

Global sourcing shifts in the U.S. textile and apparel industry: a cluster analysis

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Abstract:

Globalization of the U.S. textile and apparel industry has been significantly spurred in the last decade by trade agreements such as the North American Free Trade Agreement (NAFTA), and the Caribbean Basin Initiative (CBI). In terms of the U.S. textile and apparel manufacturers and retailers, the competitive pressure from markets and consumers has forced many firms to rely increasingly on global sourcing to sustain competitiveness. In the last decade, U.S. textile and apparel manufacturers and retailers have been actively involved in global sourcing to find suppliers who could meet the criteria of low cost, high quality, reliable delivery, quick response time, and flexibility. The purpose of this study is to investigate the changes in U.S. global sourcing patterns for yarn, fabric, and apparel. Cluster analysis is used to analyze trade data in 1993 and 2002 in order to investigate the patterns of U.S. global sourcing of textile and apparel products.

Results indicate that U.S. textiles and apparel sourcing patterns have shifted, with a substantially increased emphasis on apparel imports from Mexico and the CBI countries in 2002 as compared to imports from mainland China and Hong Kong in 1993. Sourcing patterns of yarn and fabric indicate that Mexico upgraded its place in U.S. imports of yarn and fabric in 2002. In addition, further longitudinal analysis of U.S. apparel imports from mainland China, Hong Kong, CBI countries, and Mexico, which were the major players in the U.S. global sourcing of apparel, shows that there was a dynamic change in the status of these four regions in terms of their respective percentage shares in U.S. apparel sourcing. The paper concludes that the U.S. textile and apparel global sourcing patterns in last decade reflect the dramatic changes in the competitive and dynamic global textile and apparel business environment. Global sourcing is indeed a fine-tuning business strategy that requires balanced and comprehensive consideration of economic, trade, environmental, and competitive factors.

Keywords: Global sourcing | U.S. textile and apparel industry | textile and apparel trade | globalization | cluster analysis

Article:

INTRODUCTION

Open international trade has encouraged nations to specialize in different branches of manufacturing and even in different stages of production within a specific industry. This process, 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.

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. A customer-driven corporate vision and effective SCM can result in several competitive advantages. The short-term objective of SCM is primarily to increase productivity and reduce inventory and cycle time, while the long-term objective is to increase customer satisfaction, market share and profits for all members of the supply chain. To realize these objectives, all strategic partners must recognize that sourcing/purchasing is the crucial link between the suppliers and the customer, with support coming from overlapping activities such as product design and transportation. SCM seeks to improve performance through better use of internal and external supplier capabilities. This, in turn, can change intercompany competition into inter-supply chain competition (Tan *et al.*, 1998; Wisner and Tan, 2000).

Sourcing, for retailers as well as manufacturers, refers to the process of determining how and where manufactured goods or components will be procured/obtained (Dickerson, 1999). Global sourcing is best defined as the process of identifying, evaluating, negotiating, and configuring supply across multiple geographies in order to reduce costs, maximize performance, and mitigate risks. Global sourcing factors that must be understood and balanced can be segmented into six categories: material costs; transportation costs; inventory carrying costs; cross-border taxes, tariffs, and duty costs; supply and operational performance; and supply and operational risks (Minahan, 2003).

Companies have increasingly adopted global sourcing strategies in support of their global business strategy. Regardless of the extent of business globalization, global sourcing and purchasing strategies are increasingly viewed as critical to realizing competitive advantage (Carter and Narasimhan, 1996; Frear *et al.* 1992; Petersen *et al.*, 2000). Increasingly, in an effort to attain a high degree of manufacturing flexibility without prohibitively expensive capital investments, firms are beginning to rely on suppliers with proven manufacturing and technological capabilities. Customization demands and the need for 'quick response' in rapidly changing markets are causing firms to recognize the strategic role that suppliers and supply

management can play in achieving sustainable competitive advantages (Carter and Narasimhan, 1996).

Over the last two decades, the U.S. textiles–apparel complex experienced radical and continuous changes in their products, processes, and business operations. Textile and apparel firms in the U.S. faced increased competition from all around the world. To gain sustainable competitiveness, the U.S. textile and apparel industries realized the importance of managing the whole textile and apparel supply chain.

The comprehensive textiles and apparel supply chain, which encompasses all of the activities of the textile complex as well as the functions of distribution and retail operations to the end users/consumers is depicted in Fig. 1 (adapted from Dickerson, 1999; Gargeya *et al.*, 2001). The textiles and apparel supply chain consists of the industry chain from fiber to textile components and processes (including some finished products and operations such as spinning, weaving, knitting, and finishing), apparel industry operations (including cutting, sewing, contracting, and marketing), through end uses of apparel, home furnishing, and industrial products.

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. From the point of view of the U.S. apparel supply chain, there is increasing tendency that each type of organizational buyer in the apparel supply chain has become more actively involved in offshore sourcing; the competition between retailers, marketers, and manufacturers has intensified, leading to a blurring of the traditional boundaries between these firms and a realignment of interests within the chain (Gereffi, 1999).

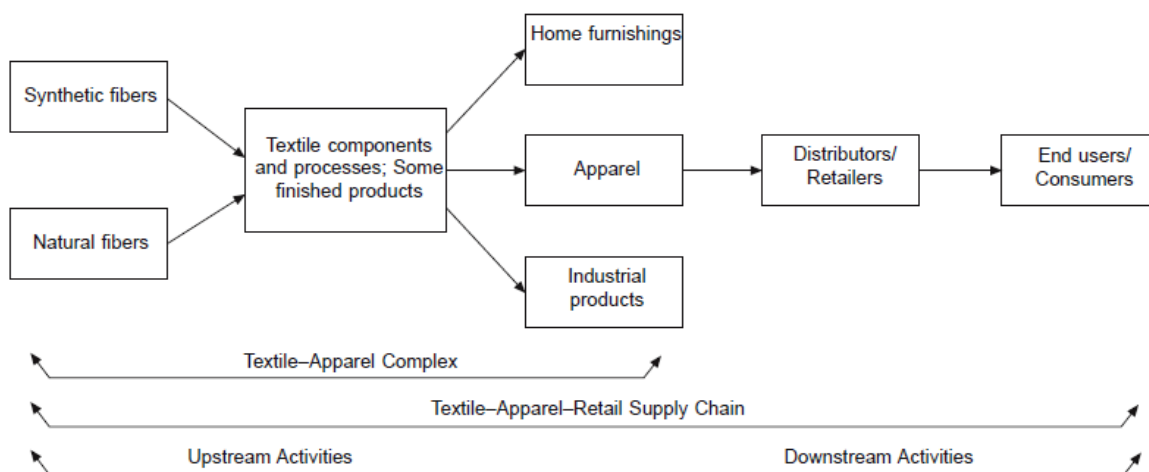


Figure 1 The textile–apparel supply chain (adapted from Dickerson, 1999, and Gargeya, Birdwell, and Martin, 2001).

The globalization of the apparel industry in the U.S. has been significantly spurred by the trade regulations and agreements such as North American Free Trade Agreement (NAFTA), U.S. Tariff Item number 807 (now known as 9802), and the Caribbean Basin Initiative (CBI). Apparel manufacturing is labor intensive, with companies historically competing on price. However, the

criteria of cost, quality, delivery speed, delivery reliability, and flexibility are becoming critical for apparel companies. Apparel products must still meet the requirements of the customer in terms of design, quality, cost, and delivery, even as the industry attempts to cope with the intense cost pressures (Gargeya *et al.* 2001).

