



## A Descriptive Analysis of North Carolina Textile Complex: 2006

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### ABSTRACT

*In Spring of 2006, North Carolina State University's College of Textiles conducted a research study with funding from the North Carolina Department of Commerce entitled State of the Union of the Textile Industry in North Carolina: Improving Global Market Competitiveness with Identification and Assistance of Core Competencies. This paper focuses on the results of the descriptive analysis of the North Carolina textile complex. Rather than only focus on the traditional manufacturing sectors of the textile industry, the entire textile value chain from raw materials to retail, intangible value-adding activities, auxiliary industries, and the supporting environment were included in the analysis. Even with North Carolina's historical dominance in textiles, this was the first research study that looked extensively at the entire North Carolina textile complex including all steps in the value chain from fiber to consumer with auxiliary firms.*

*Outcomes of the study indicate that North Carolina is still recognized as a leader in textile marketing and manufacturing as well as university and industry research and development. Yet with the opening up of global markets, more than ever companies need to look to additional areas of the textile complex as sources of growth, inspiration and collaboration to remain competitive in today's industry. Fortunately, North Carolina companies do not have to attempt this endeavor alone. North Carolina has a wealth of resources within its borders to support and assist companies making this transition.*

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*Keywords: North Carolina, textile complex, value chain, competitiveness, clusters*

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### Introduction

Within the last ten years, the global textile complex has undergone a major restructuring, due in part to trade liberalization as well as growth in global product and market demand. While both production and consumption of textiles and apparel are anticipated to increase, a major shift has occurred in both global production and marketing:

*Firms are **marketing** their products in the most profitable places in the world (predominantly developed countries), and **manufacturing** in the most economical and efficient places in the world (increased shift to developing countries).*

Throughout this restructuring, North Carolina has continued to play a significant role in the global textile complex. North

Carolina is recognized as *the* headquarters for several major global textile marketing and manufacturing companies, as well as a leader in university and industry research and development. Historically, North Carolina has consistently led the other 50 United States in textile production (ranked #1 among all 50 U.S. states), and currently ranks as the fourth largest state for apparel production in the nation in terms of employment (U.S. Department of Labor, 2005; National Council of Textile Organizations, 2006). North Carolina still accounts for more than a fourth of total United States' textile employment (U.S. Department of Labor, 2005).

However North Carolina's *historical* dominance in the textile and apparel industry will not be enough to propel North Carolina's companies into today's globally restructured textile complex. Internationalization of the textile complex has created a new playing field that presents new challenges along with new opportunities.

In order to understand North Carolina's position in today's global textile complex, the North Carolina Department of Commerce awarded North Carolina State University's College of Textiles a research grant to analyze the North Carolina textile complex to order to identify opportunities to improve global competitiveness. Even with North Carolina's historical dominance in textiles, this was the *first* research study that looked extensively at the existing North Carolina textile complex (fiber through consumer, with auxiliary firms).

Specifically, the research objectives of the study were to:

- 1) Conduct a market analysis of the North Carolina textile industry by developing a database of companies including select variables regarding products, markets, functions, demographics, and core competencies.
- 2) Identify common strategies and tactics of North Carolina textile complex companies

- 3) Determine available resources that can provide North Carolina textile complex companies with assistance in developing supplementary strategies and tactics
- 4) Identify the next steps to enhance the global competitiveness of the North Carolina textile complex.

This paper will focus the results of the market analysis of the North Carolina textile complex.

## Background

The textile industry is global and complex. It is made up of distinctive characteristics that involve a large and diversified range of activities that use a varying mix of labor and capital (OECD Policy Brief, 2004). Textile products are unique, as they encompass diverse end-use markets that range from apparel and home textiles, to industrial and medical applications. On the same accord, the industry is also diverse, in that it can be a labor-intensive, low wage industry or a *dynamic and innovative* sector, depending on the end-market and production location one chooses to concentrate.

However in 2005, came the end of the World Trade Organization's (WTO) Agreement on Textiles and Clothing (ATC) eliminating quantitative import restrictions on textile products and creating a new, level playing field for all nations around the world. Trade liberalization (which actually began over 40 years ago, with formation of General Agreement on Tariffs and Trade – GATT) has allowed global companies to look at the *world* as their production site for textile products and components. The result has been a shift in production to developing nations (from developed countries) in the form of both offshoring (foreign direct investment) and outsourcing (importing products from a third party or full-package supplier), eroding high labor manufacturing in developed countries (e.g., United States).

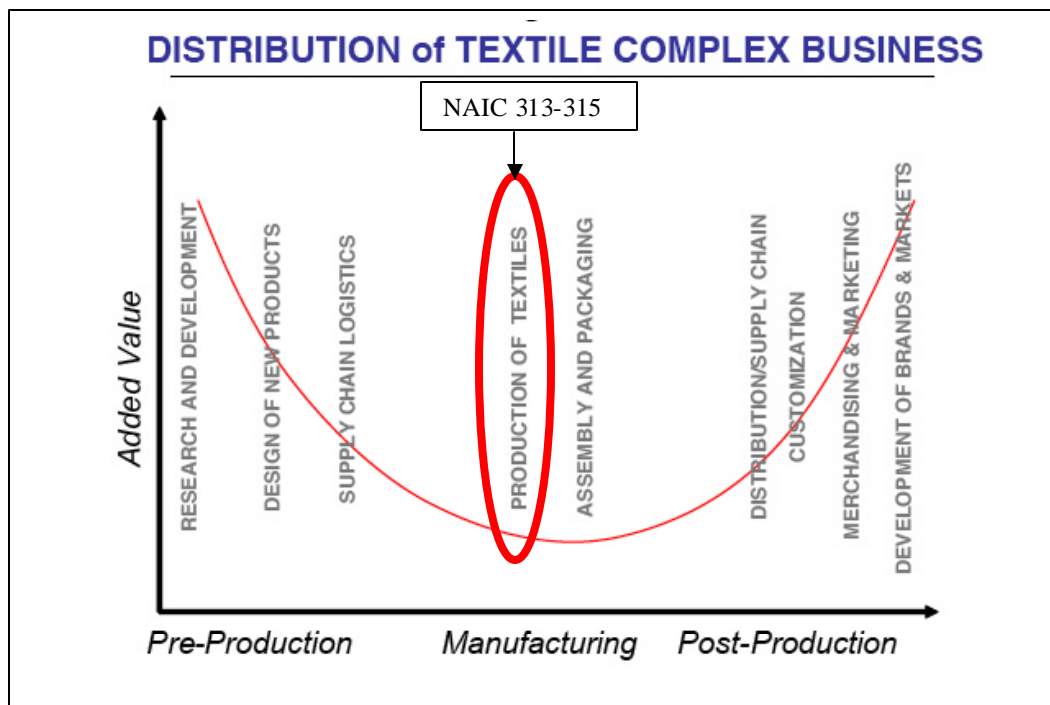
So how can textile and apparel companies in developed countries remain competitive in today's restructured textile

