



## Global Textile and Apparel Business Dynamics

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### ABSTRACT

*This paper presents a brief profile of the U.S. marketplace with a focus on the Nonwovens industry. The production and consumption statistics and forecasts show the United States as the largest producer as well as consumer of Nonwovens. Latest data (year ending June 05) from OTEXA shows that the US is a net exporter of Nonwovens, exporting almost twice as much as importing. Trends analysis of the Nonwovens industry reveals the increased focus on waste elimination, energy conservation, and recycling. Polypropylene continues to be the most dominant fiber in the Nonwovens industry. Bicomponent and multicomponent fibers are however making inroads in the fiber market.*

*The global nonwovens production is forecasted to increase by 8.5% annually until 2006. One major problem, threatening to disrupt the global supply chain of the nonwovens industry is surging oil prices, which in turn makes it expensive to produce raw material. The industry may have to invest in R&D to evolve alternate sources for raw materials. The increase in oil prices is escalating the raw material prices and could possibly slow the nonwoven's growth rate.*

*Keywords: Nonwovens, Nonwoven, Textile Import Export, Textile Consumption Production, Supply chain, Nonwovens trading partners, Trends in nonwovens industry, US Marketplace, Nonwoven Products*

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### Overview of the US Market Place

The U.S. is by far the largest economy in the world. In 1998 it included more than 270 million consumers and 20 million businesses. U.S. consumers purchased more than \$5.5 trillion of goods and services annually, and businesses invested over a trillion dollars more for factories and equipment. In addition to spending by private households and businesses, government agencies at all levels (federal, state, and local) spend roughly an additional \$1.5 trillion a year<sup>1</sup>. Today the U.S. population is over 297,734,134 (Census

Bureau)<sup>2</sup>. The national average per capita income of US is \$37,500, second in the world, only to Luxemburg<sup>3</sup>. Luxemburg is however slightly smaller in area than the state of Rhode Island, with a population of 468,571<sup>4</sup>. The US GDP was \$11.6 trillion in 2004<sup>5</sup>. The United States produces over 80 percent of the goods and services purchased by its consumers<sup>1</sup>. This leaves almost 20 percent to be imported from other countries. Twenty percent of this is a substantial amount when considering such a huge economy. It is reason enough for exporters around the globe to focus on the US market.

In the case of textiles and apparel, the interest is further aroused because the US imports more goods in this sector than it produces locally. Today the apparel imports account for an astronomical 96% of total market size. The production and shipments for apparel for the first quarter of 2005 are

valued at 3,678.9 million dollars<sup>6</sup> (see Table 1 in appendix for explanation). US apparel sales exceeded 182 billion dollars in year 2000<sup>7</sup>. Below is an analysis of the strengths, weaknesses, opportunities and threats faced by the US textile and apparel industry.

**The SWOT Analysis of US textile and apparel industry**

**Table 1: SWOT Analysis of US textile and apparel industry**

<b>Strengths</b>	<b>Weaknesses</b>
Large domestic market	Consumer demand for lower prices
Communication technologies such as electronic data exchange	Low profitability
Higher efficiency and productivity as compared to other countries	Inflexibility
Economies of Scale	Many companies lack global vision
Strategic alliances	Intra industry competition means market get flooded easily
Research and development capabilities	Inaccessibility of the markets of developing countries
	Focus on commodity products instead of specialty products
<b>Opportunities</b>	<b>Threats</b>
Regional trade agreements	Elimination of quotas in 2005
Investment in Technology	Intense international competition
Growth of industrial textile market	Deterioration of domestic market in favor of imports
Large global market opportunities	Govt. reluctance to enforce trade laws
Niche markets—looking to specialty markets	Growing volume of transshipments

Source: Erin Dodd Parrish, Nancy L Cassill, William Oxenham; *Opportunities in the international textile and apparel marketplace for niche markets*. Journal of Fashion Marketing and Management. Bradford: 2004. Vol. 8, Iss. 1; p. 41<sup>8</sup>

**Overview of the nonwoven industry**

**Market description**

The nonwoven fabrics industry is one of the fastest growing sectors of the textile business, becoming an integral part of the American economy and everyday life. The nonwoven industry has grown to present a broad array of “engineered” products that are driven by high-speed, low-cost, innovative, value-added processes. Nonwovens have barriers to imports because of high capital & low labor requirements. The high volume and low cost of the nonwoven goods make imports quite

unattractive economically (B. Pourdeyhimi 2004)<sup>9</sup>. The production of nonwoven fabrics requires a substantial capital investment and a relatively small workforce; therefore, it is not an attractive industry for developing countries where finding employment for numerous people is a prime objective. This category requires sophisticated, electronically controlled machinery and highly trained fabric engineers. In almost all cases where nonwoven fabrics can be

substituted for woven and knitted fabrics, the result is a less expensive product.

### US Nonwovens Market

The US is the largest market for nonwovens production, and is growing at a considerable rate. The US industry leads the world in nonwovens technology, production and consumption. It is composed of over 550 firms that employ more than 160,000 people. These firms have combined annual sales of over 40 billion dollars. The typical

US nonwovens firm is small, has a median employment of about 75, and annual sales of about 7.5 million dollars. Core nonwovens firms are located primarily in 32 states and the District of Columbia (Pourdeyhimi, 2004)<sup>9</sup>. However, manufacturing of nonwoven fabrics is segmented by geographical areas within the US, indicated by the table below. It is also apparent from the table that the state of North Carolina is dominant in the nonwovens industry.

