GLOBAL SOURCING AND THE COMPETITIVENESS OF THE TURKISH TEXTILE AND APPAREL INDUSTRIES

Barış Tan
Koç University
Rumeli Feneri Yolu, 3440, Istanbul, Turkey
Phone: +90 212 338 1459; Fax: +90 212 338 1652
E-mail: btan@ku.edu.tr

Key words: *Turkish Textile and Apparel Industry, Global Sourcing, Competitiveness, Quick Response*

This paper assesses the competitiveness of the Turkish Textile and Apparel Industry from the perspective of public and company policies that affect global sourcing decisions. It is argued that the geographic position of Turkey and quick response capabilities of the producers create a competitive advantage for Turkey against low labour-cost producers in China and other countries. Moreover, it is also possible to compete with basic goods if the producers take a place in the European textile-apparel-retail channel of replenishment products. However, the public policies that affect international trade are also very important and affect the competitiveness of the companies. The paper also gives descriptive statistics on the structure of the Turkish textile and apparel industry.

JEL Classification: L67, O5, F14

1. INTRODUCTION

The international trade in the textile and apparel industries has been developed for centuries. Therefore, globalization of these industries is not a new phenomenon. However, elimination of the bilateral agreements on quotas for apparel and textiles that has been in place for decades has brought many changes to the international trade in 2005. More specifically, China's entry into the competition under the World Trade Organization (WTO) is affecting all the players.

In Turkey, the textile and apparel industries have been very important driving forces for the economy. With a total export of $17.6 Billion, the textile and apparel industry accounted for 28% of all the exports in 2004. Faced with the low-cost competition with China, the Turkish textile and apparel industries are reconsidering their competitive strategies for the future.

In addition to factor prices and comparative productivity, transportation costs, exchange rates and tariffs, a new set of factors related to the product characteristics affects the sourcing decisions in the international trade. This study examines the competitiveness of the Turkish textile and apparel industries from the perspective of newly emerging factors that affect the sourcing decisions of international buyers.

2. OVERVIEW OF THE TURKISH TEXTILE AND APPAREL INDUSTRY

In Turkey, the textile and apparel industry has been a very important driving force for the economy. Today, the textile and apparel industry has a major importance in Turkish economy. As an industry that generates an export of around $20 billion a year, it accounts for

10.4% of the GNP, 21% of industrial output, 23% of manufacturing output, 21% of the total industrial employment, 10% of the total employment, and 32% of all the exports (State Planning Organization, 2004).

The textile and apparel industry in Turkey dates back to the Ottoman Empire era. Production and processing of cotton and yarn was an important part of the manufacturing activities of the empire. When the empire collapsed, the new Turkish Republic that was founded in 1923 inherited 8 factories and 10,000 looms (Dünya, 1998). The new republic designated the textile and apparel sector as one of the *protected* sectors and invested heavily in the sector by opening new factories and forming State Economic Enterprises. Under the protection of the state, the industry flourished rapidly and started exporting textile products in 1960s. The share of textile and apparel exports as a percent of total exports was only 2.96% in 1970.

The liberalization of the economy in 1980s and export-oriented government strategies and incentives accelerated the exports of the textile and apparel to the global markets. Turkey became a major exporter of yarn and unprocessed fabric to Europe in 1980s. Although Europe imposed quotas limiting Turkish textile exports to European countries in these years, Turkey continued to be the major supplier of cotton yarn until late 1980s. As a result of the emergence of Asian competitors and also an antidumping tax of 12% that was charged on Turkish yarn by the European Union, Turkey lost its leadership position. The industry then moved towards more value-added products such as finished cotton, synthetic fiber fabrics, and ready ware.

Enjoying the availability of raw materials, especially, cotton, relatively low labor costs, proximity to Europe, and then the customs union agreement with the European Union, the textile and apparel industry increased its exports almost twenty-fold in twenty years: from $777 million in 1980 to $17.6 billion in 2004.

This increase is mainly a result of high growth in the apparel industry. The share of the apparel industry in the total textile and apparel exports increased from 36% in 1984 to 72% in 2004.

Turkey is the largest textile supplier and the second largest apparel supplier of the European Union. In the world market, Turkey ranks as the fourth largest apparel and the tenth largest textile exporter (2004). Although the share of Turkey in the world's export markets is 0.4%, the share of the Turkish textile and apparel sector is 4.1% (1999).

The industry is composed of 44,000 mostly small- to medium-size establishments. In 1997, there were 105 large textile and apparel companies among the Turkey's largest 500 industrial firms. After the privatization of the most of the state owned enterprises, the private sector is currently dominating the industry.

Despite its accomplishments over the last years, the Turkish textile and apparel industry is currently facing a number of crucial challenges. The competitiveness of the industry is decreasing due to rising labor costs, inefficiencies and quality problems, and the emergence of other low-cost suppliers in the Far East and Eastern Europe. The changes in world trade, heavy reliance on the European market (56% of Turkey's textile exports and 66% of its apparel exports in 1999) create uncertainty for the industry's future.

With the Customs Union agreement with the European Union that has been in effect since 1996, the industry was filled with great enthusiasm and exaggerated expectations. In this environment, the companies reacted to these challenges by substantial investment in production capacity without considering its impact and sources of financing. During 1990-1995, the textile industry invested around $6 billion to purchase textile machinery. This made Turkey one of the largest customers of the textile machinery. However, this sudden increase in investments without coordination created an overcapacity in the sector. In addition to this overcapacity, stagnant European markets, depreciation of the Euro against the dollar, and rising production costs reduced the capacity utilization ratio for the textile industry from 81% in 1995 to 77% in 1998, and for the apparel industry from 90% in 1995 to 80% in 1998 (Türkant, 1998).

Although the share of Turkey in the world's export markets is 0.4%, the share of the Turkish textile and apparel sector is 4.1%. The textile and apparel industry in Turkey depends heavily on exports. Turkey's exports account for, approximately, 58% of the woven textiles output, 70% of the apparel output, and 63% of the textile and apparel output (Dünya, 1998).

