Identifying the Small Apparel Manufacturer: A Typology of Manufacturing Strategies

by

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(ABSTRACT)

The purpose of this study was to develop a typology of small apparel manufacturers (SAMs), firms classified between SIC 2310 to 2389 and less than 50 employees. The objectives were to (a) determine if distinct manufacturing strategies existed among SAMs, (b) develop a profile of these groups using environmental factors known to affect the apparel industry and small businesses (i.e., customer service, operations, barriers, assistance, customer size, customer location, competitor size, competitor location), (c) develop a profile of SAMs based on demographics (i.e., SIC, end-use for products, manufacturing process, type of firm, fashion position, employee size, manufacturing strategy, marketing strategy, annual gross revenue), and (d) determine the existence of a relationship between SAMs use of market strategies and manufacturing strategies. Data were collected from 146 SAMs, which represented 15 states with the highest number of SAMs. Factor analysis was used to identify manufacturing strategy factors (i.e., flexibility, environmental consciousness, product attributes, lot sizes), which were used to cluster respondents; and environmental factors (i.e., customer service, education/industry awareness, flexibility, timing, unit costs, production resources, technology/automation, consistency in sales, investment capital, import reductions). Four clusters of manufacturing strategies emerged and were profiled according to environmental factors and demographic variables (i.e., products, product classification, manufacturing processes, type of firm, type of fashion, manufacturing strategies, marketing strategies, firm's employee size, annual gross revenues). Significant differences occurred among the four manufacturing strategy groups and environmental factors. Significant differences occurred among the four manufacturing strategy groups and demographic variables. No relationship existed between manufacturing strategy groups and their marketing strategy.

To Mom & Dad

Dedication

This document, tangible evidence of many weeks and years of work, is dedicated to my mother and my family. I know their love, acceptance of my many hours away from home, patience in times when I had run out, and support are a direct result of their willingness to allow themselves to be used by God and their willingness to share their blessings and gifts with me.

When you bow down before the Lord and admit your dependence on Him, He will lift you up and give you honor. James 4:10

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CHAPTER I

Introduction

Researchers and analysts agree that a significant portion of production within the US apparel manufacturing industry has been on the decline due in part to off-shore production, imports, and increased productivity (Black, 1997; Christerson & Appelbaum, 1995; K. Clark 1997; Oliver, Kincade, & Albrecht, 1994; Black, 1997). As a result, many apparel manufacturers are concerned with implementing strategies to be more globally competitive. Strategies such as Total Quality Management (TQM), Quick Response (QR), and Just-in-Time (JIT) were developed to make production and service firms more competitive by providing the firms with a process of achieving efficiency in producing goods, responding to customers, or improving the total organization. The latest trends in manufacturing strategies are flexible manufacturing and agile manufacturing (Aggarwal, 1997; Gunasekaran, Okko, Martikainen, & Yli-Olli, 1996; Gunneson, 1997; Taplin, 1996). These strategies are designed to increase a firm's ability to adapt to changes in the market and accommodate multiple markets (i.e., global markets, multiple target markets).

Large apparel manufacturers are typically the focal point when industry analysts examine manufacturing strategies, effects of trade regulations, revenue, expenditures, and contributions to the US GNP (Jennings & Beaver, 1997). In most industry analyses, the small apparel manufacturer is ignored. Small apparel manufacturers (SAMs), firms with less than 50 employees, represent 83% of the 24,216 apparel manufacturing establishments in the United States, not including the District of Columbia and Puerto Rico (US Census Bureau, 1995). Yet, little empirical research is known about these producers as a separate group from the larger population of apparel producers. Little is known about the manufacturing strategies used by SAMs. When researchers and industry analysts focus on large apparel producers, the small apparel manufacturer (SAM) may not be receiving assistance in the manner it needs to survive in the age of global competition. Researchers, industry consultants, and others who can provide assistance to these firms need to know the current status and operational procedures for this major segment of the apparel industry to be effective. What are the manufacturing strategies SAMs are using to survive changes occurring within the industry? Do these manufacturing strategies mirror the ones reported for large apparel producers?