Although global sourcing and purchasing has received a great deal of attention from researchers and practitioners alike (Carr and Pearson, 2002; Carter and Narasimhan, 1996; Ellram and Carr, 1994; Gereffi, 1994 and 1999; Leung, 2000; Monczka and Trent, 1991; Monczka *et al.*, 1994; Narasimhan and Das, 1999; Petersen *et al.*, 2000; Wisner and Tan, 2000), there exists little empirical research investigating the global sourcing shifting pattern for U.S. textile/apparel companies. In order to explore the U.S. global sourcing pattern of yarn, fabric and apparel in the most recent decade, three research questions are related to the objectives of the study:

1. What is the pattern of U.S. global sourcing of yarn, fabric, and apparel in 1993?
2. What is the pattern of U.S. global sourcing of yarn, fabric, and apparel in 2002?
3. Based on the results from the above two questions, who were the major players for the U.S. global sourcing of textiles and apparel in the last decade? What are the dynamics within the last decade for these major players?

Existing literature lacks empirical studies that investigate the big picture of the U.S. global sourcing of textiles and apparel simultaneously. This paper is an effort to address this gap through an empirical examination of the shifts of the U.S. global sourcing of textiles and apparel. This paper differs from previous studies (particularly those conducted by Gereffi, 1994, 1999, and 2001) about apparel global sourcing by conducting a multivariate technique – cluster analysis – to analyze secondary data (trade data) to comprehensively explore the U.S. global sourcing pattern of yarn, fabric and apparel for the years 1993 and 2002. The objective of cluster analysis is to form groups of countries such that each group is as homogeneous (in terms of actual volumes or U.S.\$ value) as possible with respect to U.S. textiles and apparel imports, and the groups are as different as possible on the same criteria. That is, groups have been formed with little intra-group variance and large inter-group variance. Cluster analysis of partner countries (supplier countries) for U.S. textile and apparel imports describes and demonstrates the major shifts in U.S. textiles and apparel global sourcing pattern in the last decade. Furthermore, based on the results of cluster analysis, a longitudinal analysis of the major players in the U.S. global sourcing of textiles and apparel is conducted and shows the dynamics within the last decade.

This study would aid other researchers to explore new research methods to understand the changing pattern of the U.S. global sourcing of textiles and apparel. In addition, this study would help practicing managers working in the U.S. textile and apparel industry to make appropriate sourcing decisions and develop policies keeping in view the global shifts.

This paper is organized as follows. In the next section, a review of the relevant literature on textile and apparel global sourcing of U.S. firms is presented. Then, the research methodology is described in the third section. The results of the cluster analysis with trade data for 1993 and 2002 are discussed in the fourth section, along with the further longitudinal analysis of major players in U.S. global sourcing of textiles and apparel. Further discussion of the findings and a

brief outlook of global apparel sourcing are presented in the fifth section. Finally, ideas for future research are presented in the sixth section.

LITERATURE REVIEW

This section of the paper examines the literature on global sourcing. The literature review is divided into four basic streams of research: (1) theoretical approaches in analyzing global sourcing of textiles and apparel, (2) factors driving U.S. global sourcing of textiles and apparel, (3) challenges in global sourcing, and (4) Gereffi's global sourcing pattern.

Theoretical approaches in analyzing global sourcing for textiles/apparel

Two partly overlapping and alternative approaches to understanding the global sourcing of textiles and apparel can be identified. The first is that provided by Global Commodity Chain (GCC) analysis, represented most clearly in the work of Gereffi (1994 and 1999). In this approach, the textile and apparel supply chain is identified as a buyer-driven commodity chain. Buyer-driven commodity chains refer to those industries in which large retailers, branded marketers, and branded manufacturers play the pivotal roles in setting up decentralized production networks in a variety of exporting countries, typically located in the developing countries where the cost of skilled labor for sewing operations is inexpensive. This pattern of trade-led industrialization has become common in labor-intensive, consumer goods industries such as the apparel industry.

Global out-sourcing was initiated in the 1970s by independent U.S. importing agents, and was adopted subsequently by U.S. retailers and branders (such as JC Penney and Nike). Originally, out-sourcing meant sending cut-and-sew work to manufacturers in Hong Kong, Taiwan and Korea. Later, to circumvent mounting quota restrictions and seek low-cost suppliers, manufacturers in these countries developed their own networks of producers, distributed across Thailand, Malaysia, Indonesia, and the Philippines. Subsequently, they also spread to China, Vietnam, and other Asian countries. Meanwhile, U.S. retailers delegated an increased range of service functions (such as sourcing of cloth and fabric, and product development) to their Hong Kong, Taiwanese and Korean contractors.

Gereffi (1999 and 2001) identified retailers, marketers, and branded manufacturers as the lead firms that organize the bulk of apparel imports into the U.S. market. In the past, retailers were the apparel manufacturers' main customers, but now they are increasingly becoming their competitors. As consumers demand better value, retailers have increasingly turned to imports. Marketers include companies such as Liz Claiborne, Nike, and Reebok, which literally were born with global sourcing. To deal with the influx of new competition, branded marketers have adopted several strategic responses that altered and continue to alter the content and scope of their global sourcing networks: they shrunk their supply chains, using fewer but more capable manufacturers; they instructed the contractors where to obtain needed components, thus reducing their own purchase and redistribution activities; they shifted the geography of their sourcing configuration from Asia to Mexico and Central American countries to take advantage of trade regulations. Branded manufacturers include many larger apparel manufacturers in the U.S., such as VF Corp. Their decision is no longer whether to engage in foreign production, but how to

organize and manage it. These firms supply intermediate inputs (fabric, thread, buttons, and other trim) to extensive networks of offshore suppliers, typically located in neighboring countries with reciprocal trade agreements that allow goods assembled offshore to be re-imported with a tariff charged only on the value added by the foreign labor.

Abernathy and co-workers (1999) provided the basis for an alternative interpretation of the shift to sourcing 'nearer to home'. According to them, wage-cost considerations have little to do with it and concessionary tariff levels are of secondary importance. Rather, the shift arises mainly from lead-time considerations – which are in turn explained in terms of the rise of lean retailing. During the early 1990s, the latter trend became U.S. retailers' paradigmatic response to the problems of overinvestment in retail space, product proliferation, sharply intensified price competition and resulting reductions in margins. Lean retailing attempts to minimize the costs associated with holding inventory, with forced markdowns to clear unsold goods, and with 'stock-outs'. It does so partly on the basis of using more accurate sales forecasts, itself made possible by the adoption of electronic sales registers and electronic data interchange (EDI). Although this is not much explored by Abernathy *et al.* (1999), lean retailing has obvious implications for supplier entry barriers. The investment costs of conformity with new EDI standards are considerable, but even more so are the additional working capital costs required by supplier managed inventory. Furthermore, there are new geographical constraints on production locations, in terms both of distance from distribution centers and predictability of times of arrival at distribution centers. Abernathy, and co-workers lean retailing approach shows that apparel suppliers are under pressure to fulfill retailers' orders rapidly, efficiently, and flexibly. Logistics play a key role in apparel sourcing. This, in turn, impacts on the U.S. global sourcing of textiles and apparel.