Table 1. Turkey's Apparel and Textile Exports

		Apparel		Textile		Textile and Apparel	
	Total Exports (1000 $)	Value (1000$)	% in total Turkish exports	Value (1000$)	% in total Turkish exports	Value (1000$)	% in total Turkish exports
1996	23,224,465	6,075,747	26.2	2,723,822	11.7	8,799,569	37.9
1997	26,261,072	7,696,933	25.5	3,351,611	12.8	10,048,544	38.3
1998	26,973,952	7,074,068	26.2	3,556,769	13.2	10,630,837	39.4
1999	26,587,225	6,515,967	24.5	3,477,802	13.1	9,993,769	37.6
2000	27,774,906	6,585,974	23.7	3,705,688	13.3	10,291,663	37.1
2001	31,334,216	6,661,072	21.3	3,942,685	12.6	10,603,757	33.8
2002	36,059,089	8,093,656	22.4	4,268,291	11.8	12,361,947	34.3
2003	47,252,836	9,961,748	21.1	5,261,671	11.1	15,223,418	32.2
2004	63,016,889	11,191,023	17.8	6,426,088	10.2	17,617,712	28.0

Source: The Undersecretariat of Foreign Trade, The Republic of Turkey, Prime Ministry Reports (2004)

2.1. Destinations for Turkish Textile and Apparel Exports

It is estimated that Turkish apparel industry supplies 20,000 points of sale destinations in Turkey and 200,000 destinations worldwide (State Planning Organization, 1998). European Union is the main destination for Turkish textile and apparel exports followed by the United States. Other major textile export destinations are East Europe, Middle East, and North Africa following the European Union and the United States. Russia is also a major destination for Turkey's apparel exports following the European Union and the United States.

Although the apparel exports have been concentrated mainly in the European Union and USA with a combined share of 78% of Turkish apparel exports, textile exports are more distributed across the European Union, USA, East Europe and Middle East with a share of 81%.

Germany is the largest market for Turkish textiles with a market share of 12.3% in 2004. Germany is also the largest market for Turkish apparel (Table 2 and 3) with a share of 28.4% in 2004.

Table 2. Largest Markets for Turkey's Textile Exports

	Value ($1,000)			% in Turkey's Textile Exports		
	2002	2003	2004	2002	2003	2004
Italy	315,319	421,123	518,898	7.4	8.0	8.1
USA	492,248	502,199	606,988	11.5	9.5	9.4
England	315,591	335,499	395,011	7.4	6.4	6.1
Germany	550,341	724,030	791,308	12.9	13.8	12.3
France	277,216	315,105	299,113	6.5	6.0	4.7
Spain	109,301	147,101	184,639	2.6	2.8	2.9
Israel	75,593	84,706	99,197	1.8	1.6	1.5
Saudi Arabia	86,595	101,134	119,632	2.0	1.9	1.9
Greece	81,814	112,437	145,433	1.9	2.1	2.3
Belgium	89,598	**95,767**	105,603	2.1	1.8	1.6
Algeria	39,492	39,900	49,761	0.9	0.8	0.8
Syria	51,222	41,157	41,220	1.2	0.8	0.8

Source: The Undersecretariat of Foreign Trade Reports (2004)

Table 3. Largest Markets for Turkey's Apparel Exports

	Value ($1,000)			% in Turkey's Apparel Exports		
	2002	2003	2004	2002	2003	2004
Germany	2,538,196	3,066,405	3,190,612	31.4	30.8	28.5
USA	1,232,967	1,278,943	1,190,442	15.2	12.8	10.6
England	1,281,149	1,499,905	1,783,339	15.8	15.1	15.9
France	532,474	691,829	795,179	6.6	6.9	7.1
Holland	440,717	612,091	710,678	5.4	6.1	6.4
Belgium	196,388	221,456	232,770	2.4	2.2	2.1
Italy	184,441	260,335	372,034	2.3	2.6	3.3
Denmark	191,933	274,970	331,187	2.4	2.8	3.0
Russia	145,004	167,066	182,335	1.8	1.7	1.6
Austria	97,298	108,998	89,851	1.2	1.1	0.8
Sweden	127,200	173,389	184,207	1.6	1.7	1.6
Tunisia	2,023	1,855	2,018	0.0	0.0	0.0
Libya	55,359	92,292	145,377	0.7	0.9	1.3
Poland	39,437	39,734	34,411	0.5	0.4	0.3
Egypt	11,674	5,401	7,637	0.1	0.1	0.1

Source: The Undersecretariat of Foreign Trade Reports (2004)

2.2. Product Mix of Turkish Textile and Apparel Exports

Considering the shares in the total textile and apparel exports, knitted apparel has the highest share with 38%, followed by woven apparel, 24%, and made-up textile article 9% (Table 4). Turkey imports mainly cotton, man-made, and wool fiber, yarn, and fabric lead by cotton with a share of 24% in total textile and apparel imports. As shown in Table 5, the apparel industry produces more knitted than woven products ones and more basic items such as unstructured tops and bottoms than tailored garments.

A closer look at the apparel exports shows that the apparel exports has a product mix of around 60% knitted and 40% woven products (Table 5). The main export items are t-shirt, sweatshirt, underwear, sleeping wear, socks, men shirts, and pants. However, due to decreasing competitiveness in basic items, there has been a trend towards increased production of structured garment production, i.e., jackets, suits, coats, etc. in the industry.

The recent investments in weaving and in processing (dyeing, printing, finishing) of woven fabrics also support this trend.