environment? “The key to growth--even survival--is to stake out a position that is less vulnerable to attack from head-to-head opponents, whether established or new, and less vulnerable to erosion from the direction of buyers, suppliers and substitute goods” (Porter, 1980, p. 50). For textile companies in developed countries, this means finding ways to create new products, use better processes, or in many cases, move out of manufacturing altogether to less labor-intensive and more capital- and knowledge-intensive positions in the value chain that take advantage of the strengths of the home environment.

However, in the United States, the classification of the textile and apparel industries is strictly limited to the *manufacture* of textile materials and apparel products. According to the U.S. Department of Labor, the textile and apparel industries fall within the following manufacturing sub-

sectors within the North American Industrial Classification System (NAIC): *Textile Mills (313)*, *Textile Product Mills (314)*, and *Apparel Manufacturing (315)* (Bureau of Labor Statistics, 2007; U.S. Dept. of Labor, 2004).

In Figure 1, this definition (contained within NAIC codes 313, 314, and 315) falls entirely into the ‘production of textiles’ category circled below, yet the growth areas for textile companies are not limited to textile manufacturing. In fact, many of the most profitable areas are centered around pre- and post-production activities or through collaborative projects with supporting industries. The textile industry should be viewed as a *value chain*, including the entire supply chain (raw materials through retail), intangible value-adding activities plus supporting industries, referred to as the textile complex for the remainder of this paper.



*Figure 1: The Distribution of Activities in the Textile Complex*  
Source: NC State's College of Textiles' Leadership Role in the New World of Textiles (2006), p. 4. Unpublished White Paper for College Strategic Assessment.  
Authors: Cassill, N.L.; Clapp, T.; Little, T.; O'Neal, W.G.; Warren, S.; Watson, J.

As seen in Figure 1, the textile *complex* includes *more* than just the traditional textile manufacturing industry composed of yarn, fabric, apparel, and home furnishings producers. It also includes:

- pre-production inputs and activities such as raw materials, fibers, research, design, development, and inbound logistics
- post-production activities including distribution, wholesale, packaging, labeling, marketing, retail, and after-sale services; and
- supporting environment consisting of machinery, training institutions, trade associations, and regulatory bodies.

All of these areas are necessary for the traditional textile industries to serve the long-established apparel and home furnishings markets as well as diversified markets from the medical to the industrial industries. This research presents a first attempt to move past the limited, traditional definition of the textile and apparel industries to include additional members of the textile complex that will foster growth for the entire value chain.

## Method of Approach

Given the global competitive environment, the researchers developed the *Global Textile Competitiveness Framework* to guide the study. The framework served as a guide for the identification of eight key variables to be included in the *North Carolina Textile Complex Database (Database)*: manufacturing capability, product type & mix, technology, research and development, financial strategy, market mix, marketing, and global business perspective. This research framework was developed using the researchers' expertise in textiles with primary data (information from industry, government, and academic personnel) combined with secondary data (government, trade and industry documentation). A Steering Committee comprised of personnel from industry, government, trade associations, and academia provided the researchers with inputs and guidance for the project. The

Committee provided a collaborative network among industry, academia, and government to discuss textile issues.

Due to the complex and fragmented nature of the textile industry, existing textile databases are limited in scope and are not comprehensive in nature. In order to create a comprehensive data source for the project, all of the following resources were used to create the Database: Dun & Bradstreet's Selectory, Davison's Bluebook, ReferenceUSA, N.C. Military Business Center database, textile trade association membership listings, consultation with the N.C. seven Regional Partnerships and various local Chambers of Commerce, company websites, personal phone calls and company visits. The Database is in EXCEL format and consists of 1,400 locations that can be searched and sorted by 90 variables. Each of the variables falls within one or more of the eight key variables.

## Results and Discussion: Market Analysis

The Database was used to conduct a market analysis of the North Carolina Textile Complex. The following three steps provided the market analysis of the North Carolina Textile Complex.

- I: Overall examination of the North Carolina Textile Complex
- II: Breakdown of activities by textile complex sector
- III: Descriptive profile by geographic clusters

### I. Overall examination of the North Carolina Textile Complex

A total of 1,400 locations were included in the database. This total number of establishments included textile and apparel manufacturers (NAIC 313, 314, and 315) as well as establishments in upstream operations (research, raw materials, fibers), downstream operations (converters, wholesale, and retail) and supporting industries that contribute to the production process such as machinery and chemical producers. These establishments serve a

variety of final product markets with home and interiors taking the largest market share at 16%. Table 1 shows the final markets served by North Carolina textile complex establishments.