In summary, the past literature (particularly the work of Gereffi, 1994, 1999, and 2001; and Abernathy *et al.*, 1999) described theoretical approaches in analyzing global sourcing for U.S. textiles and apparel. Economic, environmental and competitive factors have contributed to the global sourcing of firms in the last couple of decades. In spite of the technological, cultural, political, infrastructural, and economic challenges in building global supply network in the apparel industry, the imports of textiles and apparel into the U.S. increased substantially in the last 10 years.

Factors driving global sourcing for the 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 (Tyagi, 2003). 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 sourcing strategy was key to accomplishing that goal (Carter and Narasimhan, 1996; Leung, 2000; Petersen *et al.*, 2000). Birou and Fawcett (1993), Monczka and Trent (1991), Watts *et al.* (1995), and Gargeya *et al.* (2001) identified the major reasons for global sourcing 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; Carter and Narasimhan, 1996; Cho and Kang, 2001). In 1981, apparel imports comprised only 15.4% of the American apparel market, while by 1996 the market share of apparel imports was about 40 percent of the apparel products sold in the U.S. (Cho and Kang, 2001). 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 U.S., apparel products can be procured at relatively lower prices from these countries than from domestic sources (Barbee, 1998; Cho and 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) examined the potential impact of sourcing on flexibility. They found that strategic sourcing can be used to target specific manufacturing flexibilities and added that inter-flexibility synergies need to be considered while formulating the buying firm's flexibility-based manufacturing strategies. 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 U.S. 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.

Challenges of global sourcing for textiles and apparel

While global sourcing has been steadily increasing, a number of problems remain unresolved. International logistics generally cover longer distances than domestic logistics. A longer distance in turn creates a longer lead time, which requires more inventories and creates more opportunities for things to go wrong. Transportation systems and intermediaries may not be as reliable as in the home country, which can cause delays in delivery and can make inventory management much less flexible (Cho and Kang, 2001).

Cross-cultural business practices impact heavily on communication, conflict, and perceived relationship performance between U.S. and foreign suppliers (LaBahn and Harich, 1997). Values, attitudes, manners, customs, religions and languages are the components of culture.

Differences in these factors can cause miscommunication and create further problems in supplier evaluation, contracting, product inspection and maintaining relationships in global sourcing.

Global businesses take exchange rate risk, political risk, and legal environment into consideration in making global sourcing decisions. Exchange rate issues have become more important in recent years, especially in emerging markets. Global sourcing of textile and apparel products are mainly from developing countries (some of which are politically and economically unstable). The U.S. firms are exposed to exchange rate volatility and sometimes unexpected political risk in some countries.

Other challenges in global sourcing include information sharing and government regulations. Little sharing of information among retailers, distributors and suppliers constrains the responsiveness of the supply system and makes the apparel supply chain inefficient (Leung, 2000). Government regulations influence global sourcing directly and indirectly and often make it complicated. The most directly influential trade regulations are tariffs and quotas. Non-tariff restrictions and various kinds of international trade policies are also difficult challenges which buying firms face. NAFTA and the CBI bill impact the U.S. global sourcing of textiles and apparel products substantially (Gargeya *et al.* 2001).

Pattern of U.S. apparel global sourcing

Gereffi (1997) provided an import map (with concentric circles) that helps to identify shifts in the regional structure of U.S. apparel imports from 1986 to 1996. The rings indicate the percentage share of total U.S. imports (in U.S.\$) by partner countries. The 1996 position corresponds to the ring where the country's name is located; the 1986 position, if different, is indicated by a small circle. The arrows represent the magnitude and direction of change over time. Those nations in the innermost circle each account for 10 percent or more of the total value of U.S. clothing imports in 1996, while each of those in the outer ring makes up 1 to 2 percent of total imports. In other words, as countries move from the outer rings to the inner ones in the import map, their relative importance to U.S. apparel imports increases.

Gereffi's (1997) import map illustrated directly the movement of individual supplier countries in the U.S. apparel imports between 1986 and 1996. However, the current paper uses a different analysis approach, namely, a multivariate technique – cluster analysis, to comprehensively identify group of countries that are similar to each other with respect to U.S. yarn, fabric and apparel imports in 1993 and 2002. We have also used two sets of data points (1993 and 2002) across a ten year period as was done by Gereffi (1994, 1997, 1999, and 2001). We have looked at yarn, fabric, and apparel data while Gereffi (1994, 1997, 1999, and 2001) studied only apparel imports by U.S. firms.

RESEARCH METHODOLOGY

Trade data of U.S. imports of textiles and apparel (U.S. Textiles and Apparel Imports Trade Data, 2003) shows that the total amount of U.S. global sourcing experienced dramatic change from 1993 to 2002 (Table 1). Table 1 shows the general trends of U.S. textile and apparel imports from 1993 to 2002: the total amount of U.S. textile and apparel imports from the world

(in U.S. \$) doubled from 1993 to 2002; Mexico and China were two leading suppliers in the world, providing the U.S. market with various textiles and apparel products; it seemed that other countries did not exhibit substantial change during this period. However, it is not clear about the U.S. global sourcing patterns with respect to specific categories (in terms of yarn, fabric and apparel) from Table 1. To better understand detailed sourcing patterns with respect to yarn, fabric and apparel, in the current paper, trade data of U.S. imports of yarn, fabric and apparel in 1993 and 2002 were used to investigate the changes in U.S. global sourcing patterns (Tables 2 and 3).

In order to identify the groups of countries from which U.S. global sourcing has a similar pattern, a multivariate technique – cluster analysis (Sharma, 1996) – was carried out using U.S. textiles and apparel import data from 25 countries/regions in 1993 and 2002, respectively. U.S. textiles and apparel imports from these 25 countries/ regions accounted for 86% and 83% of total U.S. textiles and apparel imports (in U.S. \$) from the world in 1993 and in 2002, respectively.

To explore the first two research questions (given in the Introduction section), cluster analysis is a useful multivariate technique to identify groups of entities that are similar to each other with respect to certain characteristics. Each group or cluster is as homogenous as possible with respect to certain characteristics, and each group should be different from other groups with respect to the same characteristics (Sharma, 1996).

For research question 1, groups of countries/regions from which U.S. imported yarns, fabrics and apparel in a similar pattern in 1993 are identified. For research question 2, groups of countries/regions from which U.S. imported yarns, fabrics, and apparel in a similar pattern in 2002 are identified. Based on the results of the first two research questions, major players in the U.S. global sourcing of yarn, fabric, and apparel are identified. Longitudinal trade data analysis of these major suppliers in U.S. global sourcing of textiles and apparel is conducted. The next section presents the results from the data analysis.

ANALYSIS AND RESULTS

Trade data in Tables 1, 2 and 3 show that U.S. imports of textiles and apparel increased substantially from 1993 and 2002. U.S. total textile and apparel imports from the world grew from U.S.\$ 36 078.9 million in 1993 to U.S.\$ 72 183.1 million in 2002, doubling in the last decade. U.S. yarn imports from the world grew from U.S.\$ 718.3 million in 1993 to U.S.\$ 1303.5 million in 2002, increasing by more than 80%. U.S. fabric imports from the world grew from U.S.\$ 4017.8 million in 1993 to U.S. \$ 5493.2 million in 2002, increasing by more than 30%. U.S. apparel imports from the world grew from U.S.\$ 28 215.6 in 1993 to U.S.\$ 56 963.4 million in 2002, increasing by about 100%. The main reasons for the dramatic growth of U.S. apparel imports were the cost advantage that the foreign sources offered, trade agreement influences, and lean retailing requirements. U.S. textile and apparel firms expanded their sourcing to supply the U.S. domestic market and to meet U.S. consumers' needs.