Table 4. Product Mix of Turkish Textile and Apparel Exports

	Share in Total Textile and Apparel Exports	Share in Total Exports
Knitted Apparel and Accessories	38.34%	14.24%
Woven Apparel and Accessories	24.43%	9.08%
Made-up Textile Articles	9,56%	3.55%
Cotton (Fiber, Yarn, woven fabric)	7.87%	2.92%
Man-made staple (Fiber, yarn, woven, fabric)	6.13%	2.28%
Man-made filament (Fiber, yarn, woven, fabric)	4.09%	1.52%
Carpets and floor coverings	2.73%	1.02%
Knitted Fabrics	2.26%	0.84%
Special woven fabrics	1.89%	0.70%
Coated laminated fabrics	1.27%	0.47%

Source: The Undersecretariat of Foreign Trade Reports (1999)

Table 5. Product Mix of Turkish Apparel Exports

		1996	1997	1998	1999
Knitted	T-Shirt	13.0%	14.4%	16.8%	17.9%
	Pullover	18.0%	16.2%	16.7%	15.9%
	Pants, jackets	9.4%	9.4%	9.2%	8.5%
	Underwear	8.6%	10.1%	8.2%	7.0%
	Shirts	5.7%	5.3%	5.2%	4.0%
	Socks	3.9%	3.9%	3.7%	3.9%
	Others	3.4%	3.4%	3.0%	2.9%
	Outwear	0.3%	0.4%	0.3%	0.3%
	Total	**62%**	**63%**	**63%**	**60%**
Woven	Pants, jackets	18.8%	19.2%	20.9%	23.5%
	Shirts	8.3%	8.0%	7.1%	5.9%
	Underwear	3.4%	3.6%	3.8%	4.2%
	Others	3.5%	2.9%	2.5%	3.7%
	Outwear	3.5%	3.2%	2.6%	2.3%
	Total	**38%**	**37%**	**37%**	**40%**

Source: Undersecreteriat of Foreign Trade reports (1999)

In recent years, a number of foreign manufacturers have formed license agreements. Currently, more than 10 foreign brands of denim jeans, including Levi's, Lee, Jordache, Lois, and Fronti, are produced in Turkey and exported to foreign markets.

2.3. Industry Structure

Textile and apparels are produced by a number of private firms and state-economic-enterprises (SEE). The textile and apparel industry flourished as a state-protected industry in Turkey. In 1930s, after the republic was founded in 1923, the state owned all the textile and apparel factories as a part of the largest SEE, Sumerbank. As a part of the ongoing privatization program, the privatization of all state-owned enterprises in the textile and apparel industry has been planned. The privatization of Sumerbank started in 1995 and still continues. As a result of the transformation from a state economy to a more liberal economy, privately owned companies constitute the majority of textile and apparel firms today.

Most of the firms are small to medium size. Most of these companies are family owned and managed. The textile and apparel production is concentrated on the west, south, and central parts of Turkey around Istanbul, Izmir, Bursa, Denizli, Adana, Gaziantep Kahramanmaras, Eskisehir, Ankara, Corlu, Malatya, and Usak.

The Ministry of Labor's number for the number of employees in the textile and apparel industry was 505,153 in 1999. However, it is not possible to obtain exact statistics due to the fact that many small firms that employ unregistered workers to avoid taxes are not included in the studies. According to the estimates of unions, it is estimated that there are more than 2,000,000 workers employed in the Turkish textile and apparel industry (Dunya, 1998).

Tables 6, 7, and 8 give the index of production workers, wages, and production relative to their levels in 1997. Employment in textile and apparel has been decreasing in the public sector as a result of privatization programs. In the private sector, employment has dropped slightly as a result of drop in total production.

Table 6. Index of Production Workers in Manufacturing Industry (1997=100)

Year	Textile			Apparel		
	Public	Private	Total	Public	Private	Total
1995	154,8	84,7	89,4	120,0	82,5	84,1
1996	114,7	92,5	94,0	102,7	91,3	91,7
1997	100,0	100,0	100,0	100,0	100,0	100,0
1998	67,4	99,1	97,0	90,8	98,7	98,4
1999	57,9	84,9	83,1	86,4	88,0	87,8
2000	49,9	84,4	82,2	80,6	85,3	85,1
2001	40,6	77,9	75,5	81,1	81,2	81,2
2002	24,6	83,5	80,0	67,1	90,9	90,2
2003	17,6	83,6	79,7	45,5	91,0	89,9
2004	4,7	80,7	76,3	35,2	82,0	81,7

Table 7. Index of Production Workers Hourly Wages in Manufacturing Industry (1997=100)

	Textile			Apparel		
	Public	Private	Total	Public	Private	Total
1995	32,5	27,4	28,6	26,4	23,4	24,1
1996	48,0	54,1	54,0	46,0	48,9	48,8
1997	100,0	100,0	100,0	100,0	100,0	100,0
1998	209,0	176,2	177,4	167,5	163,1	162,2
1999	428,8	330,1	333,9	252,6	296,4	292,3
2000	834,4	472,8	485,6	577,2	431,2	430,7
2001	1038,8	617,2	626,8	742,7	576,5	574,1
2002	1457,0	902,7	900,2	1130,3	796,5	783,5
2003	1609,3	1107,1	1095,8	1512,1	1044,6	1021,5
2004	617,4	1329,1	1301,7	1365,9	1297,4	1258,4

Table 8. Production Index of Manufacturing Industry (Source: State Planning Organization)
(Weighted by Value Added 1997=100)

Year	Textile			Apparel		
	Public	Private	Total	Public	Private	Total
1995	126,7	82,6	83,7	168,5	93,1	94,9
1996	104,8	91,7	92,0	153,1	97,9	98,9
1997	100,0	100,0	100,0	100,0	100,0	100,0
1998	80,1	93,9	93,6	65,7	107,9	106,6
1999	52,4	87,8	87,1	45,1	103,7	102,0
2000	49,2	96,7	95,7	22,2	111,4	108,7

2001	40,8	92,0	90,9	20,5	107,9	105,3
2002	18,1	104,1	102,3	16,0	111,6	108,7
2003	4,9	106,6	104,4	3,8	113,2	110,7
2004	0,5	105,1	102,9	0,0	114,6	114,6

3. DETERMINANTS OF GLOBAL SOURCING

In this study, we discuss two important determinants of global sourcing in textile and apparel industry. These are the company policies used by buyers and also the public policies that affect the international trade.

3.1. Company Policies

In global sourcing, there is a clear distinction for one-time purchases and repeating purchases for replenishment products. For example, when a buyer considers selecting a producer for a fashion item or a dress, then factor prices together with comparative productivity, transportation costs, exchange rates and tariffs determine the producer to be selected. On the other hands, deciding on the producer to replenish items such as jeans, t-shirts, shirts, etc. on a regular basis requires consideration of additional factors.

Replenishment products constitute an important part of the volume of products sold at retailers. For example, 65% of underwear, 40% of men slacks and coats, 20% of men suits and jackets that are sold in USA are replenishment products.