**Table 1: Final Product Markets**

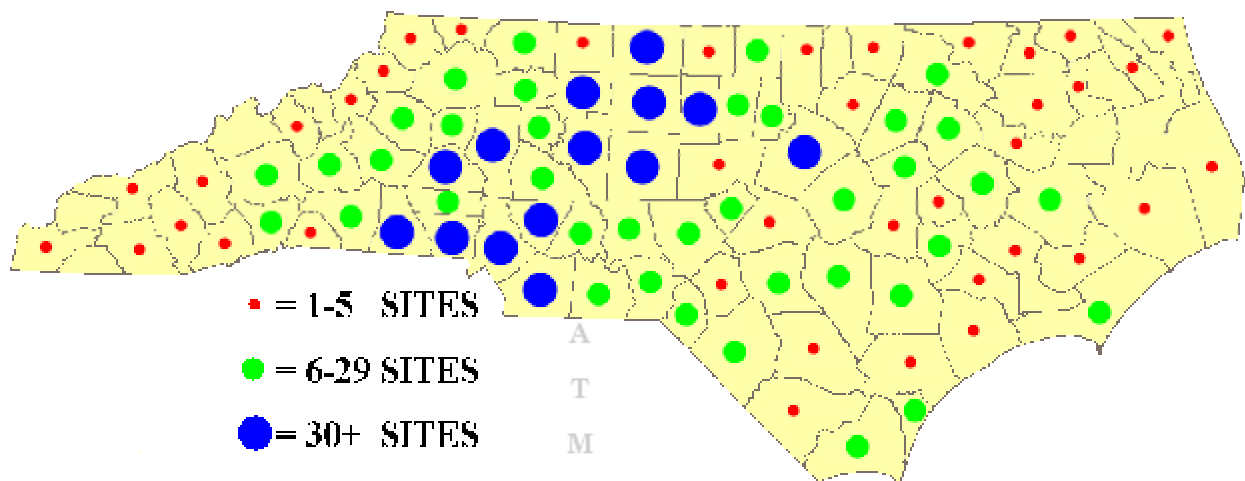
<i>Markets</i>	<i>Percentages<sup>(a)</sup></i>
Automotive	3%
Medical	3%
Military	4%
Furniture	5%
Home Fashions/ Furniture/Rugs	16%
Apparel	12%
Hosiery	12%
Accessories	5.5%
Finishing	13%

<sup>(a)</sup> Note: Total percentage is less than 100%, as final market could not be determined for all locations.

These 1,400 establishments employed 111,864 people and produced sales in excess of \$35 billion in 2006. However, due to the privately held nature of 91% of the establishments in North Carolina, the sales figure is an estimate. Furthermore, 15% of the companies participated in at least one trade show and 26% belong to at least one trade association. Additionally, 65% of the companies had an active website.

A total of 90 of the 100 counties in North Carolina were found to have at least one textile complex company (See Figure 2).

**Figure 2: North Carolina: Counties with Textile Complex Locations**

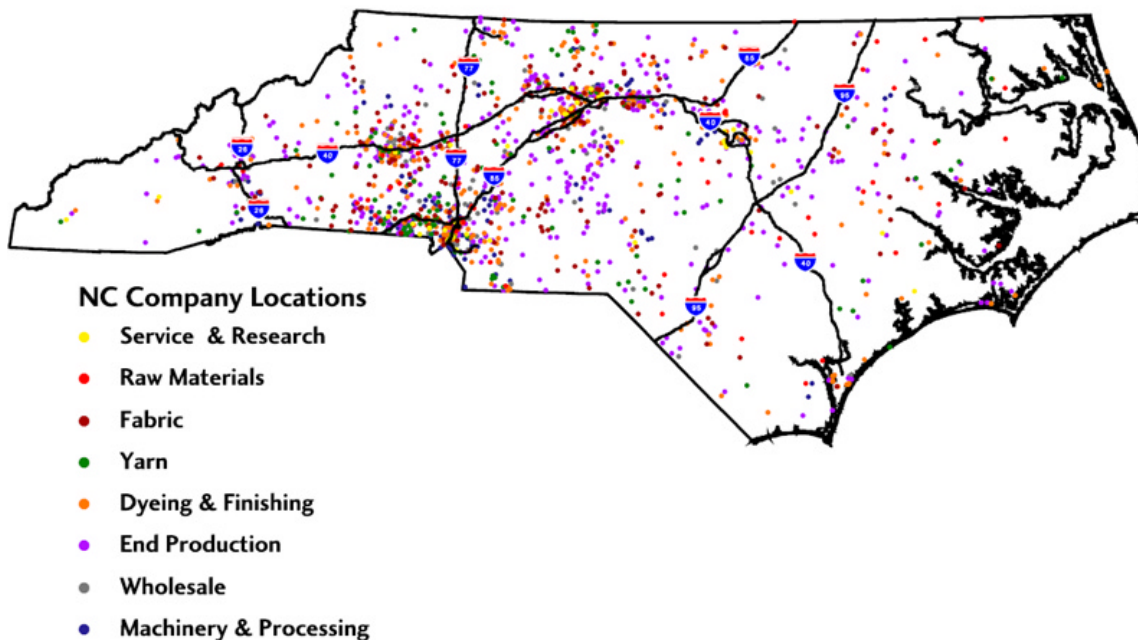


## II. Breakdown of activities by textile complex sector

The North Carolina textile complex consists of all production, marketing and services of textile products, from fiber to the ultimate consumer, including auxiliary services needed to *manufacture, finish,*

*distribute and market the product.* Textile products are unique, as there are diverse end-use markets for textiles: apparel, home textiles, industrial, automotive, and medical. Figure 3 represents all of these locations included in the *North Carolina Textile Complex Database.*