Table 1 U.S. imports of textiles and apparel from 1993 to 2002 (in million U.S. \$)

Country	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Bangladesh	765.9	927.4	1,114.6	1,177.7	1,498.4	1,695.0	1,753.9	2,204.7	2,205.0	1,989.7
Canada	1,019.9	1,317.1	1,651.0	1,994.8	2,401.2	2,756.1	3,053.3	3,350.1	3,162.4	3,198.8
China	4,766.9	4,930.7	4,800.1	4,889.6	6,023.5	5,900.4	6,128.8	6,527.5	6,536.3	8,744.0
Costa Rica	658.8	693.4	766.3	710.1	849.6	831.1	831.3	828.9	753.3	729.8
Dominican Republic	1,457.7	1,616.4	1,786.6	1,802.1	2,272.5	2,395.0	2,384.9	2,451.2	2,274.5	2,173.3
El Salvador	268.1	420.9	607.0	747.9	1,078.7	1,203.2	1,363.5	1,616.2	1,645.7	1,709.4
France	292.6	334.6	354.4	363.2	373.6	410.4	408.6	432.0	422.9	421.9
Germany	404.0	374.6	345.8	332.4	337.0	302.7	290.9	301.3	312.4	325.9
Guatemala	565.1	612.1	698.4	806.0	971.3	1,144.7	1,243.5	1,498.0	1,613.7	1,668.9
Honduras	508.3	647.7	921.1	1,222.5	1,663.3	1,878.5	2,164.2	2,328.3	2,347.5	2,443.6
Hong Kong	3,956.8	4,405.5	4,390.8	4,031.0	4,100.2	4,622.9	4,465.0	4,707.0	4,403.0	4,032.3
India	1,285.5	1,520.3	1,614.0	1,736.4	2,009.5	2,287.3	2,384.3	2,740.7	2,633.3	2,992.6
Indonesia	1,111.4	1,170.2	1,336.1	1,493.0	1,872.4	1,972.7	1,958.7	2,380.2	2,552.7	2,328.7
Italy	1,048.4	1,271.3	1,464.0	1,703.1	1,846.4	1,975.7	2,001.8	2,128.5	2,063.0	2,030.6
Japan	582.9	583.7	480.5	450.5	473.4	471.3	434.8	470.2	444.8	460.5
Korea, S	2,476.9	2,448.8	2,267.4	2,047.1	2,287.8	2,638.5	2,887.2	3,071.8	2,930.8	2,881.2
Malaysia	678.5	704.0	745.0	706.9	715.1	782.4	809.9	851.9	813.9	774.9
Mexico	1,371.9	1,894.4	3,035.9	4,229.5	5,927.7	7,452.5	8,620.6	9,692.9	8,945.1	8,619.1
Pakistan	651.6	767.9	964.8	1,011.2	1,197.3	1,427.2	1,475.1	1,834.7	1,923.8	1,982.7
Philippines	1,337.1	1,457.0	1,702.3	1,705.2	1,845.6	2,071.6	2,155.6	2,289.0	2,248.0	2,041.6
Sri Lanka	840.2	892.4	1,025.0	1,138.8	1,362.3	1,487.7	1,469.9	1,677.4	1,698.3	1,526.9
Taiwan	2,860.9	2,829.8	2,755.7	2,732.0	2,812.1	2,832.2	2,708.9	2,755.9	2,475.6	2,207.5
Thailand	1,131.1	1,234.0	1,417.4	1,399.8	1,660.7	1,964.5	2,074.3	2,447.1	2,441.4	2,203.4
Turkey	472.2	688.2	805.1	745.6	885.8	1,067.0	1,183.1	1,463.0	1,451.0	1,678.0
UK	347.5	394.0	420.5	439.9	495.5	519.7	477.6	521.8	506.3	470.3
World	36,078.9	39,980.9	43,952.9	45,915.5	54,001.9	60,397.3	63,742.9	71,691.5	70,239.8	72,183.1
Total of 25 countries	30,860.0	34,136.3	37,469.9	39,616.4	46,960.8	52,090.4	54,729.8	60,570.0	58,804.7	59,635.9
% share	85.5	85.4	85.3	86.3	87.0	86.2	85.9	84.5	83.7	82.6

Source: Compiled from Official statistics of U.S. Department of Commerce, Office of Textiles and Apparel, <http://otexa.ita.doc.gov>.

Note: The statistics are summarized as the general import statistics in notional categories.

Table 2 U.S. imports of textiles and apparel from 25 countries in 1993 and 2002 (in million M2*)

Country	Total 1993	Total 2002	Yarn 1993	Yarn 2002	Fabric 1993	Fabric 2002	Apparel 1993	Apparel 2002
Bangladesh	398.7	1,149.8	0.0	1.7	0.2	6.4	355.4	927.7
Canada	1,119.6	3,386.8	351.0	837.2	608.2	1,874.8	77.0	291.7
China	2,111.6	4,963.1	32.9	31.6	456.0	612.6	935.5	1,565.0
Costa Rica	252.3	377.1	5.9	13.8	5.6	0.5	240.6	361.6
Dominican Republic	548.6	743.3	0.0	0.0	0.3	3.0	488.2	730.0
El Salvador	132.1	816.8	25.3	18.1	7.2	4.3	98.0	777.2
France	89.1	159.8	14.8	28.6	63.2	105.3	5.2	11.9
Germany	318.2	550.7	182.7	139.0	120.8	367.9	4.3	6.1
Guatemala	194.0	451.9	7.9	2.0	25.8	2.4	156.6	415.4
Honduras	157.9	1,098.8	0.9	0.7	3.0	2.2	152.8	1,090.2
Hong Kong	935.4	961.7	3.4	0.2	141.2	97.3	771.9	821.3
India	641.3	1,544.7	3.1	23.6	135.7	169.8	232.1	508.7
Indonesia	478.2	1,215.4	34.8	113.4	155.5	235.0	260.4	594.6
Italy	188.9	518.0	28.1	100.9	108.8	292.1	40.4	96.2
Japan	309.8	270.4	32.7	32.3	265.6	200.4	8.7	26.7
Korea, S.	872.5	2,032.2	27.5	46.2	286.9	959.9	427.5	650.0
Malaysia	245.5	325.6	9.7	78.4	92.8	48.8	139.7	193.1
Mexico	746.2	4,335.1	150.4	566.3	120.8	570.0	321.6	2,157.2
Pakistan	621.6	2,536.9	4.9	297.5	317.9	695.9	124.2	382.1
Philippines	479.3	817.4	1.6	46.2	10.0	66.9	393.0	550.5
Sri Lanka	285.8	559.1	6.2	27.7	14.9	31.7	237.0	393.9
Taiwan	1,230.1	1,391.3	24.0	27.9	341.4	610.2	652.3	575.7
Thailand	671.8	1,315.5	78.8	143.3	201.7	272.5	227.7	490.3
Turkey	222.8	1,068.3	31.7	81.1	47.6	238.2	105.5	346.9
UK	120.3	167.5	26.0	14.5	33.9	113.6	11.7	19.6
World total	15,847.5	38,284.6	1,517.2	3,143.2	4,310.9	8,680.9	7,545.8	17,256.4
25 countries total	13,371.4	32,757.3	1,084.6	2,672.2	3,565.1	7,581.6	6,467.5	13,983.7
% share of 25 countries	84.4	85.6	71.5	85.0	82.7	87.3	85.7	81.0

Source: Compiled from Official statistics of the U.S. Department of Commerce, Office of Textiles and Apparel, <http://otexa.ita.doc.gov>.