Facing with increased product proliferation and demand volatility, retailers are adopting lean retailing practices (Abernathy et. al., 1999). The risks of having too much or too little inventory increase as the demand volatility increases. One of the strategies to reduce these risks is to delay production and ordering decisions to incorporate revised demand forecasts. Consequently, lean retailers demand fulfillment of a higher percentage of their orders within a selling season from their suppliers usually located at different countries in the world. This change in the retailing industry has increased the demand volatility risks a producer faces. In order to cope with these challenges, a producer should devise effective strategies to respond effectively to changes in demand.

Traditionally, sourcing decisions are based on product costing methods that often do not take above-mentioned risks into account. As a result, companies who source from overseas suppliers with long lead times in quest of lower production costs rely on high inventories to respond quickly to changes in customer demand. However, using a supplier with a short lead-time but higher production cost can be more profitable, especially, for goods with high demand variability.

Analytical studies and simulation studies show that additional costs of using a manufacturer with a short lead time can be justified by reducing the inventory levels and its associated costs (Abernathy et. al., 2000), (Tan, 2002), (Tan and Gershwin, 2004), (Yıldırım et. al., 2005).

A recent study shows that, for USA, the inventory costs increase the total cost for t-shirts and jeans around 6% when they are sourced from China. However, sourcing from a producer in Mexico yields an inventory cost of 2.7%.

When the lists of top exporters of jeans or t-shirts to USA and European Union (EU) are compared, it is observed that they include different countries located close to these regions. More specifically, among the top 10 exporting countries to USA in t-shirts, only 2 of them are

in the top 20 exporters to EU list. Similarly, among the top 10 exporting countries to USA in men's and boy's denim jeans, only one country is among the top 20 exporters to EU. However, among the top 10 exporting countries to USA in women's and girls' cotton dresses that are not replenished on a regular basis, 8 of them are also among the top 20 exporters to EU.

From this perspective, geographic advantage of Turkey and the quick response capabilities of Turkish producers yield an advantage over other low cost producers with longer lead times. However, this advantage is realized especially for replenishment products and products with high variability.

It is known that the demand variability increases as the sales volume decreases. This implies that ability to produce orders in small lots or having volume flexibility is also crucial to sustain the competitive advantage of Turkish producers.

3.2. Public Policies

In textile an apparel industry, competitiveness of a producer is not determined solely by the policies it implements. The international agreements between the countries and regions and the policies that affect factor prices are also determining the competitive position of the producers.

The Customs Union agreement with the European Union that was signed in 1996 made it easy to export and import intermediary goods between the European Union and Turkey and reduced Turkey's average tariff rates to 3.6%. The Customs Union agreement is a part of the process for Turkey's membership in the European Union where Turkey is an official candidate. The EU's quantity restrictions on Turkish textile and clothing were eliminated after the Customs Union. The Customs Union Agreement also includes the Law on the Protection of Competition within the Frameworks of the Integration with the World Markets and Customs Union with the EU; The Law on the Protection of the Consumer; The Protection of Industrial Designs, The Protection of Brand Names, etc. The agreement is expected to increase the competitiveness of all the industries faced with global competition.

Similar to many other countries, Turkey's textile and apparel exports were constrained by the Multi Fiber Agreement (MFA). Elimination of all the quotas according to General Agreement on Tariffs and Trade (GATT) between the countries of World Trade Organization (WTO) on January 1, 2005 introduced new opportunities and also challenges for Turkey's textile and apparel industry.

Although all the quotas applied to countries in textile and apparel industry were removed on January 1st 2005 based on the agreement in WTO, tariffs, restrictions, and special agreements will still be in effect between countries and regions.

For example, the free trade agreements of USA with Canada and Mexico, with 26 Caribbean countries, 36 African countries, or special arrangements with Israel and Jordan still play an important role in global sourcing decisions.

Similarly, European Union's Customs Union with Turkey, the agreement with 12 Mediterranean and Middle East countries, the agreement with Balkan countries, and

thespecial agreement with 48 less-developed countries are further examples of the complicated rules of international trade in addition to the quotas.

Recent developments in USA and European Union to restrict imports from China also indicate that the WTO agreement to eliminate quotas does not determine all the rules of international trade in the textile and apparel industry.

In addition to these multinational agreements, public policies affect the factor prices directly. For example, energy prices, labor costs, and taxes are determined by the public policies. Moreover, the infrastructure that fosters competitiveness can be developed by the public policies together with the private sector.

4. COMPETITIVENESS OF THE TEXTILE AND APPAREL INDUSTRY

4.1. Cost Structure

When the price of cotton in Turkey is compared to world cotton prices, it is observed that the price in Turkey has been above the world prices. One of the reasons for this deviation is the government's policy of giving support to cotton production. However, the gap between the local and global prices has been diminishing (Türkant, 1998).

The labor costs in textile industry increased steadily from $0.95/hour in 1980 to $4.44/hour in 1993. After the devaluation of Turkish lira in 1994, the labor costs went down to $2.48 in 1998 (Table 9).

Table 9. Comparison of the Labor costs ($/hour) in the Textile Industry

	1990	1991	1993	1994	1996	1998
Germany	16.46	16.96	20.50	20.77	21.94	21.48
Italy	16.13	17.31	16.20	15.65	16.65	15.81
U.S.A.	10.02	10.33	11.61	11.89	12.26	12.97
Greece	5.85	5.75	7.13	7.68	8.92	7.99
Taiwan	4.56	5.00	5.76	5.98	6.38	5.85
Hong Kong	3.05	3.39	3.85	4.40	4.90	5.65
Turkey	*1.82*	*3.12*	*4.44*	*2.31*	*2.02*	*2.48*
Morocco	1.28	1.37	1.47	1.54	1.92	1.89
Tunisia	2.82	2.82	2.97	2.30	1.89	1.76
China	0.37	0.34	0.36	0.48	0.58	0.62
India	0.72	0.55	0.56	0.58	0.56	0.60
Pakistan	0.39	0.38	0.44	0.45	0.43	0.40
Indonesia	0.25	0.28	0.43	0.46	0.52	0.24

Source: Internationalisation of European Textiles and Clothing Production/Textiles Intelligence, Werner [Error! Bookmark not defined.]