Industry analysts state that the apparel industry in many ways still operates under the paradigms of the past. If these paradigms are not changed to reflect the future changes in populations, economies of developing countries, and consumer demands, extinction is eminent (Conrad, 1998). Thousands of employees have been displaced and production has been moved off shore to take advantage of low labor costs. Movement was first to the Asian territory and more recently to the Latin American region (Black, 1997; Gereffi, 1997; Black, 1997; Robert Morris Associates, 1989). Business failures, acquisitions, mergers, increased productivity among large and

small apparel manufacturers have resulted in fewer apparel firms. However, analysts assure pessimists of the continued existence of the apparel industry that as long as consumers have a need for one of the most basic items, clothing, the apparel industry will most surely remain (Jarnow & Guerreiro, 1991; Whalen, 1997). Some analysts believe that SAMs will survive the restructuring and decline of apparel production better than large apparel manufacturers (Black, 1997). What needs to be determined is SAMs' preparedness for surviving the declination period until a correction occurs for the industry.

The advantages of small businesses have often been extolled by researchers and analysts. These advantages include greater flexibility in products offered, quick turnaround in production, production of small runs for market testing, and greater opportunity for ensuring quality products. These factors are vital to meeting the needs of future apparel consumers (Armfield, 1994; Kincade, Cassill, & Vass, in review; Kincade & Regan, 1994). Alan Brooks, president of New Generation Computing stated, "You don't have to be a $100 million company to think like a $100 million company and to have the same types of dramatic results" (DesMarteau, 1997, p. 48). The disadvantages of being a small business are almost tantamount to the advantages. They include low capital investment potential, lack of resources for latest technology and employee training and high labor turn-over (Gunasekaran, et al., 1996; Van Auken & Holman, 1995). Statistics reveal that approximately 60 percent or more of all new businesses fail within the first two years of operation for such reasons as lack of technology and investment capital (US Chamber of Commerce, 1996). The need for capital and new technology is essential to adopting manufacturing strategies such as TQM, QR, and JIT. Lenders to the apparel industry are warned that the financial records of SAMs are lower in quality than those from larger apparel producers; the lower quality is attributed to less stringent requirements for audits and external reviews (Robert Morris Associates, 1989). As such, this lack of adequate documentation may further hinder SAMs in securing the resources needed to exploit the advantages of being a small business. The US Chamber of Commerce (1996) purports that if the advantages are not exploited by those who have the privilege, then the advantages are of no value.

Small apparel producers who serve niche markets are reported to have faired the best in the apparel industry. These niche servers are expected to capture market share from the larger apparel producers who have not adapted their manufacturing processes or services to accommodate the modern consumer (Black, 1997). New opportunities are appearing for SAMs in the United States. Retailers and manufacturers who use off-shore produced goods are beginning to recognize disadvantages in using off-shore production (e.g., loss of quality control, time lags in delivery, transportation costs) and are seeking to recapture the rewards of collaborations with domestic apparel producers (DesMarteau, 1997; Robert Morris Associates, 1989).

With the increased global interdependence with the textile and apparel complex, apparel manufacturers who intend to survive in a competitive and changing environment must become a world-class firm.

> *Success in global markets means faster time to market, sharper response to customer needs, and better value. To be a world-class competitor, you must do this while expending fewer product development resources per project and while increasing the efficiency with which those resources are deployed. (Dimancescu & Dwenger, 1996, p. front cover)*

Research Problem

Research has been conducted on the benefits of off shore production for apparel products, specifically on the benefits to large manufacturing firms. Large apparel manufacturers are able to reduce costs through economies of scale and the use of foreign labor at tremendously reduced labor costs. In exchange for these cost savings to the manufacturer and possibly to the consumer, issues of low quality, time delays, inhumane labor conditions under which products are manufactured, and a lack of product differentiation have surfaced (Robert Morris Associates, 1989). In addition, consumers have reported dissatisfaction with available apparel, which consists of mass produced standardized clothing, and they are expressing an increased consciousness of products "Made in the USA" (Leeming, 1994).

The continuous move to deeper market segmentation or niche marketing by retailers has resulted in the need for more customized apparel products. Aside from the traditional market segments (i.e., women's, men's, children, apparel related accessories), additional sub-markets, which are based on attributes such as lifestyles, careers, and physical characteristics, are being carved out of the general population,. Evidence of the perceived profitability of niche marketing is seen by the inundation of specialty stores and department stores with divisions established to resemble specialty stores within the department store itself (Bohlinger, 1990). For the retailer to be successful within these smaller markets, retailers need access to the products their customers want in a timely manner. These small production runs and the variety of specialty items can be produced by SAMs, who can make adjustments in production lines relatively faster than most larger firms. SAMs have product mix flexibility at a lower cost than large apparel manufacturers (Gerwin, 1993).