**Table 2: Nonwoven Fabrics (NAICS 3132301). Value of product shipments**

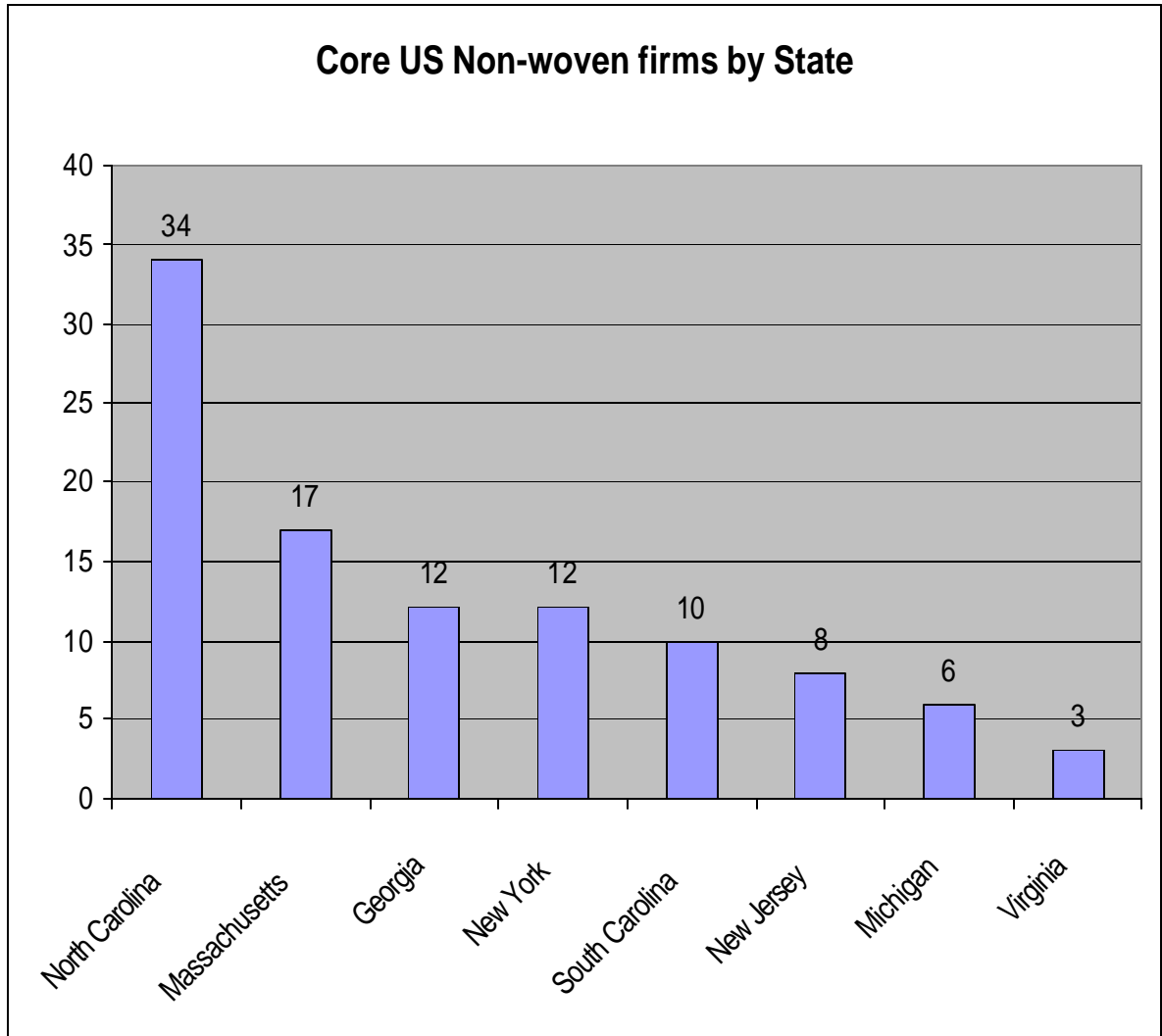
	Value of product shipments (\$1,000)	
	Year	Value
United states	2002	3201452
	1997	2784259
California	2002	29879
	1997	N
Georgia	2002	315724
	1997	289311
Massachusetts	2002	74313
	1997	58507
New York	2002	47004
	1997	56869
<b>North Carolina</b>	<b>2002</b>	<b>745933</b>
	<b>1997</b>	<b>635366</b>
Ohio	2002	16210
	1997	N
Pennsylvania	2002	22631
	1997	N
South Carolina	2002	319465
	1997	432839
Wisconsin	2002	138995
	1997	131950

Source: U.S. Census Bureau, 2002 Economic Census. (2004, December). Nonwoven Fabric Mills: 2002. Retrieved on September 8, 2005 from : <http://www.census.gov/prod/ec02/ec0231i313230t.pdf>

North Carolina has the largest number of core nonwovens firms in the US, doubling the amount of firms the next ranked state has. Forty of North Carolina's

100 counties have at least one commercial nonwoven related facility located in them (Pourdeyhimi 2004)<sup>9</sup>.

**Figure 1: Core US Nonwoven firms by State:**



Source: Pourdeyhimi, Behnam (2004, December). Directions in Nonwovens Technology. Nonwovens Cooperative Research Center.