Although the labor cost in Turkey is lower than the labor costs in countries like Germany, Italy, USA, Taiwan and Hong Kong, it is more than four times higher than the costs in China and India, and higher than the costs in Morocco and Tunisia which have similar proximity to Europe, Turkey's largest market. As a result of increase in labor costs, some companies are shifting the production to areas with lower labor costs in Turkey. A similar research on wages in the apparel sector is not available.

The electricity prices in Turkey are also higher than its competitors. In addition to the cost of electricity, power cuts that are becoming more frequent as a result of insufficient supply affect the industry. In order to tackle this problem, integrated plants have started to build their own power sources while small- to medium-size companies are still exposed to production loss. The government offers 25 to 50% discount in electricity prices in the Eastern and Southeastern parts of Turkey to attract investments to the region.

The International Textile Manufacturers Federation (ITMF) conducts a biennial study to compare the production costs for different production processes in different countries. The 1998 study compared the production costs in Indonesia, India, Turkey, Brazil, S. Korea, USA, and Italy. The comparison considers labor costs, electricity costs, costs related to construction, machines, operation time of factories, cost of financing, cost of cotton, etc (Table 10). By using these parameters, the study provides a production cost index for each country for the cases the raw material cost is included and excluded (Table 11). The study reveals that although most of the recent investments were made in purchasing open-end machinery, the production costs for this type of production are among the highest in the group.

Table 10. Cost Structure in Different Countries

	Indonesia	India	Turkey	Brazil	S.Korea	USA	Italy
Master workman cos($/hr)	1.17	1.09	3.85	7.86	8.14	14.05	22.06
Skilled-labor cost ($/hr)	0.48	0.79	2.31	4.02	5.24	11.63	19.95
Labor-cost ($/hr)	0.30	0.71	1.62	2.89	3.53	9.83	19.44
Electricity (cent/kWh)	5.65	9.92	7.00	5.70	5.33	5.00	8.02
Cost of building construction ($/m2)	97	141	132	524	533	700	595
Building depreciation time (year)	20	30	24	30	40	32	30
Machine depreciation time (year)	9	10	7	10	8	7	8
Annual operation time of a factory (hour)	8500	8420	7100	7500	8280	7900	7600
Custom fees, etc. (%)	20	0	3	21	5	5	0
Cost of financing (%)	17.0	18.0	9	13	12.0	8.3	11.5
Cotton price ($/kg)	1.82	1.44	1.83	1.80	1.79	1.59	1.75

Source: ITMF International Production Cost Comparison Report (1998)

By one estimate, in Turkey's apparel industry, the costs of fabrics and other raw material inputs account for 60% of a small- to medium-sized producer's revenues while the labor cost is 20% of the revenue, water, electricity and heat is 6%, transportation is 5% and the remaining 9% is overhead, interest, and other costs [**Error! Bookmark not defined.**]. However, in Turkish textile industry, the cost of raw materials, mostly cotton yarn, constitute 64% of the total costs, the direct labor costs and the energy costs represent 17% and 8% of the remaining costs respectively (Kornosor, 2000).

Table 11. Comparison of Production Costs (Index: Italy=100)

Type of production	Raw material	Indonesia	India	Turkey	Brazil	S.Korea	USA	Italy
Ring yarn	Not inc.	72	72	76	77	74	80	100
	Included	85	76	88	99	86	85	100
Open-end yarn	Not inc.	91	91	96	87	84	84	100
	Included	98	87	100	95	93	87	100
Weaving	Not inc.	47	59	55	67	68	74	100
	Included (Ring)	70	69	74	79	78	80	100
	Included (open-end)	74	74	79	82	81	81	100
Knitting	Not inc.	47	47	52	60	59	75	100
	Included (Ring)	81	72	83	84	82	83	100
	Included (open-end)	91	81	94	100	89	86	100

Source: ITMF International Production Cost Comparison Report (1998)

4.2. Productivity

Analyzing the productivity of the Turkish textile and apparel industry is instrumental to assess its competitiveness. Table 12 reports the results of a UNIDO study on the value added, value added per employee and wage rates for textile, apparel industry and for total manufacturing in United States, Turkey, China, and Mexico. The wages and salaries per employee in Turkey and in Mexico are quite close to each other. As the table shows, the value added per employee in Turkish textile industry is very close to the one in Mexico and higher than in China. However, the value added per employee in the US textile industry is almost three times higher than the value added per employee in Turkish textile industry. In the apparel industry, the value added per employee in Turkey is almost twice of the one in Mexico.

Note that, this is a very simplistic comparison of value-added per employees in these countries. Either because of some sort of demand and supply shocks in the particular years or by a mere speculative bubble in foreign exchange rate markets the values may be under- or over-estimated

Furthermore, the ratio of real value added per employee is a simple, non-parametric measure of productivity. However, since it measures the contribution of a single factor, it cannot evaluate the effects of other factors such as technical efficiency and capital accumulation on the productivity

Filiztekin (2000) presents a thorough study of the dynamics in Turkish manufacturing industry before and after the liberization of the economy. He measures labor productivity defined as the ratio of real value added to labor input and total factor productivity defined as

the residual after the contribution of accumulation of all factors is removed from output growth, for each sector. He reports that there is an improvement in the productivity performance of Turkish manufacturing industry after the economy is opened to free trade and productivity growth accounts for nearly 50% of value added growth. The analysis, summarized in Table 13, shows that the textile and apparel industry sustained a high value-added growth rate during 1980-1996. The employment in the apparel industry increased substantially while the increase in the textile industry was relatively low during the same period. In the same period, the labor productivity and total factor productivity in textile and apparel industry grew around 5% and 3.5% per year respectively. Although this is a significant growth rate, it is lower than the average productivity growth rate of all manufacturing for the same period. As a result of increase in real wages after 1988, the firms increased their efficiency and productivity of existing inputs through substitution of capital for labor.