Figure 3: North Carolina Establishments by Complex Sector



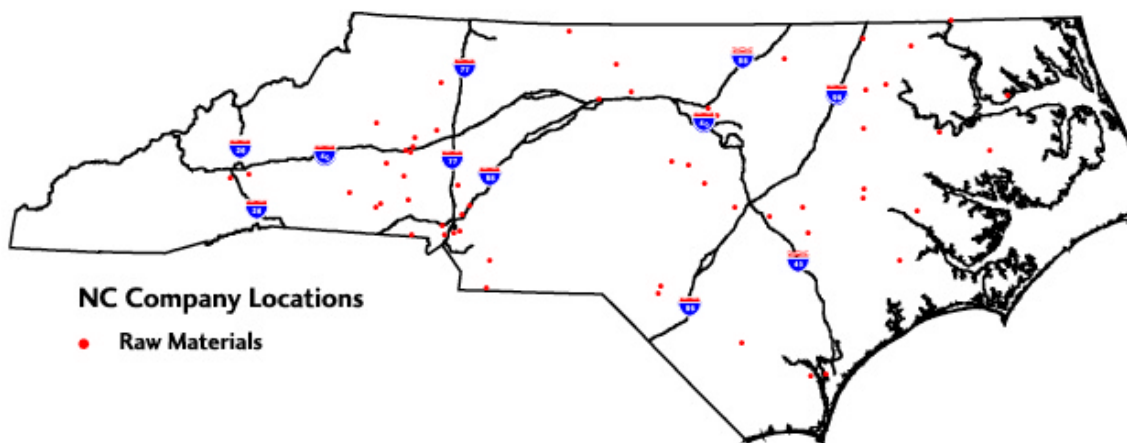
#### *Fiber, Yarn, Rope, Cord, Thread*

Textile products begin with the production of textile fibers (both natural and man-made) followed by the assembly of textile fibers into yarns or in some case, fabrics. Raw material providers (such as

cotton gins and chemical fiber producers) are combined with the yarn, thread, rope, and cord manufacturers because in many cases, the formation of textile fibers is carried out in the same establishment as the assembly of the textile fibers.

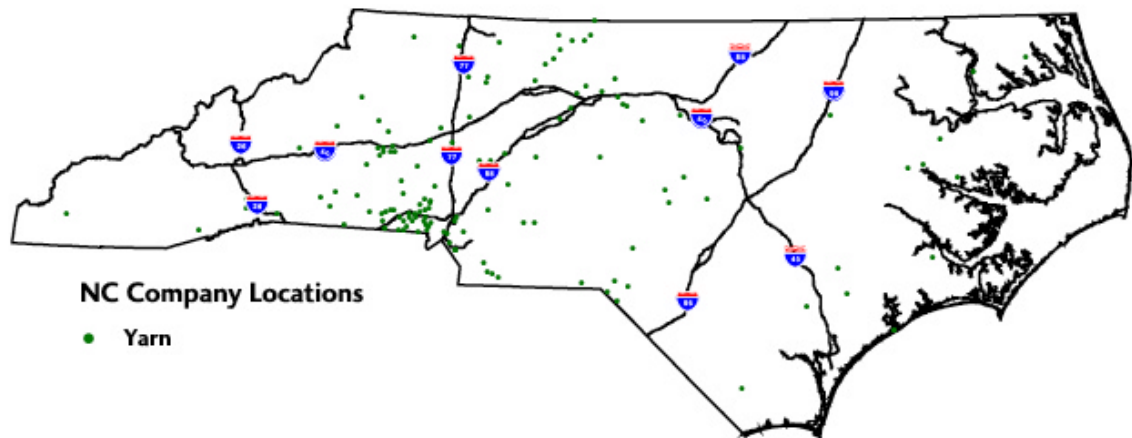
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Figure 4: Locations of Raw Material Suppliers (Fiber Producers and Cotton Gins) in North Carolina





**Figure 5: Locations of Yarn Producers (including thread, rope, and cord) in North Carolina**



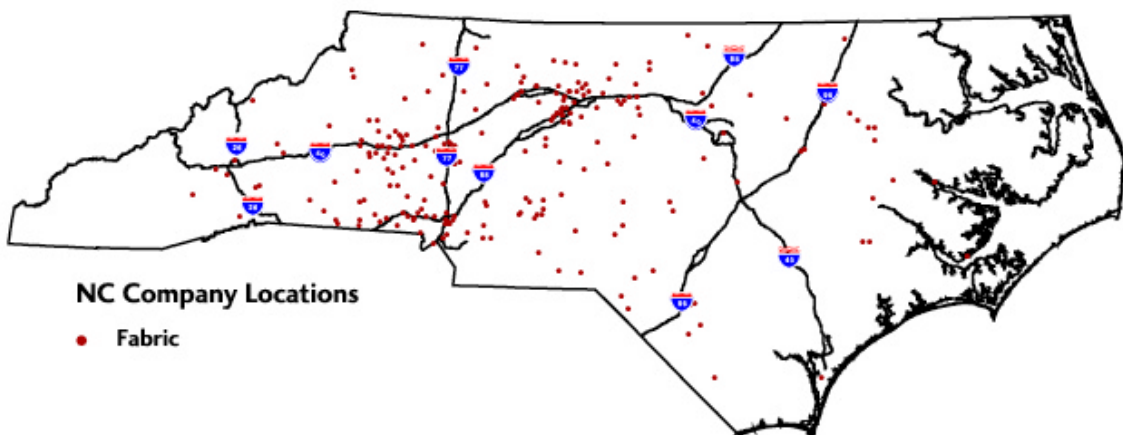
***Fiber, Yarn, Rope, Cord, Thread Statistics:***

- Total Locations: 164 (11.7% of total)
- Employees: 19,815 (16.5% of total)
- Sample Companies: Parkdale Mills, National Spinning, Frontier Spinning, Unifi
- Estimated \$4.75 billion in sales
- Largest percentage of establishments located in the following counties: Gaston, Randolph, Alamance, Catawba

***Fabric***

Fabric producers in North Carolina include woven, knit, and nonwoven fabric mills with the largest number of locations coming from woven fabric production. Yet, the lower number of nonwoven firms should not underscore their importance to North Carolina. Due to the capital-intensive, faster production processes required to produce nonwoven fabrics, fewer locations and employees are typically needed.