### **Production and Consumption**

Nonwovens are consumed globally, but a great deal of this consumption is concentrated right here in the United States, as represented by the data in the table below. This, however, is expected to change as

developing countries become increasingly developed. Becoming more developed will create the opportunity for them to produce nonwovens and at an affordable price. As this occurs, developing countries will gain access to more nonwovens products.

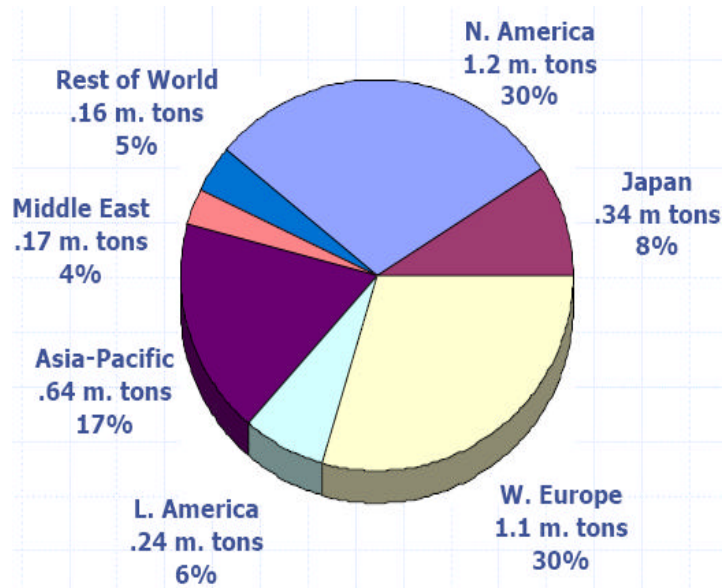
**Table 3: Nonwovens Consumption by Region**

Nonwovens consumption by Region 1983-2007 (% of Total)					
Year	USA	West Europe	Japan	China	Rest of the World
1983	52	31	8	-	9
1988	48	30	9	2	11
1995	38	30	9	6	17
1998	35	30	10	80	17
1999	34	30	9	10	18
2000	33	30	9	11	18
2005	31	31	9	11	18
2007	30	30	9	12	19

Source: Stan Dobson, Manmade Fibers Fuel Growth of Nonwovens, International Fiber Journal, February 2001 - Volume 16 / Number 1. <sup>10</sup>

Like consumption, nonwoven’s production is found worldwide, but is mainly concentrated in North America, Europe, and Japan.

**Figure 2: Worldwide Nonwovens Production**



Source: Pourdeyhimi, Behnam (2004, December). Directions in Nonwovens Technology. Nonwovens Cooperative Research Center.

The concentration of production in the western hemisphere and Japan may decline as developing countries advance their technology. Production is expected to rise in Latin America, Asia-Pacific, and the

Middle East. In terms of nonwoven roll goods production, production has increased since 1991 and is expected to increase over the next few years.

**Table 4: Nonwovens Production by Region**

Nonwovens production by Region 1983-2007 (% of Total)					
Year	USA	West Europe	Japan	China	Rest of the World
1983	53.0	34.0	10.0	-	3.0
1988	53.0	34.0	9.0	1.0	3.0
1995	45.0	32.0	9.0	2.0	12.0
1998	41.0	30.0	8.0	3.5	17.5
1999	38.0	30.0	8.0	5.0	19.0
2000	37.0	29.0	8.0	6.0	20.0
2005	37.0	28.0	8.0	7.0	20.0
2007	36.0	28.0	8.0	7.0	21.0

Source: Stan Dobson, Manmade Fibers Fuel Growth of Nonwovens, International Fiber Journal, February 2001 - Volume 16 / Number 1. <sup>10</sup>

Advances in the industry are expected to be driven by incontinence products, filters and protective apparel. Total demand is forecasted to reach nearly \$5 billion in 2007. (Table 5)

**Table 5: Nonwoven Fabric Demand**

	2002	2007	Share
Consumer, disposable	\$ 935	\$ 1,085	35.98%
Medical, disposable	670	820	22.05
Filtration, disposable	580	740	16.67
Other disposable	400	505	15.04
Nondisposables	1,470	1,770	10.26

Source: Market Share Reporter 2005, p192, graph 719

The nation's average age is rising, driven in part by the baby boomers reaching the retirement age and nation's low birth rate. This demographic shift in population will have a positive effect on growth of adult incontinence products and personal convenience items<sup>10</sup>. Longer life span of the population will increase consumption of nonwovens in the healthcare sector. Medical

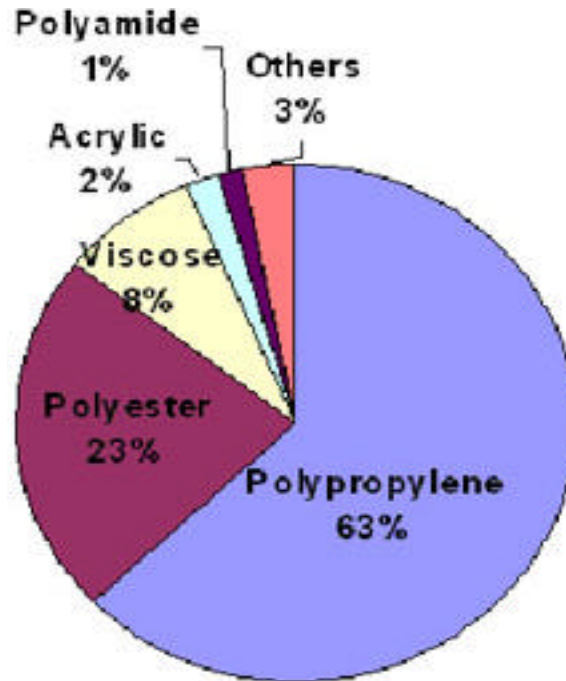
procedures will become uniform around the world. The use of disposable nonwovens apparel and related surgical products are expected to increase their share of the total medical market versus reusable products.

