors, t-values, and the summary of the analysis of reliability in the measurement model. As can be seen from Table V, the t-values of all the path parameter estimates for each factor in the measurement model are greater than 2.0; therefore, all the path parameter estimates are statistically significant with $p<0.05$. Reliability for a composite trait or factor, considering the simultaneous error of all of the observed variables loading on that factor, is a consistency among the scales in their measurement for a latent construct. Highly reliable scales are strongly inter-correlated, indicating that they are measuring the same latent concept (DeVellis, 2003). In the measurement model, reliability analysis was conducted to check and confirm internal consistency using the standardized reliability estimate (Sharma, 1996) and composite reliability coefficient (DeVellis, 2003) for a given construct. These two statistics are analogous.

Standardized reliability of the indicators of a given construct is given by (Sharma, 1996):

$$\frac{(\sum_i^p \lambda_{ij})^2}{(\sum_i^p \lambda_{ij})^2 + \sum_i^p V(\delta_i)}$$

where λ_{ij} is the loading of the ith variable on the jth construct, $V(\delta_i)$ is the error variance for the ith variable, and p is the number of indicators of the jth construct. Completely standardized parameter estimates should be used in the above formula (Sharma, 1996).

The composite reliability coefficient is computed using the generalized Spearman-Brown formula, which is shown as follows:

$$\alpha = \frac{q\bar{r}}{1 + (q-1)\bar{r}}$$

	Fit indices for the measurement model	Value	Recommended value
	Chi-square (degree of freedom) [χ^2 (df)] (p-value)	37.38 (32) ($p=0.24$)	Non-sig p-value
	Root mean squared error of approximation (RMSEA)	0.034	≤ 0.10
	Goodness-of-fit index (GFI)	0.95	≥ 0.90
Table IV.	Normed fit index (NFI)	0.96	≥ 0.90
Fit evaluation of the	Nonnormed fit index (NNFI)	0.99	≥ 0.90
measurement model	Comparative fit index (CFI)	1.00	≥ 0.90

Indicator variables and their underlying factors	Factor loading	Standard error	t-values	R-square	Composite reliability	Standardized reliability
Strategic sourcing					0.752	0.746
V1	0.88	0.09	9.89	0.71		
V2	0.77	0.09	8.66	0.54		
V3	0.47	0.08	5.90	0.26		
Sourcing capability					0.840	0.839
V4	0.79	0.08	9.37	0.52		
V5	0.71	0.08	8.79	0.47		
V6	0.74	0.07	11.15	0.68		
V7	0.89	0.09	10.29	0.60		
Firm performance					0.875	0.874
V8	0.95	0.07	14.05	0.89		
V9	0.92	0.07	12.38	0.75		
V10	0.61	0.07	9.00	0.46		

Table V.
Factor loadings, standard errors, *t*-values, *R*-squares and reliability coefficients in the measurement model

Notes: All *t*-values are statistically significant at $p < 0.05$; Valid $n = 146$

where $\bar{r}$ is the average reliability coefficient computed across the observed measures and q is the number of measures loading on the composite trait (DeVellis, 2003).

As shown in Table V, all the reliability coefficients are above the threshold 0.60 which DeVellis (2003) recommended and the acceptable guideline 0.70 which Nunnally (1978) suggested. For each factor, all the t-values of the factor loadings are statistically significantly different from zero (see Table V), and each loading is in the anticipated direction and magnitude. Thus, convergent validity is established since all indicators are effectively measuring the same construct. Discriminant validity is shown by the confidence interval of two standard errors around the correlation for each respective pair of factors. None of the confidence intervals include 1.0; therefore, discriminant validity was established (see Table VI). Thus, the measurement model is adequate for the testing the proposed structural model.

4.3 The structural model

Table VII presents the fit indices for the structural model. A satisfactory fit is achieved for the structural model [The χ^2 (32)=37.38, non-significant (p=0.24); the root mean squared error of approximation (RMSEA)=0.034; the goodness-of-fit index (GFI)=0.95; non-normed fit index (NNFI)=0.99; comparative fit index (CFI)=1.00].

Figure 2 shows the results of structural equation modeling. There are two positive and statistically significant paths (strategic sourcing – sourcing capability; strategic sourcing – firm performance), and one positive but statistically non-significant path (sourcing capability – firm performance). The first hypothesis (*H1*), strategic sourcing positively leads to greater emphasis on sourcing capability, is supported (path coefficient=0.34, *t*=3.54, *p*<0.05). The second hypothesis (*H2*), strategic sourcing has a positive impact on firm performance, is supported (path coefficient=0.35, *t*=3.12, *p*<0.05). The third hypothesis (*H3*), sourcing capability has a positive impact on firm performance, is not strongly supported (path coefficient=0.20, *t*=1.67) at *p*<0.05.