Table 12. Value Added, Labor Productivity and Wage Rates (at current prices, in US$) by Manufacturing Branch

United States

Branch (ISIC)	Value Added (million US$)		Value Added per employee		Wages and Salaries per employee	
	1985 (1)	1999*(1)	1985	1999*	1985	1999*
TOTAL MANUFACTURING(300)	**996440**	**2537055**	**57188**	**145344**	**22681**	**45368**
Textiles(321)	26910	48673	32074	68332	15221	27917
Wearing apparel, except footwear(322)	22150	27058	24972	52560	11116	20271

Turkey

Branch (ISIC)	Value Added (million US$)		Value Added per employee		Wages and Salaries per employee	
	1985 (2)	1998*(2)	1985	1998*	1985	1998*
TOTAL MANUFACTURING(300)	10448	36678	12385	32179	2619	6432
Textiles(321)	1289	4179	7392	16488	2122	4644
Wearing apparel, except footwear(322)	146	1868	5136	13727	1292	3600

China

Branch (ISIC)	Value Added (million US$)		Value Added per employee		Wages and Salaries per employee	
	1985 (3)	1998 (3)	1985	1998	1985	
TOTAL MANUFACTURING(300)	78389	182191	2636	3659	384	...
Textiles(321)	8588	12288	2031	2126	345	...
Wearing apparel, except footwear(322)	1717a/	5821a/	10279 a/	2750 a/	357a/	

a/ 322 includes 324 (Footwear)

Mexico

Branch (ISIC)	Value Added (million US$)		Value Added per employee		Wages and Salaries per employee	
	1985 (2)	1999*(2)	1985	1999*	1985	1999*
TOTAL MANUFACTURING(300)	18820	41861	18932	44059	3958	7440
Textiles(321)	757	787	9836	20462	3261	6263
Wearing apparel, except footwear(322)	215	224	6588	9204	2510	5239

Source: Based on data supplied by OECD with estimates by the Statistics and Information Networks Branch, UNIDO. Note: (1) = Factor values (2) = Producer's prices (3) = Unspecified valuation, Note: An asterisk (*) next to year denotes provisional figures estimated by UNIDO.

Table 13. Annual Growth Rates During 1980-1996

	Textiles	Clothing (incl. Footwear)	All Manufacturing
Real Value Added	7.47	18.86	9.55
Employment	2.86	13.90	3.45
Labor Productivity	4.60	4.96	6.10
Total Factor Productivity	3.40	3.61	4.59

Source: Filiztekin (2000)

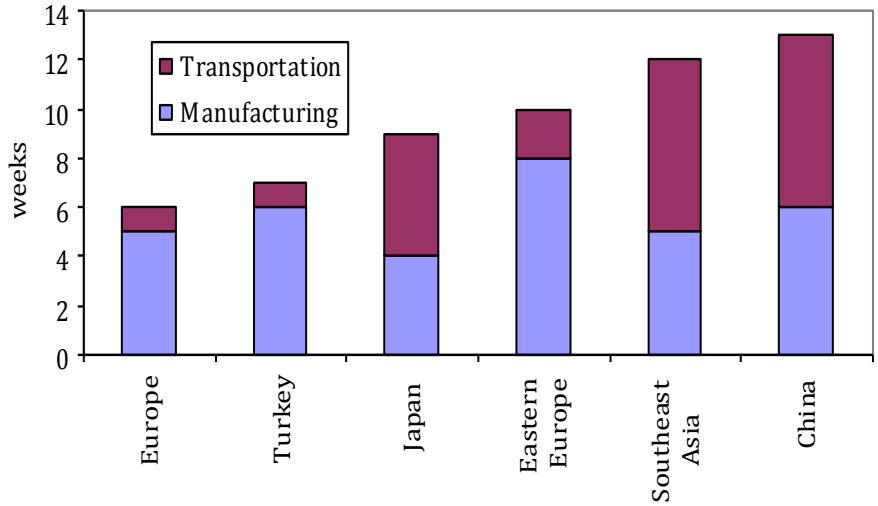
4.3. Lead Times and Delivery Performance

One of the advantages of Turkey is its geographical location, as a country located between Europe and Asia, it is close to the European market as well as the Middle East, and newly developing markets in the former Soviet Republics.

Proximity to Europe is a major advantage over the competitors in the Far East in the European Market. Truck transportation is the main mode of transportation since the railways are not well developed and air transportation is quite costly. The transportation companies are quite developed and provide satisfactory logistics services. It takes 4 days, on the average, for a truck to travel from Istanbul to Germany, that is the largest market for Turkish apparels.

A recent study compares the delivery times, including the transportation and manufacturing times, to the European Union (Ghemawat and Baird, 1998),. The study shows that Turkey still has an advantage over the new low-cost competitors in Eastern Europe due to shorter manufacturing lead times.

Figure 1. Comparative Delivery Times to the European Union.



Another study shows a similar conclusion for the advantage of Turkish apparel exporters in the European market over the competitors in the Far East, but not over the competitors in the Eastern Europe and Northwest Africa (Table 14) .

Table 14. Comparative Lead Times in the European Market

Source	First order	Repeat Order
Eastern Europe, Maghreb,	3-6 weeks	3-6 weeks

Turkey, Greece		
Other EC	2-4 weeks	2-4 weeks
China	6-7 months	3 months
Other Far East	4-5 months	3-5 months

Source: Textile Asia (Sung, 1994).

Marine transportation is also available from some authorized and equipped harbors. However, truck transportation is preferred over marine transportation for the European destinations due to its flexibility, availability, cost, and ease of arrangements. However, for the United States, marine transportation is the preferred mode of transportation. On the average, it takes 16 days for a ship to deliver to the United States. As a result of increasing exports to the US market, a direct ship service to the United States has started recently. It takes 10 days to deliver by using this service.
Table 15 gives the delivery times and delivery costs to the largest markets of Turkey for different modes of transportation. This table is constructed by utilizing the data gathered from major international transportation companies working in Turkey.