### Fiber / Raw Material Consumption

At present, the nonwovens industry is dominated by manmade fibers and resins. Polypropylene and polyester make up majority of nonwoven raw material consumption. World consumption of fibers in nonwoven production is 63%

polypropylene, 23% polyester, 8% viscose rayon, 2% acrylic, 1.5% polyamide and 3% other high performance fibers<sup>11</sup>. Future advancements will be in bicomponent fibers, micro fibers (split bicomponent fibers or meltblown nonwovens), nano fibers, biodegradable fibers, super-absorbent fibers and high performance fibers.

**Figure 3: Fiber Consumption in Nonwovens Industry**



Source: Raghavendra R. Hegde, M. G. Kamath, Atul Dahiya, Fiber and Fiber Consumption in Nonwovens, University of Tennessee 2004<sup>11</sup>.

### Trends in the Nonwovens Industry

Innovation is the key for growth within the nonwovens industry. Today's companies are fully aware that the world's resources are being exhausted at an increasing pace, and this situation demands the design of environmental friendly processes through out the nonwovens value chain. The important factors to consider are<sup>12</sup>

- Waste elimination
  - i) Reduce
  - ii) Reuse
  - iii) Redesign
- Energy conservation
- Reclamation

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- Recycle
- Government regulations and consumer awareness are forcing companies to come up with technologies that are environment friendly, including the capability of producing biodegradable, flushable and disperseable products. David Rigby Associates report that there will be more technological innovations such as
- 1) New, more efficient and economical processing technologies,
  - 2) Direct polymer to roll goods,
  - 3) Use of new types of composite nonwovens and laminates, and

- 4) New finishing techniques and novel additives (Hegde, Kamath, Dahiya; 2004)<sup>11</sup>.

The review of Idea 2004 revealed a few other trends in nonwoven products. One very prevalent trend is the use of bicomponent and multicomponent fibers. These fibers have continued to grow in use, especially in spunbonded, meltblown and spunlaced products. In addition to multicomponent fibers, the use of finer-denier fibers and specialty fibers also continues to expand in all major types of nonwovens. There has also been increased sophistication of composite nonwoven products. These products are growing in number and as reported in Textile World include “the use of multiple polymers within a fabric, combining nonwovens produced by different processes, and fabrics combined with films and/or polymeric foams.” The finishing of nonwovens products is also gaining more attention as producers try to create innovative products to meet customers’ needs<sup>13</sup>.

### **Products**

Association of Nonwovens fabric industry defines nonwovens as “A sheet or web structure bonded together by entangling fiber or filaments (and by perforating films) mechanically, thermally or chemically. They are flat, porous sheets that are made directly from separate fibers or from molten plastic or plastic film. They are not made by weaving or knitting and do not require converting the fibers to yarn”<sup>14</sup>. Some of the familiar nonwoven products are as follows

- Disposable diapers
- Sanitary napkins & tampons

- Sterile wraps, caps, gowns, masks and drapings used in the medical field
- Household and personal wipes
- Laundry aids (fabric dryer-sheets)
- Apparel interlining
- Carpeting and upholstery fabrics, padding and backing
- Wall coverings
- Agricultural coverings and seed strips
- Automotive headliners and upholstery
- Filters
- Envelopes
- Tags
- Labels
- Insulation
- House wraps
- Roofing products
- Civil engineering fabrics/geotextiles