Correlated factors	Correlation	Standard error	Confidence interval	
Strategic sourcing – sourcing capability	0.38	0.09	(0.20, 0.56)	**Table VI.**
Strategic sourcing – firm performance	0.39	0.08	(0.23, 0.55)	Discriminant validity of
Sourcing capability – firm performance	0.29	0.09	(0.11, 0.47)	the measurement model

Fit indices for the measurement model	Value	Recommended value	
Chi-square (degree of freedom) [χ^2 (df)] (p-value)	37.38 (32) ($p = 0.24$)	Non-sig p-value	
Root mean squared error of approximation (RMSEA)	0.034	≤ 0.10	
Goodness-of-fit index (GFI)	0.95	≥ 0.90	
Normed fit index (NFI)	0.96	≥ 0.90	**Table VII.**
Nonnormed fit index (NNFI)	0.99	≥ 0.90	Fit evaluation of the
Comparative fit index (CFI)	1.00	≥ 0.90	structural model

Sourcing
Capability

$H1$ + 0.34
$t = 3.54$

Strategic
Sourcing

$H3$ + 0.20*
$t = 1.67$

$H2$ + 0.35
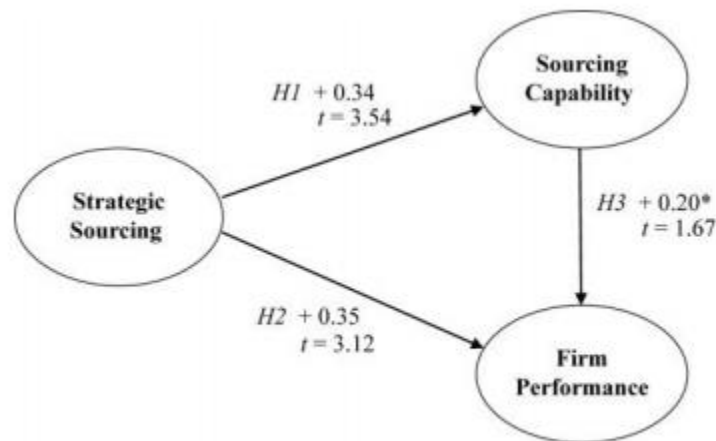$t = 3.12$

Firm
Performance

Figure 2.
Structural model and the
hypotheses in the research
model

Note: *indicates the t-value for the path coefficient is *not* statistically
significant at $p < 0.05$

5. Discussion

The study contributes to our understanding of strategic sourcing using empirical data from the
US textile and apparel industry to investigate the relationships between strategic sourcing,
sourcing capability, and firm performance by structural equation modeling methodology.

There is statistically significant evidence that supports the research hypothesis *H1*, indicating
that strategic sourcing leads to greater emphasis on sourcing capability, including awareness of
cross-cultural business practices, knowledge of the sourcing location for critical purchased items,
international negotiation skills and abilities, and managing international leadtime risk or
uncertainty. Strategic sourcing increases the importance of sourcing manager's business
capability in handling and controlling international business activities and cross-cultural
awareness. This research supports the notion that companies that have developed and
implemented strategic sourcing are more likely to put greater emphasis on developing the
sourcing manager's business capability necessary for effective strategic sourcing. This study
supports previous study (Petersen *et al.*, 2000).

There is statistically significant evidence that supports the research hypothesis *H2*, indicating
that strategic sourcing positively impacts the firm's performance by adding value to the firm. The

strategic sourcing, which includes developing relationships with key suppliers in sourcing's long-range plan, being emphasized by company's top management, and having active interaction with other functions (e.g. manufacturing, marketing, customer services, etc.) to support the company's overall strategies, leads to improvements in the firm's performance. There have been some reports showing that integrating sourcing into strategic planning leads to higher business performance (González-Benito, 2010, 2007; Chen *et al.*, 2004; Carr and Pearson, 2002, 1999; Narasimhan and Das, 1999). This study supports previous research concerning strategic sourcing and its relationship with firm performance.

However, the third hypothesis (*H3*), sourcing capability has a positive impact on firm performance, was not strongly supported. The path in the model between sourcing capability and firm performance is positive, but not statistically significant at $p<0.05$ (path coefficient=0.20, $t=1.67$). There is some evidence that sourcing capability has positive impact on firm performance, but the evidence is not strong enough. This is quite contrary to our expectation. One plausible explanation for this result might be that firms try to achieve better performance in any business environment by all kinds of means. It is not clear whether the firm's current performance result from sourcing capability or other functions. Another possible explanation may be many firms do not emphasize, develop or cultivate sourcing capability to a great extent that can lead to better business performance. In today's volatile domestic and global markets, the US textile and apparel firms may struggle for the survival in business. Although the firm regards those capabilities very important, the firm may not have appropriate organization structure, resources or human resource policies to truly develop and cultivate sourcing capability that is necessary for effective strategic sourcing implementation. It is also possible that smaller companies do not devote much to developing purchasing personnel's sourcing capability. Future research needs to further examine this relationship.