**Figure 6: Locations of Fabric Manufacturers in North Carolina**



***Fabric Statistics:***

- Total Locations: 167 (12% of total)
  - Woven (52%), Knit (36%), and Nonwoven (12%) Fabric Mills

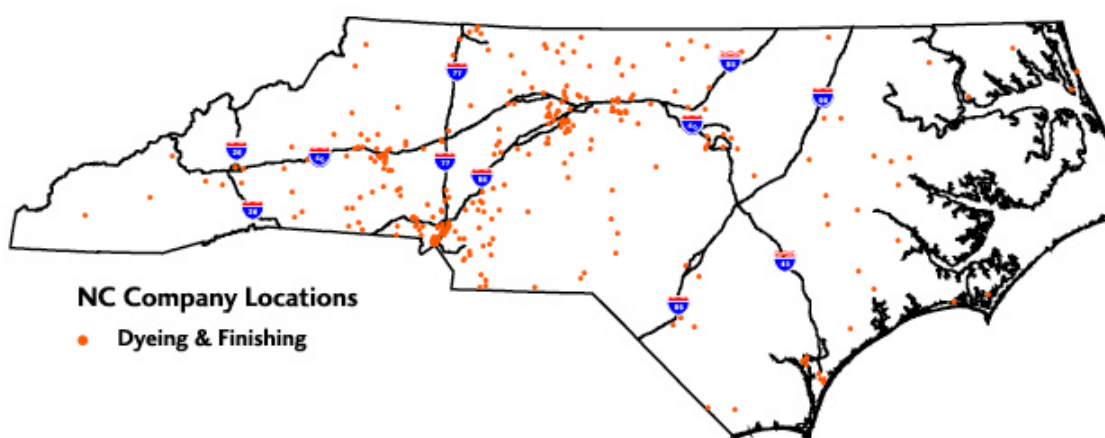
- Employees: 19,512 (16.26% of total)
- Hanesbrands, Guilford, Freudenberg, PGI, Glen Raven, Swift Galey, Mastercraft

- Estimated \$4.4 billion in sales
- Largest percentage of establishments located in the following counties: Guilford, Mecklenburg, Gaston, Alamance, Stanly

### **Dyeing and Finishing and Chemical Producers**

The next stage in the value chain involves the dyeing and finishing of textile products as well as the chemical producers that provide the inputs necessary to perform these processes. The companies included in the chemicals segment also provide chemicals to other industries, however they are an integral part of the textile value chain.

**Figure 7: Locations of Dyers, Finishers and Chemical Producers in North Carolina**



### **Chemicals Statistics**

- Total: 40 locations (3% of total)
- Employees: 4,104 (3.5% of total)
- Ciba, Clariant, Reichhold
- Estimated \$2.2 billion in sales
- Largest percentage of establishments located in the following counties: Guilford, Mecklenburg

- Estimated \$1.04 billion in sales
- Largest percentage of establishments located in the following counties: Catawba, Alamance, Union, Forsyth

### **End Product Production and Distribution**

A variety of final product manufacturers and post processors have a presence in North Carolina including hosiery, apparel, and household textile producers, as well as establishments engaged in the post processing stages of these final products. Included within these categories are manufacturers as well as wholesalers.

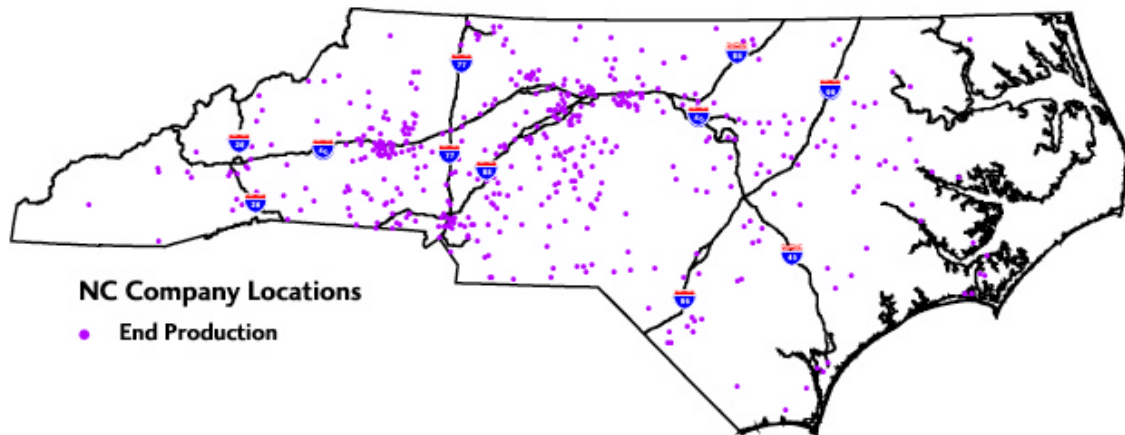
### **Finishing Statistics**

- Finishing: 103 (7.5% of total)
  - Dyeing, finishing, and coating of fabrics, fibers, yarn, and textile products
- Employees: 6,668 (6% of total textile workers)
- Coats North America, Culp, Hanes, McMurray Fabrics

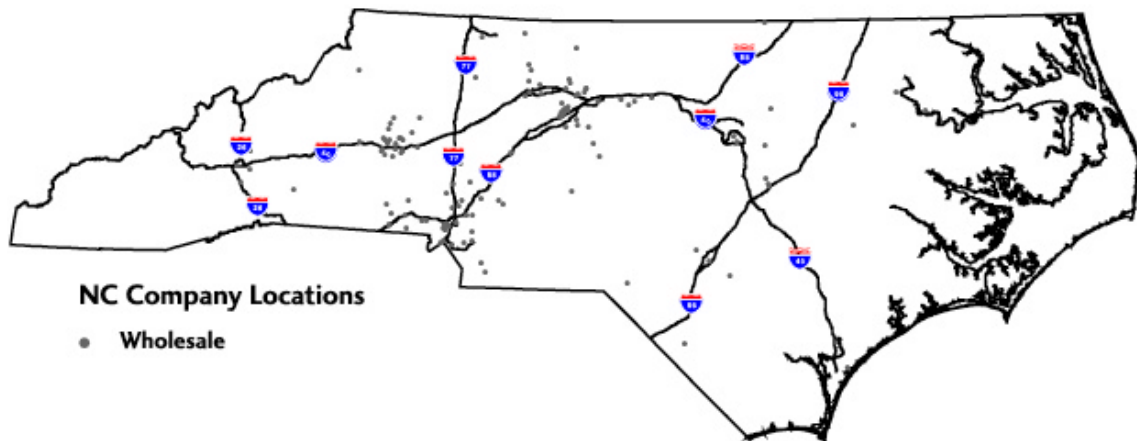
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**Figure 8: Locations of Textile End Product Manufacturers and Processors**