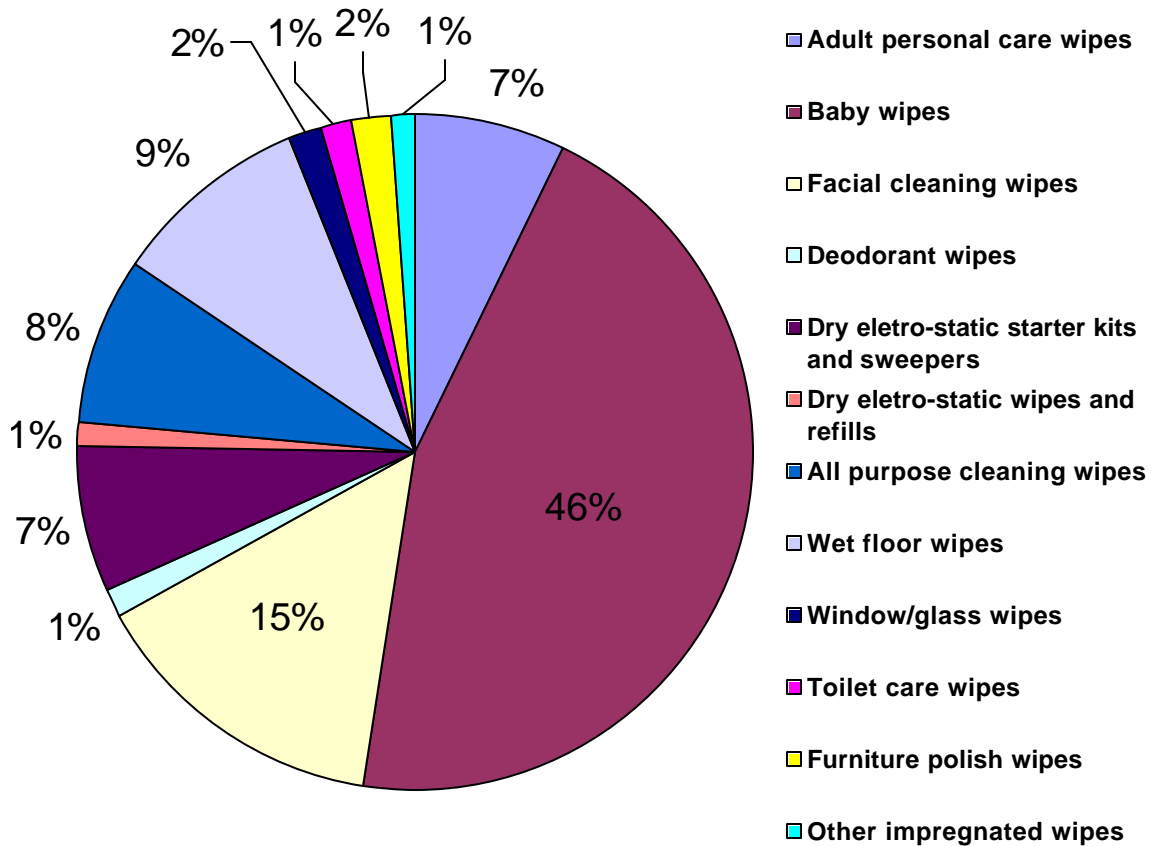
(Source: INDA)<sup>14</sup>

According to a study by Packaged Facts, a market research firm based in New York City, U.S. sales of household cleaner cloths and wipes jumped from \$284.4 million (retail) in 2000 to \$435.9 million in 2002 for a compound annual growth rate of 23.7%<sup>15</sup>. The industry continues to grow with new production introductions, such as pet wipes and luxury facial products. As the consumer market matures and growth potential appears less attractive, some wipes manufacturers are focusing on the institutional and industrial wipes markets. Figure 4 shows an example of how household wipes are segmented. Personal wipes are a large segment of the household wipes.

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**Figure 4: Household Wipes Market Segments, 2004**



Source: Lisa Doyle, Global Cosmetic Industry, New York: Apr 2005. Vol.173, Iss. 4; pg. 38, 3 pgs<sup>16</sup>

Euromonitor, a UK-based research firm, expects the global market to reach nearly \$5.3 billion in 2006, representing a compound annual growth rate of more than

6%. Although growth is only about half of what it was just a few years ago, it is still well ahead of what is expected for many household and personal care categories<sup>15</sup>.

### **Imports and Exports**

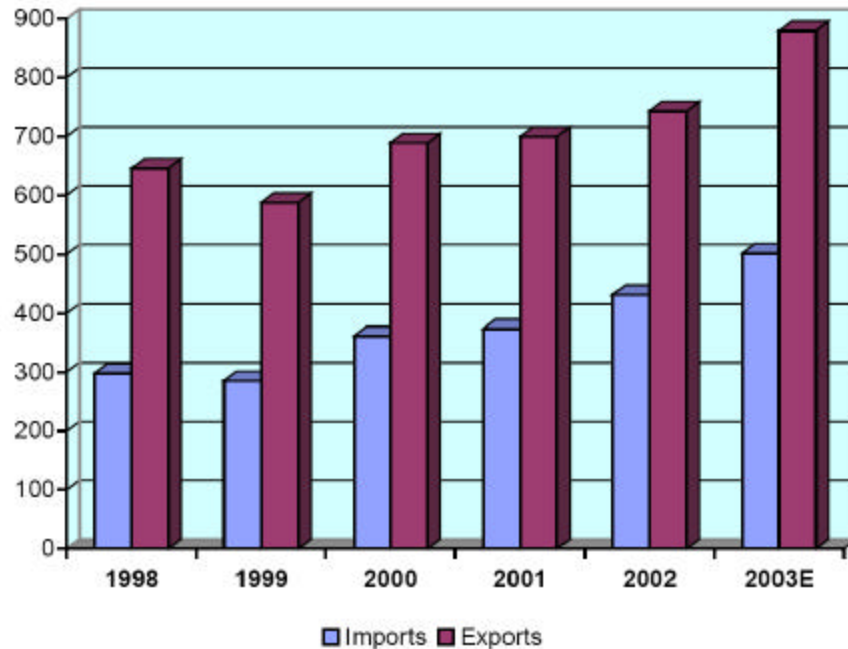
With the exception of a few years in the late 1900s, U.S nonwoven producers have enjoyed a constant rise of exports for more than a decade. U.S. nonwovens roll goods producers export a little over twice the volume imported. The decline in the value of the U.S. dollar by 20%-30% against the Euro, British Pound, Yen and several other major currencies since mid 2002 is

expected to improve the competitiveness of the U.S. exports and will make nonwoven imports in the U.S. less attractive. This should be beneficial to domestic nonwoven producers involved in exports.