Note: (1) The statistics are summarized as the general import statistics in notional categories.

(2)* The quantity unit is M2 (Metric Equivalent), which is a notional, common unit of quantity, constant across categories and time. Conversion factors are used to convert units of quantity into M2.

In 1993 and in 2002, U.S. imports of textiles and apparel from the 25 countries/regions surveyed accounted for more than 80 percent of U.S. total imports from the world. In 1993, U.S. imports of yarn, fabric, and apparel from the 25 countries/regions accounted for about 74%, 84%, and 86% respectively of U.S. imports of yarn, fabric and apparel (in U.S.\$) from the world. In 2002, U.S. imports of yarn, fabric, and apparel from the 25 countries/regions accounted for about 85%, 89%, and 81% respectively of U.S. imports of yarn, fabric, and apparel (in U.S.\$) from the world. These 25 countries/regions were major suppliers to U.S. market during last decade. Another point is that these 25 countries/regions exhibited quite different characteristics in exporting textiles and apparel to the U.S. in 1993 and 2002. Analysis of U.S. global sourcing of textiles and apparel from these 25 countries/regions is provided in the next subsection.

Shifts of U.S. global sourcing of textiles and apparel

Cluster analysis was used to identify groups of countries/regions that were similar to each other with respect to export of yarn, fabric and apparel to the U.S in 1993 and 2002, respectively. Complementary clustering techniques (namely, hierarchical and nonhierarchical techniques with Ward's method) were used to get the interpretable solution. Euclidean distance for standardized data was used as a similarity measure in clustering because it has scale invariant property

(Sharma, 1996). Results from different hierarchical clustering methods suggested the general consistency of the results and Ward's method was chosen to get a reasonable and interpretable solution. Nonhierarchical clustering was used to refine the results from hierarchical clustering (Sharma, 1996). R-squared measures the extent to which groups or clusters are different from each other, or alternatively, it measures the extent to which the groups are homogenous. R-squared should be high (Sharma, 1996) to emphasize homogeneity within cluster and heterogeneity between clusters.

Six clusters, which result in an interpretable and reasonable solution, were identified for 1993 and 2002 respectively, based on the statistics for evaluating cluster solutions, the objectives of this study, the type of the data, and the interpretability of the resulting solution. For the content of this study, it can be clearly seen that the clusters differ with respect to the export figures (in units or US\$) of yarn, fabric, and apparel. The U.S. global sourcing pattern of textiles and apparel product in 1993 and in 2002 are shown in Tables 4, 5, 6, and 7.

From the analyses in Tables 4, 5, 6, and 7, the U.S. global sourcing patterns are different for 1993 and 2002. In terms of quantity in units, (1) Mexico moved from 'medium yarn, low fabric, and low apparel exports to U.S.' group in 1993 to 'high yarn, medium fabric, and very high apparel exports to U.S.' group in 2002; (2) Hong Kong moved from the 'low yarn, medium fabric, and high apparel exports to U.S.' group in 1993 to 'low yarn, low fabric, and medium apparel exports to U.S.' group in 2002; (3) South Korea and Taiwan moved from the 'low yarn, medium-high fabric, and medium apparel exports to U.S.' group to 'low yarn, medium fabric, and low apparel exports to U.S.' group; (4) China did not change its position from the 'low yarn, medium fabric, and high apparel exports to U.S.' group for 1993 and 2002; (5) Canada maintained its position of 'high yarn, high fabric, and low apparel exports to U.S.' category for 1993 and 2002; and (6) major CBI countries were in 'low yarn, low fabric, and medium apparel exports to U.S.' group in 2002. In terms of U.S. import quantity in U.S. \$, results are similar.

It should be noted that yarn, fabric and apparel exports were considered simultaneously to identify groups in cluster analysis. Countries in each group or cluster were as homogenous as possible with respect to certain characteristics (yarn, fabric, and apparel exports). There was not much difference between volume data and value data; however, we think it is more reasonable to use volume data because value data could be impacted by other factors such as exchange rate issues.

Table 4 U.S. global sourcing pattern for textiles/apparel in 1993 (in quantity units, million M2)*

Cluster	Country	Sourcing volume (in units, million M2)		
		Yarn	Fabric	Apparel
1	Costa Rica, El Salvador, France Guatemala, Honduras, Italy, Malaysia, Sri Lanka, Turkey, UK	low (0.922–31.729)	low (3.01–108.824)	low (5.229–240.588)
2	Bangladesh, Dominican Republic, Philippines	low (0–1.620)	low (0.182–10.042)	medium (355.448–488.217)
3	India, Indonesia, Japan, Pakistan, Thailand	low (3.106–78.799)	medium (135.7–317.896)	low (8.678–260.394)
4	China, Hong Kong, South Korea, Taiwan	low (3.436–32.950)	medium-high (141.2–456.016)	medium-high (427.547–935.535)
5	Germany, Mexico	medium (150.446–182.687)	low (120.776–120.793)	low (4.316–321.579)
6	Canada	high (351.034)	high (608.156)	low (77.04)

Note: (1) The reported R-squared values for each variable (0.960, 0.855, 0.788) suggest yarn, fabric, and apparel, are appropriate for forming clusters.

(2)* The quantity unit is M2 (Metric Equivalent), which is a notional, common unit of quantity, constant across categories and time. Conversion factors are used to convert units of quantity into M2 (U.S. Department of Commerce, Office of Textiles and Apparel, 2003).

Table 5 U.S. global sourcing pattern for textiles/apparel in 1993 (in million U.S. \$)

Cluster	Country	Sourcing volume (in million U.S. \$)		
		Yarn	Fabric	Apparel
1	Bangladesh, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, India, Indonesia, Malaysia, Pakistan, Philippines, Sri Lanka, Turkey	low (0–12.658)	low (0.083–134.434)	low (251.179–1409.850)
2	France, Mexico, Thailand, UK	medium (21.754–58.579)	low (67.835–121.402)	low (125.913–1127.024)
3	South Korea, Taiwan	low (13.832–13.995)	high (344.435–411.881)	medium (1883.65–2196.546)
4	China, Hong Kong	low (2.63–13.317)	medium (149.356–273.971)	high (3449.663–3775.837)
5	Italy, Japan	medium (26.406–28.089)	high (295.143–465.275)	low (78.537–683.561)
6	Canada, Germany	high (90.255–144.209)	medium (214.783–302.728)	low (83.334–453.778)

Note: The reported R-squared values for each variable (0.907, 0.871, 0.884) suggest yarn, fabric and apparel are appropriate for forming clusters.

U.S. apparel imports grew significantly and there were substantial changes during the last decade, compared to U.S. imports of yarn and fabric. Results also show that Mexico, CBI countries, Hong Kong, and China were still major U.S. textile and apparel suppliers but they demonstrated quite different changes from 1993 to 2002 in U.S. global sourcing of textiles and apparel. They were major players and had significant impacts in the U.S. global textile–apparel–retail supply network. Hence, further analysis was carried on these four regions/countries in the next subsection.