**Figure 9: Locations of Textile End Product Wholesalers**



#### ***Hosiery Statistics***

- All Hosiery: 143 mills (10% of total)
  - Socks and Sheer Hosiery (pantyhose)
- Employees: 12,820 (10.7% of all employees)
- Hanesbrands, Gold Toe, Kayser Roth
- Estimated \$1.1 billion in sales
- Largest percentage of establishments located in the following counties: Alamance, Catawba, Burke, Davidson, Montgomery

#### ***Apparel Statistics***

- Total: 153 locations (11% of total)
  - Men, women, and children apparel producers

- Employees: 10,384 (8.6% of total)
- VF Corp, MJ Soffe, Hanesbrands
- Estimated \$7.2 billion in sales
- Largest percentage of establishments located in the following counties: Randolph, Guilford, Gaston, Robeson, Wake

#### ***Household Textile Products Statistics***

- Total: 141 (10% of total)
  - Bedding, sheets, blankets, pillows, drapes, wiping cloths, cushions, bags
- Employees: 10,077 (8.4% of all textile workers)
- West Point Stevens and Springs Industries
- Estimated \$1.5 billion in sales
- Largest percentage of establishments located in the

following counties: Catawba, Guilford, Mecklenburg, Buncombe

following counties: Mecklenburg, Wake and Guilford—near large cities

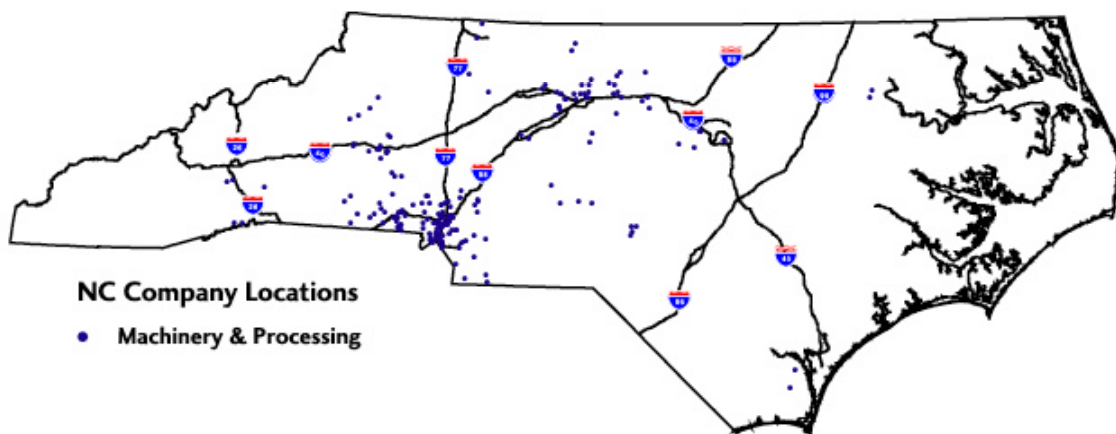
### ***Post Processing Statistics***

- Total: 154 locations (11% of total)
  - Screen printing, embroidery, trim
- Employees: 4,862 (4% of all textile workers)
- Liberty Screen Printing, Paxar
- Estimated \$555 million in sales
- Largest percentage of establishments located in the

### ***Textile Machinery***

While a significant amount of textile machinery production takes place outside of the United States, North Carolina still has a large number of sales offices, distribution centers, machinery resalers, and parts distributors within the state.

**Figure 10: Locations of Textile Machinery Manufacturers and Distributors in North Carolina**



### ***Textile Machinery Statistics***

- Total: 113 locations (8% of total)
- Manufacturers and Wholesalers of Textile Machinery
- Employees: 5,300 (4.5% of employees)
- American Truetzschler, Gaston County Dyeing Machine
- Estimated \$861 million in sales
- Largest percentage of establishments located in the

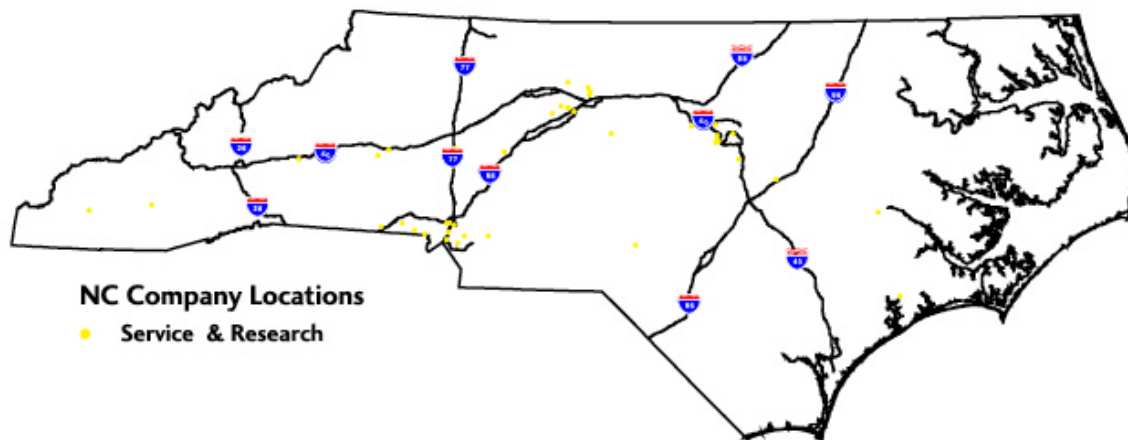
following counties: Gaston, Mecklenburg

### ***Research and Service***

North Carolina is unique in that several of the national and international research organizations, universities, community college programs, trade associations, and professional organizations are all located within state's borders.