The nonwoven trade pattern is demonstrated in the figure below depicting US exports and imports of nonwoven roll goods.

**Figure 5: Value of U.S. Nonwoven Roll Goods Imports and Exports**

**VALUE OF U.S. NONWOVEN ROLL GOODS IMPORTS AND EXPORTS**  
(millions of dollars)



Source: INDA, USITC retrieved on September 7, 2005 from: <http://www.inda.org/events/global/importexport.pdf> <sup>17</sup>

**US Nonwoven Imports**

The latest data from the OTEXA website shows that the US imported

nonwoven goods worth \$730.857 million by year ending June 2005. The following table shows the distribution of US nonwoven imports.

**Table 6: US Nonwoven imports distribution by exporting countries**

US Imports Data for Nonwovens: Category 223					
Data in Million of \$\$\$					
Countries	Calendar year		Year Ending	YE Jun-05	
	2003	2004	Jun-05	% Change	%Share
World	583.563	674.242	730.857	14.97	100
Japan	74.306	88.702	98.862	26.79	13.53
Canada	79.323	87.015	93.655	9.3	12.81
Israel	77.666	81.855	90.812	8.55	12.43
Germany	69.228	84.195	87.147	13.82	11.92
Mexico	31.359	57.839	63.983	42.24	8.75
UK	32.672	37.184	40.117	10.33	5.49
Italy	46.087	33.253	30.525	25.07	4.18
China	6.063	14.264	27.362	213.89	3.74

Luxemburg	19.392	17.43	21.663	3.58	2.96
France	17.612	18.204	18.646	9.56	2.55
Rest of the world			158.085		21.63009
World	730.857				
Top 10 Exporters	572.772				
%share of top 10 Exp	78.36991				

Source: OTEXA, <http://otexa.ita.doc.gov/msrpoint.htm><sup>18</sup>

### **US Nonwoven Exports**

The latest data from the OTEXA website shows that the US exported

nonwoven goods worth \$1,370,337 by year ending June 2005. The following table shows the distribution of US nonwoven exports.

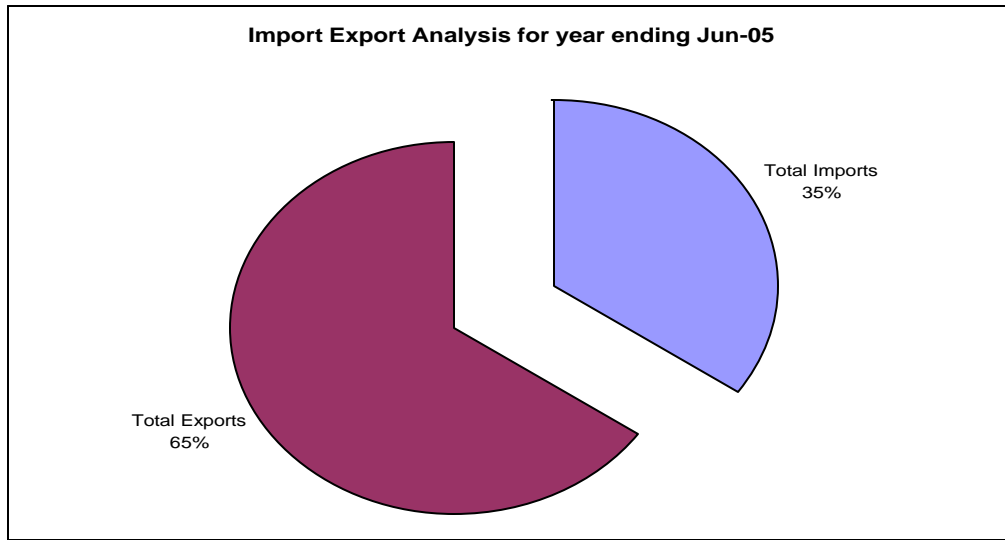
**Table 7: US Nonwoven exports distribution by importing countries**

US Export Data for Felt & other Nonwovens					
Data in thousand of \$\$\$					
Countries	Calendar year		Year Ending	YE Jun-05	
	2003	2004	Jun-05	% Change	%Share
World	1121528	1252255	1370337	18.07	100
Canada	232305	290157	308699	20.43	12.81
Mexico	258835	263228	290474	14.8	21.2
Belgium/Lu	81846	93282	106312	14.81	7.76
China	68370	83569	100322	29.07	7.32
Hong Kong	64906	68812	75740	9.87	5.53
Japan	64947	67892	69056	6.93	5.04
UK	51248	53093	58480	18.38	4.27
Thailand	31805	38126	43922	48.15	3.21
Germany	38258	41214	40183	19.32	2.93
South Korea	23386	24785	25545	19.56	1.86
Rest of the world			251604		18.36074
World YE Jun-05	1370337				
Top 10 import mkts	1118733				
%share of top 10 Imp mkts	81.63926				

Source: OTEXA, <http://otexa.ita.doc.gov/msrpoint.htm><sup>18</sup>

Analysis of the US nonwovens import and export data reveals that US is a net exporter of nonwoven goods.