Table 15 . Comparative Delivery Time & Delivery Cots

	Marine Transportation (Door to Door)		Truck Transportation	
Delivery Points	**Delivery Time (Day)**	**Delivery Cost (40 Ft. Container)**	**Delivery Time (Day)**	**Delivery Cost**
Italy	8-10	$2,500	5	$2420
England	15	$1410	8-10	$3960
Germany	15-16	$1330-1760	6	$2860
USA	16	$1100-$1330		
France (North)	20	$1330-1760	8	$2860
France (South)	12	$1330-1760		
Belgium	15-16	$1330-1760	6	$2860
Spain	10-14	$2000-$2500	10-12	
Denmark	15-16	$1330-1760	6	$3210
Holland	15-16	$1330-1760	6	$2860
Sweden	20-25	$1760-$2200	10-14	
Finland	20-25	$1760-$2201	10-14	$3740-$3960
Norway	20-25	$1760-$2202	10-14	$3740-$3961

Size of 40 feet. Container: Length = 40 feet, Height & Wide = 8 feet
Air Transportation is available within one-day delivery time to entire Europe and USA. Per kg. cost of delivery up to 3 tons is 1$ - 1.2$ for Europe and 2 $ for USA.
The data are obtained from; Ber-Ben Transp. Co., Black & Sea Transp. Co., Balnak Transp. Co in 2001

4.4. Flexibility and Quality

There is no thorough study on the flexibility and quality of the Turkish textile and apparel industry. Especially, since the apparel industry is composed of thousands of small- to medium size companies, orders of different sizes, from very small to very large, can easily be accommodated by contracting some of the work outside or by adjusting the work hours when it is needed. Existing of a competitive textile industry also allows the fabric producers to adopt new models within a short time period and feed the apparel industry. It can be argued that as one of the major contractors of world brands, the textile and apparel industry accumulated knowledge and experience to produce quality products. Furthermore stringent end-product quality standards of the buyers and also the requirements of European Union on

process quality, e.g., ISO 9000 standard, had a positive impact on the quality of the products produced. Being aware of this positive correlation, the number of textile & apparel firms acquiring ISO 9000 standards in year 1997 shows a three fold increase than that of year 1996. The upward trend continued in 1998 and stabilized to nearly 50 firms per year in 1999 and 2000.

Continuing export-oriented production also increased the source of skillful workers. However, the supply of white-collar employees including qualified managers, engineers, designers, etc. is still limited.

In addition, the production in Turkey complies with internationally accepted ecological standards and does not use harmful materials in dyeing. These standards are regulated by laws that are in accordance with the ones in the European Union. Furthermore Turkey meets social audit requirements.

5. ASSESSMENT OF COMPETITIVENESS OF TURKISH TEXTILE AND APPAREL INDUSTRY

Considering the contribution of the textile and apparel industry to the Turkish economy, sustaining and increasing the competitiveness of Turkish textile and apparel industry is of vital importance for Turkey.

The advantages of the Turkish textile and apparel industry include high production capacity, availability of raw materials, experience and knowledge in the industry, short lead-times, quality production, fair costs, and flexibility in volume, time, and variety of products. Furthermore, the Customs Union agreement provides access to the European markets without quota restrictions.

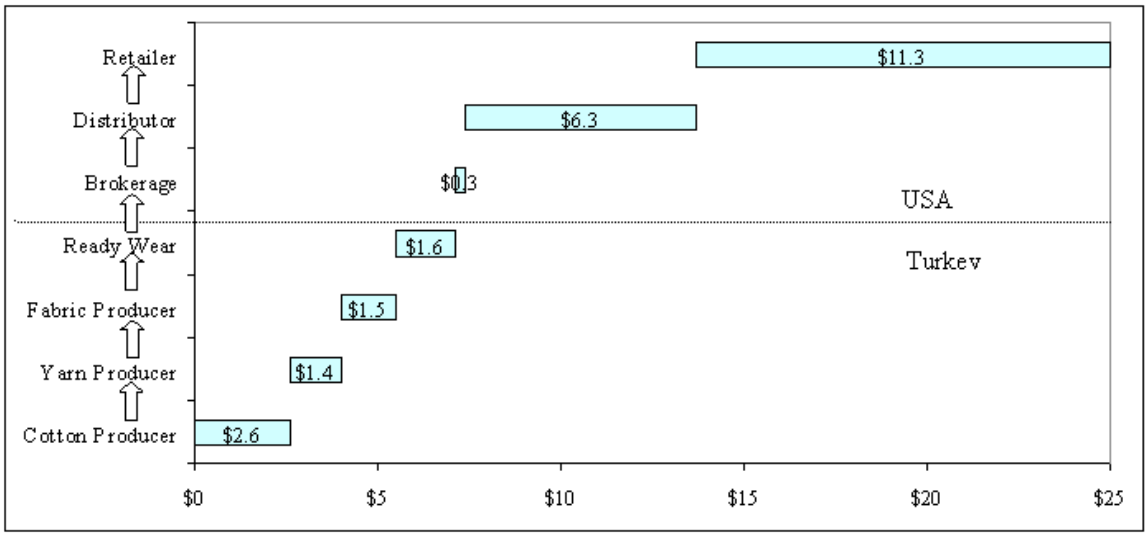
In addition to being a major cotton and wool producer, Turkey has the advantage of having both textiles and also apparel industry that are globally competitive. Considering the whole supply chain from fiber to textiles, apparel, and retail, this coverage is an important asset compared to those countries that do not have such an exposure. For example, as the main apparel supplier of the United States, Mexico imports cotton from the United States. Similarly, the low cost competitors of Turkey in the European market such as the Eastern European and Northwest African countries actually import the textiles to be used in apparel from Turkey.

However, the missing link in the whole supply chain, namely, retailing is where the most of the value generated. For example, consider a Victoria`s Secret Stretch Cotton Lingerie that is sold for $25 in USA but produced in Turkey. Figure 2 below depicts the allocation of the money paid for this lingerie in the supply chain from the cotton, yarn, fabric producer and the ready wear supplier in Turkey, to the brokerage, distributor, and retailer in USA (Kornosor, 2000).

As the figure shows the most of the value in the chain is captured by the latter part of the chain, i.e., the USA retailer/contractor/brokerage captures 71.6% of the money paid by the customer while the remaining 28.4% is shared among the cotton, yarn, fabric, and apparel producers in Turkey. Clearly, there are opportunities for the industry to expand the exposure in the chain by better coordination and integration.

As the previous section shows Turkish textile and apparel industry is losing its cost competitiveness. Namely, there are now competitors with cheaper labor costs, cheaper cotton, and cheaper electricity prices. Given those, it is not viable for Turkey to compete on price alone for basic items. Similarly the lead-time advantage can be matched in the European Market by the countries in Eastern Europe and Northwest Africa.

Figure 2. Allocation of the money paid by a customer in the supply chain of an apparel product.