6. Implications and conclusions

6.1 Implications
Sourcing is becoming sophisticated and is evolving into a strategic and global process for organizing and fine-tuning the textile and apparel supply chain, which in turn is changing the way firms think about their organizations, their supply chain partners, and their competitive positions. The purpose of this study is to investigate the effect of strategic sourcing on sourcing capability and firm performance. The linkages between strategic sourcing, sourcing capability and firm performance are worthy of research to the field of strategic management and operations management research. The results demonstrate the significant role that strategic sourcing plays in firm's business operations. Our analysis results add to the evidence supporting strategic sourcing as an important construct in supply chain management research.

The US textile and apparel industry is global, complex and diverse; therefore, the findings from this research using large-scale survey should have broad implications for US textile and apparel firms. From a manager's perspective, as demonstrated in the study, strategic oriented sourcing clearly plays a vital role in the US textile and apparel firms. When a firm is involved in strategic sourcing, top management of the company views sourcing as an important resource of the firm and emphasizes the proactive and strategic role of sourcing function; sourcing's long-range plan includes developing relationships with key suppliers; sourcing function is treated as an equal to

other major functions in the firm and has active interaction with other functions (e.g. manufacturing, marketing, etc.). As more and more firms in the US textile and apparel industry are actively involved in global market, due to the fact that buyers, merchandising managers, and private label developers for textile and apparel products face the cultural, social, economic, legal, and political challenges when sourcing products overseas, strategic sourcing entails forward-thinking and results in the increasing importance of sourcing professionals' sourcing capability. It is imperative for textile and apparel industrial practitioners to realize that firms need to put greater emphasis on developing sourcing manager's business capabilities by providing adequate resources, trainings and support to enhance sourcing manager's knowledge, skills and capabilities in managing the global textile and apparel supply network, specifically including cross-cultural awareness, knowledge of the sourcing locations, international negotiation skills and abilities, and capability of managing international lead time risk or uncertainty. It is important for textile and apparel industrial professionals to recognize that there are benefits associated with implementing strategic sourcing. As the study results show, strategic sourcing improves the firm performance in terms of return on assets, profit margin, and market share. The study provides some support for the effect of sourcing capability on firm performance, even though the support from our data is not statistically significant at the 5 percent level. This may represent an opportunity for sourcing professionals to strengthen in their future business strategy, indicating that firms need to commit resources to fully utilize those sourcing capabilities for enhancing firm performance.

6.2 Conclusions

The empirical research reported here contributes to our understanding of strategic sourcing and its impacts using data from the US textile and apparel industry and structural equation modeling. Strategic sourcing, which is characterized by top management support, relationships development with key suppliers, and sourcing's active interaction with other functions, lays greater emphasis on building sourcing capability including awareness of cross-cultural business practices, managing international risk or uncertainty, knowledge of sourcing locations, and international negotiation skills and abilities. Strategic sourcing leads to improved firm performance by increasing firm's return on assets, profit margin and market share. The research findings may benefit textile and apparel firms to realize the linkages between strategic sourcing, sourcing capability, and firm performance, and to appreciate the importance and contributions of strategic sourcing.

At this point, it is important to acknowledge limitations of the study that may provide opportunities for future research. First, the items for measuring the constructs in the model need to be further refined and new items may need to be added or developed to capture the concepts precisely. For example, the measurements of strategic sourcing, sourcing capability and firm performance in this paper are adopted from previous research. The items might not fully tap the constructs of strategic sourcing, sourcing capability and firm performance, warranting future research needed to develop and define strategic sourcing, sourcing capability, and corresponding firm performance comprehensively. Second, this study employs the subjective measures for firm performance. In the interests of obtaining a higher response rate and remaining within budgetary constraints, the use of single informants was necessary in this study. Single informants have been used extensively in management research and are considered a reliable source when the informant is the top management in the firm (BarNir and Smith, 2002). However, we realize that

one possible limitation related to these subjective measures is that we only have one informant from each firm, which is also one of the usual limitations of survey research. Third, the current domestic and global economic environment in which the US textile and apparel business operates is constantly fluctuating. Therefore, other factors not included in the model may contribute to the interpretation of the relationships in the model, especially the relationship between sourcing capability and firm performance. Fourth, the US textile and apparel industry includes many small and medium sized companies (US Small Business Administration (SBA), 2012; Dickerson, 1999); therefore, future research should attempt to use a larger sample of different sizes of firms to assess the impact of firm size on the significance of relationships in the structural model. Future follow-up survey research and case studies may be needed to extend this work to gain deeper insights about the impact of firm size on strategic sourcing issues. Finally, another limitation of this research concerns the sample population. The results of this study are only generalizable to firms in the US textile and apparel industry. Although the US textile and apparel industry has been deemed prime exemplifier of globalization, future study of other industries needs to be done to validate the relationships in the model. For example, a cross-industry comparison would help to identify any variance between industries such as differences between manufacturing versus services, or between relatively stable industries and more dynamic ones.

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