**Figure 6: Import Export Analysis of Nonwoven for year ending June 2005**



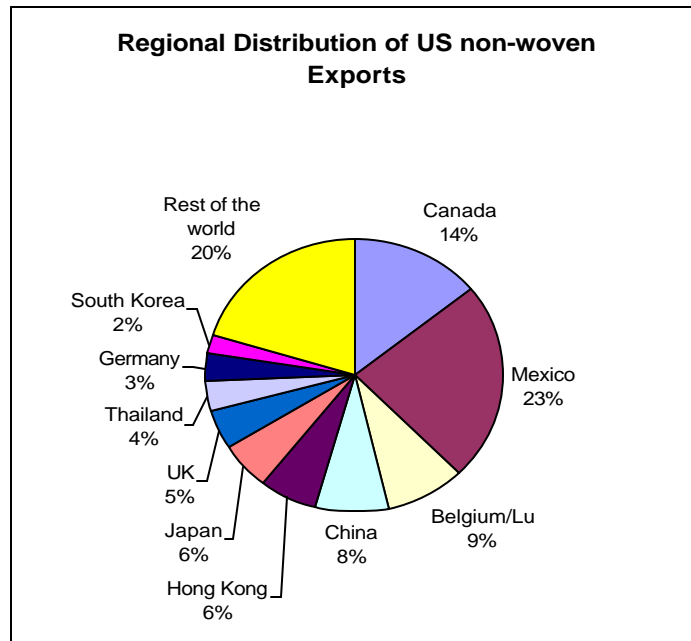
Note: The full circle is the combined volume of imports and exports. Exports are 187.5% of imports.

**Trading Partners**

The top 10 export markets for U.S nonwoven producers include Canada, Mexico, Belgium/Luxemburg, China, Hong Kong, Japan, U.K., Thailand, Germany, and

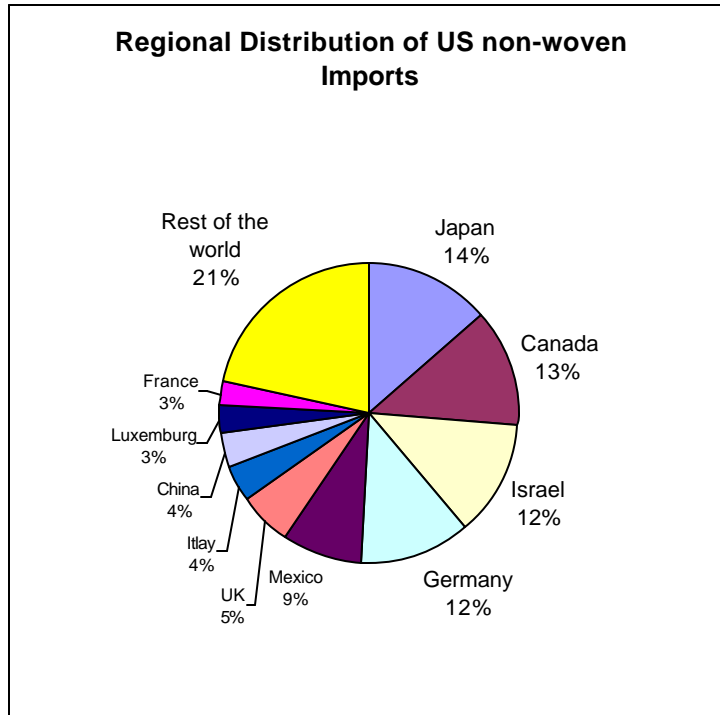
South Korea. The top 10 countries for nonwoven imports are Japan, Canada, Israel, Germany Mexico, U.K., Italy and China.. Below you can see the regional distribution of these exports and imports.