The industry has realized the need to compete with other features in addition to the cost. Service quality and due-date performance have been considered as very important to compete in the markets. Furthermore, some companies are following the route to expand the supply chain exposure to retailing, especially, by branding. Given the textile infrastructure, another possible way is to develop specialized products and compete in the markets by differentiation. This route requires substantial investment in research and development. Until now, the research and development has been neglected in the industry. The total research and development expenditures of the companies in textile and apparel industry was around $2.9 million in 1996 while during the same year the total exports reached $8.9 billion.

Removal of all the quotas set by the Multi Fiber Agreement according to General Agreement on Tariffs and Trade by January 1, 2005 between the countries of WTO introduced new opportunities and threats for the industry. Since, there are no quotas for the largest market of Turkey, i.e., the European Union, these opportunities and challenges will involve the trade with the United States. Since the Turkish exporters are negatively affected by the stagnation of the European market in recent years, the United States is now seen as the major destination for further growth.

6. CONCLUSIONS

This paper assesses the competitiveness of the Turkish Textile and Apparel Industry from the perspective of public and company policies that affect global sourcing decisions.

First, at the company level, global sourcing decisions are given by the major buyers based on the total cost and associated risks. The total cost of sourcing includes not only the factor costs but also the costs associated with meeting uncertain demand at the desired service level. As a result of lean retailing practices, most of the retailers demand quick response from their suppliers. In this setting, being close to the market provides additional benefits. More specifically, additional costs of sourcing from producers that can supply goods in a shorter period of time can be justified with the decreasing costs of inventory. As a result, the geographic position of Turkey and quick response capabilities of the producers create a competitive advantage for Turkey against low labour-cost producers in China and other countries. This advantage will be sustained not only for high-value added products but also for some basic goods that are replenished on a continuous basis by European buyers.

However, in addition to company policies, public policies that determine the rules governing the international trade are also very important. Regional agreements, custom regulations, etc. will continue be effective in determining the sources for textile and apparel goods.

As a result, Turkish textile and apparel industry has the potential to sustain its position in global competition against low-cost producers by its capability of responding quickly to customer demand for a subset of products.

ACKNOWLEDGEMENT

An earlier version of this paper was published as a Harvard Center for Textile and Apparel Research (HCTAR) Technical Report (Tan, 2001). The author thanks J.T.Dunlop and F.H. Abernathy, J.H. Hammond, D.Weil (HCTAR) for their valuable comments.

BIBLIOGRAPHY

Abernathy FH, Dunlop JT, Hammond JH, and Weil D (2000), "Control your inventory in a world of lean retailing," *Harvard Business Review,* November-December, pp. 169-176.

Abernathy FH, Dunlop JT, Hammond JH, and Weil D (1999), *A Stitch in Time,* Oxford University Press, New York: New York.

Bodgener, J. (1997), "The Clothing Industry in Turkey," Textiles Outlook International, Amy 1997, Textiles Intelligence.

Dünya (1998), Special Issue: The Turkish Economy at the 75th Year of Republic.

EIU (2000), The Economist Intelligence Unit Limited, EIU Country Report: Turkey (July).

EURATEX (2004), The European Textile and Apparel Organisation (EURATEX) Statistics http://www.euratex.org/statistics.html.

Filiztekin, A. (2000), "Openness and Productivity Growth in Turkish Manufacturing", Sabanci University Working Paper.

Ghemawat, P. and Baird, B. (1998), International Competitiveness: Turkey and its Garment Industry, Harvard Business School Case (N9-799-033).

IBS (2000), Doing Business in Turkey - (4.6) Textiles and Leatherware (April 20, 2000, IBS)
Istanbul Textile and Apparel Exporters Association (ITKIB) Statistics (2005), http://www.itkib.org.tr/res800/Istatistik/IhrSayfa.htm

ITMF (1997), International Textile Machinery Shipment Statistics (20/1997).

ITMF (1998), International Production Cost Comparison Report (1998).

State Planning Organization (1998), Textile Report.

Kornosor, A. S. (2000), "Turkey`s Textiles and Readywear: A New Age on Competition" Competitive Advantage of Turkey project: Textile and Apparel Cluster Report.

Parıltı, H. and Türkant, B. (2000), Export Performance Evaluation of Turkish Textile Industry in 1999 (in Turkish), Istanbul Textile and Apparel Exporters Association.

STAT-USA on the Internet (2005), US Department of Commerce (http://www.stat-usa.org/.
Sung, K. (1994), "Turkey's Clothing Industry Observed,", *Textile Asia*, August, pp. 10-15.

Tan, B. (2001), "Overview of the Turkish Textile and Apparel Industry," Harvard University, Center for Textile and Apparel Research, Research Paper Series, February 2001.

Tan, B. (2002), "Managing Manufacturing Risks by Using Capacity Options," *Journal of the Operational Research Society*, Vol. 53, No. 2, pp.232-242.

Tan, B. and S.B. Gershwin (2004), "Production and Subcontracting Strategies for Manufacturers with Limited Capacity and Volatile Demand," *Annals of Operations Research*: Special Volume on Stochastic Models of Production/Inventory Systems, Vol.125, pp. 205-232.

Türkant, B. (1998), Turkish Textile and Apparel Sector in 1990s (in Turkish), Istanbul Textile and Apparel Exporters Association.

Türkant, B. and Parıltı, H. (1999), Export Performance Evaluation of Turkish Apparel and Garments Industry in 1999 (in Turkish), Istanbul Textile and Apparel Exporters Association.

Turkish Clothing Manufacturers Association (2000), Evaluation of the First Four Months Performance of the Turkish Clothing Industry.

Turkiye Sinai Kalkinma Bankasi (1997), Pamuklu Tekstil Raporu.

The Undersecretariat of Foreign Trade, The Republic of Turkey, Prime Ministry Report (2000)

US Customs Service (1999), Textile Status Report, 31.12.1999
http://www.customs.gov/quotas/1999/trtxtrpt.htm

Yıldırım, I, Tan, B. and Karaesmen, F., "A Stochastic Production Planning and Sourcing Problem with Service Level Constraints, " *OR Spectrum*, Vol. 2, No. 2-3, pp. 471-489, 2005.