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**Figure 11: Locations of Textile Service and Research in North Carolina**



#### ***Research and Service Statistics***

- Total: 59 locations (4% of total)
- Employees: 1,828 (1.5% of employees)
- NCRC, [TC]<sup>2</sup>, Cotton Incorporated, AATCC
- Estimated \$443 million in sales
- Largest percentage of establishments located in the following counties: Durham, Wake

#### ***Miscellaneous***

Due to the diversity of the remaining firms in the North Carolina textile complex, individual profiles of each segment are not included. These remaining firms are involved in various activities ranging from logistics and retail firms to converters of textile products such as filter manufacturers and medical textile producers.

#### ***Miscellaneous Statistics***

- Total: 163 locations (12% of total)
  - Transportation, Distribution, Retail, Filters
- Employees: 16,494 (13.75% of employees)
- PPG, Foamex
- Sales: \$4.1 billion
- Largest percentage of establishments located in the following counties: Alamance, Catawba, Gaston, Guilford, Mecklenburg, Wake, Union

### **III. Geographic Clusters**

Clusters are geographic concentrations of interconnected companies in a particular field (Porter, 1998). Clusters lead to higher wages and productivity, improve employment opportunities, stimulate regional entrepreneurship and aid diversification and improve regional sustainability (Rosenfeld, 2006).

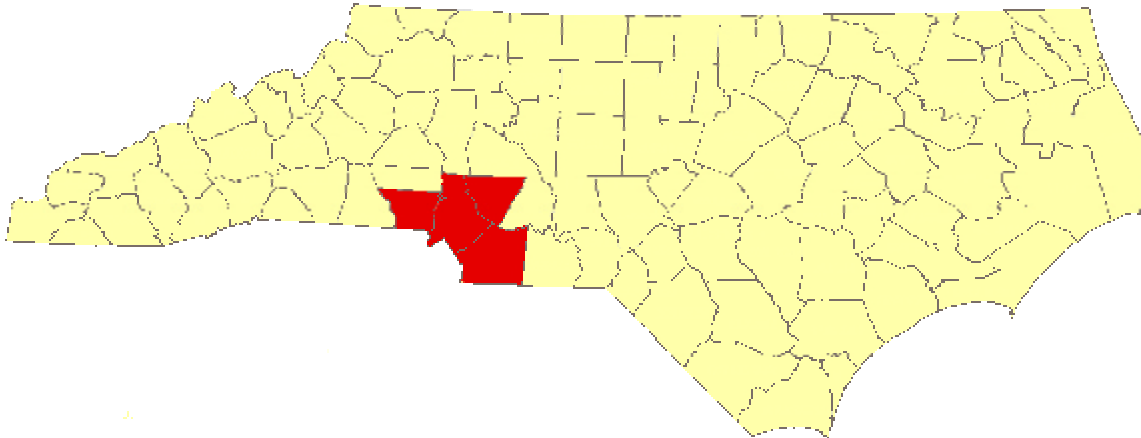
There are *four* significant geographic textile complex clusters in North Carolina that represent approximately 62% of all North Carolina establishments (represented in the database). These geographic clusters have formed over the course of the last 75 years as textile product manufacturing migrated south from the New England area to North Carolina and surrounding states. These clusters have both:

- Historical basis*: clusters originally developed in key areas within the state due to initial presence of resources (natural, textile-related, human), and,
- Distribution basis*: these four locations are near the main transportation arteries in the North Carolina--- I-40, 85, 95, 77; plus the rail systems.

#### Charlotte Area Cluster

- Counties: Mecklenburg, Union, Gaston, Cabarrus
- 290 companies (21%)
- \$4.7 billion estimated sales
- 15,000+ employees
- Highest percentage of nontraditional companies such as chemical producers, machinery, screen printing plus a significant number of yarn producing locations
- Sample of Companies: Parkdale Mills, R.L. Stowe, Clariant

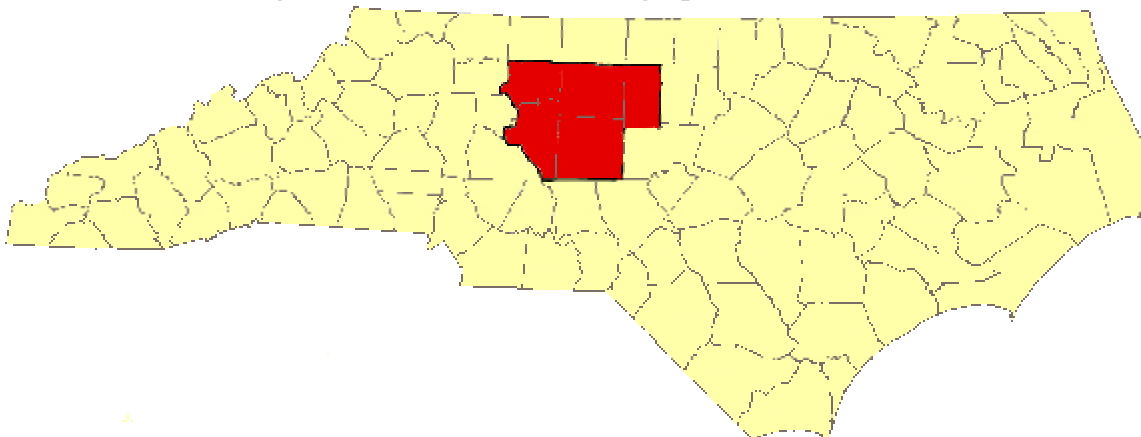
**Figure 12: North Carolina Geographic Clusters: Charlotte Area**