**Figure 7: Regional Distribution of US Nonwoven export**



Source: OTEXA, see Table 2 in Appendix

**Figure 8: Regional Distribution of US- Nonwoven Imports**



Source: OTEXA, see Table 3 in Appendix

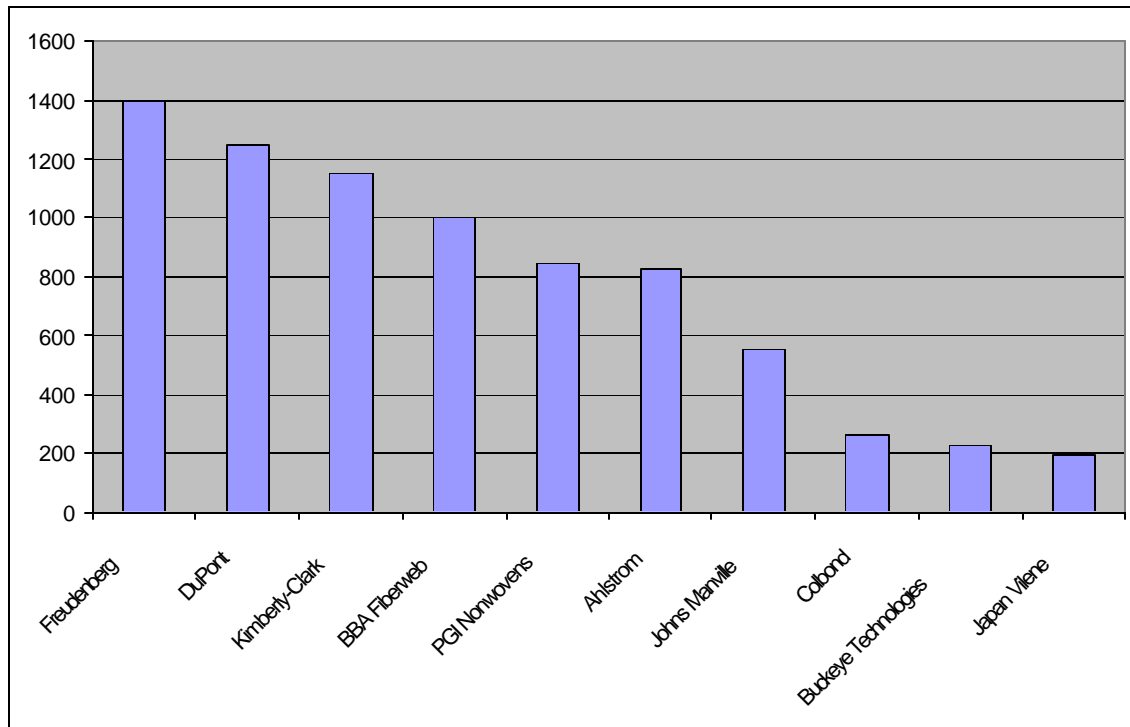
**Major players/ Competitors**

Below we have ranked firms by world wide nonwovens sales in millions of dollars (2004). Freudenberg was the largest producer of nonwovens, reporting \$1.4 billion in sales in 2003. The top 10 has

remained intact in recent years with DuPont Nonwovens, Ahlstrom Fiber Composites, Kimberly-Clark, BBA Fiberweb, PGI, Johns Manville, Colbond, Buckeye and Japan Vilene rounding out the top positions. Each company is ranked on the basis of their 2004 sales<sup>19</sup>.

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**Figure 9: Major Players in the Nonwoven Industry**



Source: International Top 40, Nonwovens Industry 2004<sup>19</sup>

### **Global Supply Chain**

Due to a very strong domestic industry U.S. foreign dependence for procurement of nonwovens is very low as compared to apparel for instance. The different supply chain positions are<sup>20</sup>

- i) Raw Material Suppliers
- ii) Equipment Manufacturer
- iii) Nonwoven Producers
- iv) Finished product manufacturers
- v) Converter or finisher
- vi) Investment community

The US is the world's largest producer of nonwovens. The industry heavily uses petroleum based synthetic fibres and resins as the basic raw material. Imports of raw materials will grow because the US has fewer trade barriers than other countries. Most of the equipment manufacturers for the nonwoven industry are based in Europe, primarily in France, Germany and Italy. Due to continued growth of nonwovens in the

US, the manufacturing is now beginning to move to the US as well.

One major problem, threatening to disrupt the global supply chain of the nonwoven industry is surging oil prices, which in turn makes it expensive to produce raw material. The industry may have to invest in R&D to evolve alternate sources for raw materials. The problem with raw material is oil prices. The surge in oil prices is because of increase in demand due to growing economies of China and India, and speculation over continued US refinery outages. The increase in oil prices is escalating the raw material prices and could possibly slow the nonwoven's growth rate.

### **Three Interesting Facts About the US Nonwovens Industry**

- 1 The US is the world's largest producer as well as consumer of nonwoven goods<sup>10</sup>.

- 2 Unlike many other textile and apparel categories, the US is a net exporter for the nonwoven goods.
- 3 According to a new report from INDA, nonwovens production grew at an

average of 7.5% a year during the 1990s. The global nonwovens production is forecasted to increase by 8.5% annually until 2006<sup>21</sup>.

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## Appendix

**Table 1: US Apparel Production and shipment Data**

Product description	First quarter 2005	
	Quantity**	Value***
Total.	616,013	4,784.1
Men's and boys' apparel:		
Suits.	745	91.4
Coats	5,739	213.1
Tops	167,737	644.3
Bottoms	(D*)	(D)
Underwear and nightwear.	33,405	63.8
Other garments	14,181	183.1
Women's and girls' apparel:		
Dresses	26,190	596.4
Coats	2,453	86.9
Tops	94,083	755.2
Bottoms	56,032	664.3
Underwear and nightwear	(D)	(D)
Other garments	23,260	344.8
Infants' apparel		
Coats, jackets, vests, swimwear, and sweaters	6,122	23.8
Dresses	(D)	(D)
Shirts, knit or woven	477	6.3
Sets	(D)	(D)
Pants and shorts	182	1.2
Play clothing	(D)	(D)
Underwear	1,454	4.3
Nightwear	(D)	(D)
Total Value of Production and shipments for Apparel		3,678.9

Source: *Census Bureau*, retrieved on Sep 7, 2005 from <http://www.census.gov/cir/www/315/mq315a.html>

\*D Withheld to avoid disclosing data for individual companies.

\*\* Quantity in thousands of units. \*\*\*Value in millions of dollars



**Table 2**

**For Graph of regional distribution of Exports**

Canada	12.81
Mexico	21.2
Belgium/Lu	7.76
China	7.32
Hong Kong	5.53
Japan	5.04
UK	4.27
Thailand	3.21
Germany	2.93
South Korea	1.86
Rest of the world	18.36074

Source: OTEXA, retrieved on September 7, 2007 from:  
<http://otexa.ita.doc.gov/msrpoint.htm>

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Table 3

**For Graph of regional distribution of Imports**

Japan	13.53
Canada	12.81
Israel	12.43
Germany	11.92
Mexico	8.75
UK	5.49
Italy	4.18
China	3.74
Luxemburg	2.96
France	2.55
Rest of the world	21.63009

Source: OTEXA, retrieved on September 7, 2007 from:

<http://otexa.ita.doc.gov/msrpoint.htm>

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