Further analysis of China, Hong Kong, CBI Countries, and Mexico

Cluster analysis results show that China, Hong Kong, CBI countries, and Mexico could be identified as the major players in the U.S. global sourcing of textiles and apparel because of their dominant role in the supply market for the U.S. textiles–apparel–retail supply network. These four regions/countries experienced substantial changes in their percentage share during the last decade. Table 8 and Fig. 2 show the longitudinal trends of U.S. general imports of textiles and apparel from these four regions/countries from 1993 to 2002. Tables 9 and 10, and Figures 3 and 4 show the longitudinal trends of the U.S. imports of apparel from these four regions/countries.

In order to examine the changing relationship in product composition between 1993 and 2002 for the entire set of products imported from China, Hong Kong, Mexico, and CBI countries, Spearman rank correlations were calculated for each region/country, using all product categories and their corresponding 1993 and 2002 percentage shares of total imports (in U.S.\$). The results are shown in Table 11, indicating that the basic ranking of product categories between the two periods did not change significantly.

Table 6 U.S. global sourcing pattern for textiles/apparel in 2002 (in quantity units, million M2)*

Cluster	Country	Sourcing volume (in million M2)		
		Yarn	Fabric	Apparel
1	Costa Rica, France, Germany, Guatemala India, Indonesia, Italy, Malaysia, Philippines, Sri Lanka, Thailand, Turkey, UK	low (1.963–143.3)	low (0.458–367.875)	low (6.117–594.645)
2	Bangladesh, Dominican Republic, El Salvador, Honduras, Hong Kong	low (0.002–18.109)	low (2.213–97.272)	medium (730.03–1090.177)
3	South Korea, Pakistan, Taiwan	low-medium (27.851–297.516)	medium-high (610.191–959.910)	low (382.067–649.954)
4	China	low (31.594)	medium (612.640)	high (1564.962)
5	Canada	very high (837.245)	very high (1874.781)	low (291.656)
6	Mexico	high (566.304)	medium (569.980)	very high (2157.196)

Note (1) The reported R-squared values for each variable (0.916, 0.940, 0.873) suggest yarn, fabric and apparel are appropriate for forming clusters.

(*2) The quantity unit is M2 (Metric Equivalent), which is a notional, common unit of quantity, constant across categories and time. Conversion factors are used to convert units of quantity into M2 (U.S. Department of Commerce, Office of Textiles and Apparel, 2003).

Table 7 U.S. global sourcing pattern for textiles/apparel in 2002 (in million U.S. \$)

Cluster	Country	Sourcing volume ((in million U.S. \$)		
		Yarn	Fabric	Apparel
1	Bangladesh, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, India, Indonesia, Malaysia, Philippines, Sri Lanka, Thailand, Turkey	low (0.007–44.641)	low (0.377–148.110)	low-medium (720.911–2439.710)
2	France, Germany, Japan, UK	low (20.356–70.533)	low (127.906–257.710)	very low (44.549–235.051)
3	Italy, South Korea, Pakistan, Taiwan	low (12.832–88.435)	medium-high (358.439–656.584)	low-medium (878.353–2061.872)
4	China, Hong Kong	low (0.107–14.791)	medium (110.520–396.151)	high (3877.242–5593.696)
5	Mexico	high (213.742)	medium (429.947)	very high (7424.198)
6	Canada	very high (384.282)	high (813.507)	low (1610.112)

Note: The reported R-Squared values for each variable (0.948, 0.883, 0.918) suggest yarn, fabric and apparel are appropriate for forming clusters.

FINDINGS AND DISCUSSIONS

Discussions of the findings

The U.S. global sourcing patterns of textiles and apparel have been shifting during the last decade. As a result of preferential trade agreements and closer geographical position to the U.S., the U.S. expanded sourcing from Mexico, Canada, and Caribbean Basin Initiative countries, compared to Asian countries. South Korea and Taiwan maintained their status as major suppliers of fabrics but became less important in U.S. apparel sourcing. While for most countries the degree of change during the last decade was relatively modest, only Mexico improved its position substantially.

Table 8 U.S. imports of textiles and apparel from China, Hong Kong, CBI and Mexico from 1993 to 2002 (in U.S. \$)

Country	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
China (US\$)	4,766,864,279	4,930,665,096	4,800,131,244	4,889,639,849	6,023,518,221	5,900,388,614	6,128,820,267	6,527,482,254	6,536,315,121	8,744,046,085
Hong Kong (US\$)	3,956,756,019	4,405,500,809	4,390,756,294	4,030,963,388	4,100,157,319	4,622,867,217	4,464,968,991	4,706,955,077	4,402,966,203	4,032,309,168
CBI (US\$)	4,064,443,108	4,592,480,676	5,543,968,063	6,106,353,646	7,693,218,292	8,384,737,745	8,917,510,528	9,629,260,013	9,452,187,673	9,538,174,032
Mexico (US\$)	1,371,897,480	1,894,415,693	3,035,910,403	4,229,470,907	5,927,665,769	7,452,537,164	8,620,564,653	9,692,902,384	8,945,096,560	8,619,144,616
World (US\$)	36,078,870,889	39,980,881,705	43,952,864,002	45,915,494,408	54,001,862,583	60,397,285,456	63,742,884,861	71,691,546,462	70,239,764,571	72,183,130,570
China (%share)	13.2	12.3	10.9	10.6	11.2	9.8	9.6	9.1	9.3	12.1
Hong Kong (%share)	11.0	11.0	10.0	8.8	7.6	7.7	7.0	6.6	6.3	5.6
CBI (%share)	11.3	11.5	12.6	13.3	14.2	13.9	14.0	13.4	13.5	13.2
Mexico (%share)	3.8	4.7	6.9	9.2	11.0	12.3	13.5	13.5	12.7	11.9

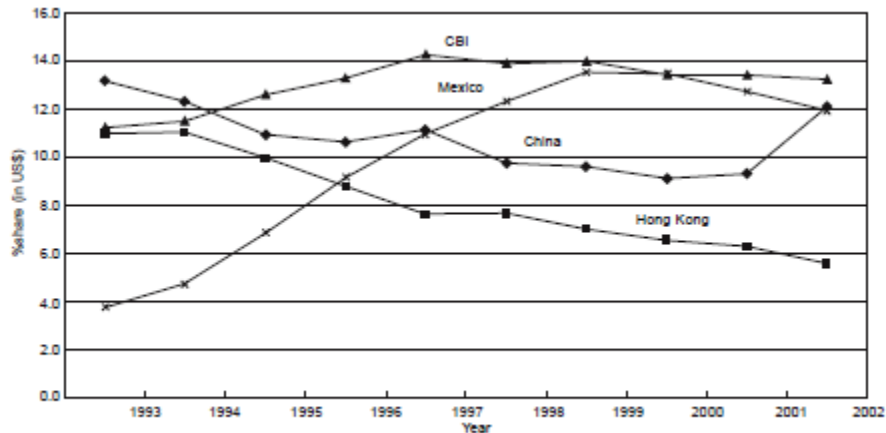


Figure 2 U.S. imports of textiles and apparel from China, Hong Kong, CBI, and Mexico from 1993 to 2002 (in U.S. \$).