#### Triad Cluster

- Counties: Guilford, Forsyth, Alamance, Davidson, Randolph
- 328 companies (24%)
- 24,600+ employees
- \$12 billion estimated sales
- Companies are equally spread across the supply chain including yarn, hosiery, screen printing, fabric, finishing, and cut/sew
- Sample of companies: Glen Raven, Guilford, Unifi, Hanesbrands, Gold Toe, VF Corp, Kayser Roth, ITG

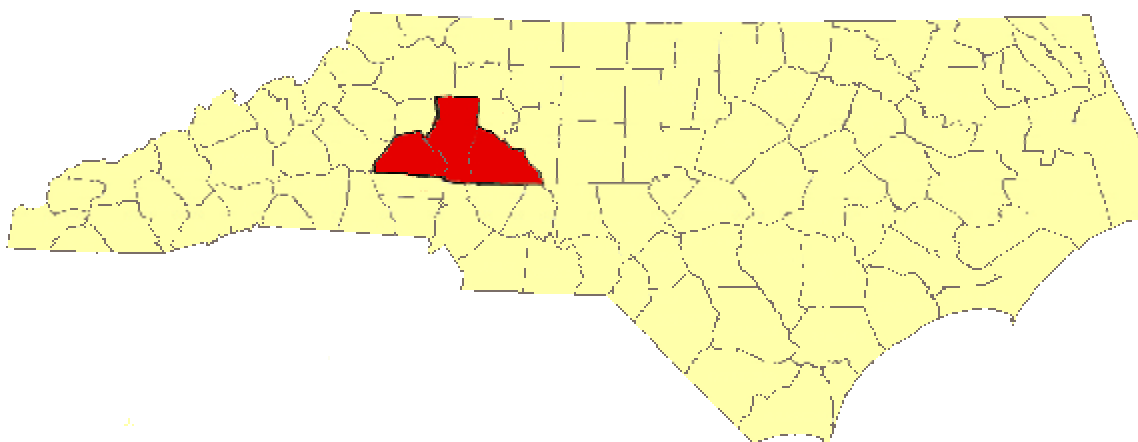
**Figure 13: North Carolina Geographic Clusters: Triad Area**



#### Hickory Area Cluster

- Counties: Catawba, Iredell, Rowan
- 159 companies (12%)
- 12,700 + employees
- \$1.75 billion estimated sales
- Hosiery, Yarn, Household Products, Upholstery Fabric
- Sample of companies: Shuford Mills, Valdese Weavers, and Thorlo

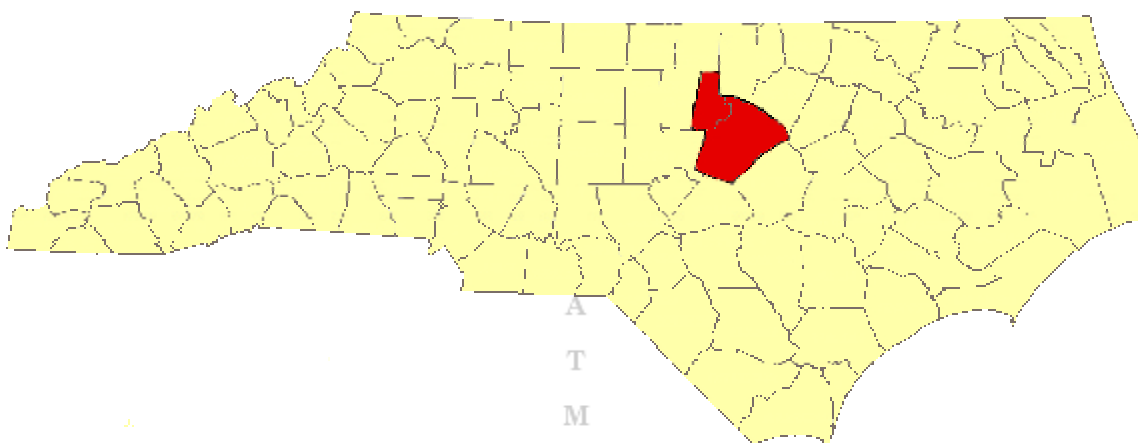
**Figure 14: North Carolina Geographic Clusters: Hickory Area**



**Triangle Cluster**

- Counties: Wake, Durham
- 67 companies (5%)
- 5,800 employees
- \$1.1 billion estimated sales
- Research and Trade Associations account for 10% of all locations in this cluster
- Sample of locations: College of Textiles, INDA, NCRC, AATCC, [TC]<sup>2</sup>

**Figure 15: North Carolina Geographic Clusters: Triangle Area**



**Conclusions**

This paper provides a descriptive market analysis of the North Carolina textile complex based on *the North Carolina Textile Complex Database* developed using the *Global Textile Competitiveness Framework*. This holistic analysis illustrates the state's diversity in traditional manufacturing as well as intangible value-adding activities, auxiliary industries, and the supporting environment.

Outcomes of the original study indicated that North Carolina companies' past sources of competitive advantage may not prove to be adequate in today's restructured industry. With the opening up of global markets, North Carolina will increasingly need to look to the additional areas of the textile complex identified in this paper as sources of growth and inspiration to remain competitive in today's industry.

However North Carolina companies do not have to attempt this endeavor alone.

North Carolina has a wealth of resources within its borders to support and assist North Carolina companies make this transition. Through open lines of communication and continued collaborative efforts among government, industry, and academia, North Carolina's textile complex stands a far better chance of surviving and thriving long into the future.

### Future Research Studies

The researchers have identified several next steps and future research studies to strengthen the North Carolina textile complex:

- Refinement of the Database to identify specific NAIC codes to

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represent additional members of the textile complex

- Create a forum that will allow continued open dialogue, sharing of resources and collaborative projects among North Carolina's industry, government and academic institutions
- Conduct an in-depth examination of industry clusters that have the potential to be growth areas for North Carolina's textile complex
- Examine the nodes and interconnectedness of the North Carolina textile complex
- Compare North Carolina's textile value chain to other states/countries

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