Table 9 U.S. imports of apparel (by quantity in million M2*) from China, Hong Kong, CBI countries, and Mexico

Year	World total	China		Hong Kong		CBI countries		Mexico	
		Total	%share	Total	%share	Total	%share	Total	%share
1993	7545.849	935.535	12.40	771.860	10.23	1391.279	18.44	321.579	4.26
1994	8421.450	934.151	11.09	864.443	10.26	1609.990	19.12	481.912	5.72
1995	9254.890	862.090	9.31	820.869	8.87	2009.833	21.72	774.220	8.37
1996	9658.472	862.062	8.93	759.679	7.87	2259.377	23.39	1099.224	11.38
1997	11349.130	947.376	8.35	736.450	6.49	2842.734	25.05	1555.103	13.70
1998	12885.669	910.256	7.06	862.469	6.69	3065.677	23.79	1984.577	15.40
1999	14102.857	910.407	6.46	840.948	5.96	3415.799	24.22	2306.888	16.36
2000	16035.348	929.159	5.79	916.306	5.71	3650.900	22.77	2526.814	15.76
2001	16103.472	975.980	6.06	916.931	5.69	3570.139	22.17	2290.142	14.22
2002	17255.768	1564.962	9.07	821.261	4.76	3713.912	21.52	2157.196	12.50

*The quantity unit is M2 (Metric Equivalent), which is a notional, common unit of quantity, constant across categories and time. Conversion factors are used to convert units of quantity into M2 (U.S. Department of Commerce, Office of Textiles and Apparel, 2003).

Table 10 U.S. imports of apparel (in million U.S. \$) from China, Hong Kong, CBI countries, and Mexico

Year	World total	China		Hong Kong		CBI countries		Mexico	
		Total	%share	Total	%share	Total	%share	Total	%share
1993	28215.586	3449.663	12.23	3775.837	13.38	3963.820	14.05	1127.024	3.99
1994	31386.485	3588.710	11.43	4205.140	13.40	4489.178	14.30	1593.979	5.08
1995	34648.598	3518.049	10.15	4188.720	12.09	5432.617	15.68	2565.763	7.41
1996	36388.800	3769.186	10.36	3860.787	10.61	6009.372	16.51	3559.937	9.78
1997	42826.908	4487.889	10.48	3934.514	9.19	7584.497	17.71	5050.085	11.79
1998	48175.628	4311.717	8.95	4428.433	9.19	8270.401	17.17	6493.643	13.48
1999	50795.301	4370.229	8.60	4255.871	8.38	8803.189	17.33	7537.512	14.84
2000	57231.656	4498.969	7.86	4486.095	7.84	9541.187	16.67	8412.625	14.7
2001	56460.383	4602.353	8.15	4211.399	7.46	9375.280	16.61	7811.241	13.83
2002	56963.397	5593.696	9.82	3877.242	6.81	9471.109	16.63	7424.198	13.03

Mexico dramatically changed its position in the U.S. global sourcing of textiles and apparel, moving from ‘medium yarn, low fabric, and low apparel exports to U.S.’ group in 1993 to ‘high yarn, medium fabric, and very high apparel exports to U.S.’ group in 2002. Mexico, on account of NAFTA, gained in status in terms of U.S. global sourcing of textiles and apparel. NAFTA came into effect on January 1, 1994 among the three member countries –USA, Canada, and Mexico. The tariffs were phased out over a 10 year period for textiles and apparel products made in NAFTA countries (U.S. Department of Commerce, Office of Textiles and Apparel, 2004). NAFTA requires manufacturers to source materials within North America to benefit from tariff-free trade. Beginning in 1994, NAFTA not only allowed instant duty entry of garments

assembled in Mexico from U.S. fabrics, but also gradually allowed Mexico to perform yarn, fabric, and apparel production. U.S. duties and quotas on Mexico's yarn and fabric exports were eliminated after five years on NAFTA-qualifying goods. It was under NAFTA that Mexico dramatically increased its exports of yarn, fabric and apparel to the U.S. market, which was reflected in the increasing export figures of textile and apparel products. NAFTA's trade benefits have complemented Mexico's other competitive advantages (such as its proximity to the U.S., and having a skilled labor force, vertically integrated industry, and close supplier – customer ties), making Mexico an attractive investment location for textile companies from North America and outside the region.

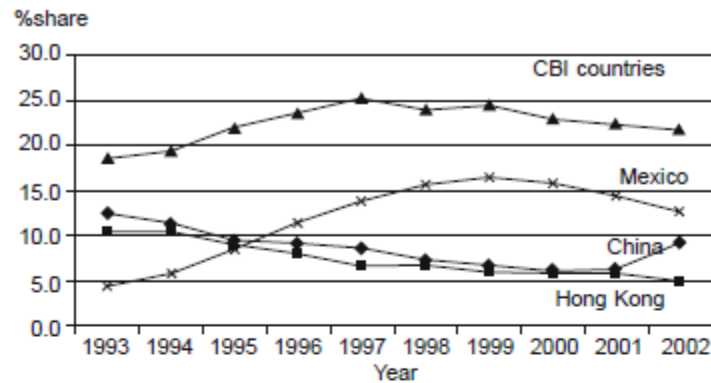


Figure 3 U.S. imports of apparel from China, Hong Kong, CBI countries, and Mexico (in units, million M2*)

* The quantity unit is M2 (Metric Equivalent), which is a notional, common unit of quantity, constant across categories and time. Conversion factors are used to convert units of quantity into M2 (U.S. Department of Commerce, Office of Textiles and Apparel, 2003).

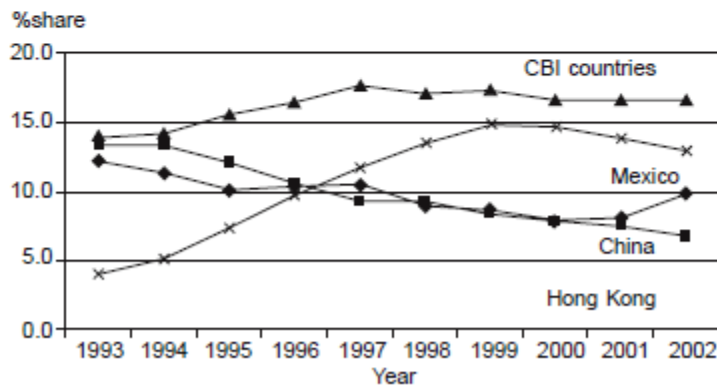


Figure 4 U.S. imports of apparel from China, Hong Kong, CBI countries, and Mexico (in U.S. \$).

Similarly, Canada also had the advantage of exporting yarn and fabric to the U.S. under NAFTA. That is, all duties between the U.S. and Canada on textiles and apparel trade were eliminated on January 1, 1998. Canada's textile manufacturing industry had substantial and sustained capital investment which made it modern and efficient, with rapidly growing productivity. In addition, Canada's proximity to the U.S. market, and its highly advanced logistics management systems enabled Canada to be a major yarn and fabric supplier to the U.S. However, for apparel, Canada

had higher labor cost, so its apparel export in the last decade was not competitive compared to other countries.

The Caribbean Basin Economic Recovery Act (CBERA) of 1983 (amended in 1990) and the Caribbean Basin Trade Partnership Act (CBTPA) of 2000, collectively known as CBI, provides customs duty-free entry to the U.S. for a broad range of products from CBI beneficiary countries. The CBTPA significantly expands preferential treatment for apparel made in the Caribbean Basin region: duty-and quota-free treatment is provided for apparel made in the CBI from U.S. fabrics formed from U.S. yarns. This brought CBI countries some degree of parity with NAFTA partner countries. CBI countries have been major apparel exporters to the U.S. market in the last decade. Moreover, the proximity of CBI countries to the U.S. market, and the Caribbean's speed advantage over Asia provided an important advantage for sourcing of apparel from CBI countries. However, lack of supporting textile production capability in CBI countries and the strict rule of origin under CBTPA (for apparel manufactured from U.S. yarns and fabrics) placed those countries at a disadvantage.

Increasing cost considerations have forced most of the industries to look for an optimal way of executing supply-chain transactions. For labor-intensive industries such as apparel, low labor cost offers an incomparable advantage. Apparel manufacturing can and will go to any country/region with lower wages. Statistics show the average hourly wages in the apparel industry for U.S., Hong Kong, Korea, Mexico, El Salvador, and China are respectively \$11.16, \$5.13, \$5.11, \$1.75, \$1.08, and \$0.86 (Patterson, 2004). With growing margin pressures and increasing consumer fickleness, manufacturers, retailers and marketers have been exploring low-cost sourcing options. There were no other compelling reasons to source most apparel from high-cost regions, such as South Korea, Taiwan, and Hong Kong at the end of last decade.

However, apparel sourcing is not just about cheap labor anymore. Time to market has become a crucial element within the apparel supply chain. Regional clusters are not only driven by trade and legislation pacts, but also more and more by lead time. Retailers would want goods fast so as to turn them around fast and move on to the next style. It is very important to have shorter six-week lead times versus longer 120-day lead times. Survey results from Rajamanickam and Jayaraman (1998) showed that lead times for apparel being manufactured and shipped from the Far East range from 14 weeks to 55 weeks with an average of 27.5 weeks, compared to an average of 6.3 weeks for U.S., 10 weeks for Mexico, and 8.6 weeks for Caribbean countries respectively. Goods produced in the Western Hemisphere with a Quick Response program can generate associated lead time cost savings of \$0.10 to \$0.15 per garment as compared to that of Asia and the Middle East (Black, 2003). The cost savings for production might not be there, but in terms of getting a good lead time on product and turning around goods fast, with low inventory, it was beneficial for the retailers to stay in the Western Hemisphere for sourcing in the last decade.

The above trade data analysis and the detailed investigation of U.S. global sourcing of textiles and apparel from 1993 to 2002 has underscored Gereffi's global Commodity Chain theory and the lean retailing approach advocated by Abernathy, *et al.* (1999). Global sourcing factors that must be understood and balanced can be segmented into the following categories: cost consideration (material costs, labor cost, transportation costs, inventory carrying costs; cross-

border taxes, tariffs, and duty costs); quality (basic mass products, high-quality products), delivery dependability, quick response time and lead time, flexibility, supply and operational performance; and supply and operational risks. Global sourcing requires the integration and coordination of procurement requirements across worldwide business units, and the examination and creation of common items, processes, technologies, and suppliers (Monczka and Trent, 1991). This underlines the fact that global sourcing is really a fine-tuning strategy.

Outlook for global apparel sourcing

With the elimination of quotas on textile and apparel products in 2005, a considerable number of challenges stand in the way of sustainable development (Patterson, 2004). China is expected to become the supplier of choice for most U.S. importers because it is considered by industry among the best in making most garments and textile articles at any quality or price level. However, uncertainty regarding textile-specific safeguards may temper export growth. To reduce the risk of sourcing from only one country, U.S. importers also plan to expand trade relationships with other low-cost countries as alternatives to China, particularly with India, which also has a very large manufacturing base to produce a wide range of textiles and apparel at competitive prices and a large supply of relatively low-cost skilled labor. However, over the long term, exports from China and India could be affected by their strong economic growth, which is likely to increase domestic demand for textiles and apparel, as well as for labor and capital to make these products. Bangladesh and Pakistan are expected to emerge as major suppliers for a more narrow, but still significant, range of goods. CBI countries are still considered by some firms as a major source of supply if a Central American or hemispheric free-trade agreement is negotiated that permits the use of regional fabrics or third-country fabrics (U.S. Department of Commerce, Office of Textiles and Apparel, 2004).

Although many countries may see their share of the U.S. market decline, there likely will be exceptions to these trends, especially at the firm level, reflecting the importance of longstanding relationships between U.S. apparel companies and retailers and their foreign suppliers, as well as the efficiency, flexibility, and experience of foreign suppliers in producing certain articles. A large number of countries likely will become major 'second-tier' suppliers to U.S. apparel companies and retailers for niche goods or services. As U.S. firms seek to balance cost, flexibility, speed, and risk in their sourcing strategies, they likely will look to the second-tier suppliers to meet those needs that are not met by the first-tier suppliers. Production of certain goods will more likely remain in Mexico and the CBI countries so as to take care of the quick turnaround or mid-season order requirements of U.S. buyers. This is particularly true for the replenishment of basic items offered in a wide range of different sizes and goods needed on a short-turnaround basis.

FUTURE RESEARCH

It is our observation from reviewing previous published literature that global sourcing has been recognized as a key decision in a firm's decision-making process. The empirical trade data analyses of this study investigate the U.S. global sourcing of textiles and apparel in the last decade. This study substantiates the work of Gereffi (1994, 1997, 1999, and 2001) on global sourcing shifts in the U.S. textiles and apparel industry, using cluster analysis of trade data.

However, this study only looked at global sourcing of U.S. textile and apparel firms through trade data. Also, the cluster analysis examined the patterns of U.S. global sourcing using two sets of data points (1993 and 2002). With changing dynamics due to global competition, global trade environment, and new technological advances in numerous areas, future research could attempt to extend the findings of this study. We suggest an agenda for future research as per the following paragraphs.

First, international studies should be conducted to better understand U.S. global sourcing strategy and practices across different countries. Global sourcing has been closely related with economic, technological, political, and cultural issues. Factors such as textile and apparel consumption, production, employment, and prices in major exporting countries, as well as their textile and apparel trade, particularly with industrial country markets, should be examined to assess the textile and apparel industries of certain foreign suppliers to the U.S. market with respect to their competitiveness.

Second, one stream that is critical to investigate U.S. global sourcing is to conduct survey-based empirical research in the U.S. textile–apparel–retail complex. Contemporary practices in U.S. global sourcing in achieving firms’ business goals should be investigated in survey research. Data gathered from the U.S. textile–apparel–retail complex by survey-based empirical research could be used to explore the key factors in U.S. global sourcing decision-making, to examine how companies develop and implement effective global sourcing strategies, and to examine the relationship between global sourcing and a firm’s business performance.

Third, the business environment in the U.S. textile–apparel–retail supply network changes over time. As each country strives to develop unique competitive advantages and upgrade their position in the dynamic business environment, future configuration of the U.S. global sourcing of textiles and apparel may have a different shape. This study provides a baseline for future follow-up longitudinal studies of global sourcing. Therefore, another area that warrants research attention is to analyze future trade data and to re-examine the U.S. global sourcing patterns of textiles and apparel in the new trade environment. Performing a follow-up study over a certain period of time would provide useful information about how U.S. global sourcing patterns change with time, and how dynamic environments impact upon sourcing patterns.

Note: China in this paper refers to mainland China.

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