To properly develop or restructure manufacturing and marketing strategies, SAMs must understand who are their true competitors. For SAMs who have intentions of becoming mass producers, their competitors truly are the large apparel producer, but for SAMs who intend to remain relatively small and will manufacture products for specific markets, their competitors are predominately other SAMs. The bottom line for SAMs is that they cannot compete simply based on price and quantity. The large producer with automated and specialized equipment will win every time. From this conceptual competitive advantage, one would hypothesize that SAMs should compete with the advantages they have: greater flexibility in products offered, quick turnaround in production, production of small runs for market testing, and greater opportunity for ensuring quality products.

Little empirical information is known about the manufacturing strategies of SAMs. The purpose of this study is to profile US apparel manufacturers classified between SIC 2310 to 2389 and who have 49 or less employees. The objectives of this study are to determine if (a) differences exist in manufacturing strategies among SAMs; (b) differences exist among SAMs' and environmental factors that are reported to have influence on the apparel industry and small businesses (i.e., customer service, operations, barriers, assistance, customer size, customer location, competitor size, competitor location); (c) differences exist among SAMs and demographics (i.e., SIC, end-use for products, fashion position, type of firm, manufacturing process, employee size, most important customer, market strategy, annual revenue); and (d) a relationship exist between SAMs' manufacturing strategies and marketing strategies.

Lax (1997) stated that the apparel industry must present a united front when confronting issues related to the industry. The author purports that many apparel executives are consumed by the daily activities of their firms, and many of the issues that affect the industry continue to exist without being addressed. Lax suggested that, as one of the leading employers in the US, the apparel industry should use its collective voice to address such issues. The voice of SAMs should be included with the larger voice and may need a voice of its own.

This study contributes to the apparel industry by providing the industry with a typology of the businesses that represent the largest portion of the industry and by providing SAMs with a collective voice that can be used by future researchers in investigating the phenomena that occur with SAMs. The study contributes to the body of knowledge for academicians by providing a foundation from which future studies on SAMs can be conducted.

CHAPTER II

Review of Literature

The review of literature reports on select empirical research conducted on the topics of competitive marketing and manufacturing strategies and select environmental factors known to influence the apparel industry and small businesses. Under these main topics, literature was included pertaining to the following variables: (a) lot size, (b) unit cost, (c) quality, (d) delivery time, (e) flexibility, (f) education and training, (g) environmental consciousness, (h) product mix, (i) technology, and (j) location. This review also contains industry reports from apparel trade periodicals that relate to the aforementioned topics. The review of literature concludes with a discussion of the Theoretical Framework used for the study.

Overview of Apparel Industry

The textile and apparel complex of the United States can be traced back to the country's early years of development. The US textile sector has grown from being strictly producers of raw materials -- prior to obtaining independence in the late 1700s -- to the sophisticated production of manufactured fibers and textile products (Dickerson, 1999). The apparel sector, likewise, has seen growth since the early acceptance of crudely produced ready-to-wear clothing of the 1800s to high quality, fashion forward ready-to-wear garments of the 1990s.

Historically, as well as currently, the apparel industry has been noted for its low barriers of entry. Viable apparel manufacturing firms can be established with a small amount of simple equipment, little capital investment, and relatively unskilled but trainable labor (Glock & Kunz, 1990). This ease of entry may explain the fact that approximately 80 percent of the number of apparel firms are small firms, those with less than 50 employees (US Census Bureau, 1995).

Technological advances have made significant improvements in reducing the amount of human intervention in the production of apparel, but the majority of the advancements have been realized in textile manufacturing. The manual intervention required to manufacture two-dimensional pieces of fabric into a three-dimensional product for the body has made advances for the apparel industry minimal (Dickerson, 1999). Those producers that have benefited the most from technological advancements are large apparel manufacturers who have invested in specialized equipment that perform automated functions that replace manual repetitive processes (e.g., button-hole makers, blind hem machine, hemming machine) (Glock & Kunz, 1990). Large firms who implement automation or mass production paradigms typically produce basic items that are ordered in large quantities, require little flexibility, and have long lead times (e.g., jeans, men's business shirts, T-shirts). These apparel manufacturers reap the benefits of economies of scale and can also benefit from reduced labor costs through off

shore production. Small apparel manufacturers (SAMs) typically do not have large orders that would warrant the investment of large specialized equipment or that can spread the overhead costs from shipping to off-shore facilities.

The apparel industry (i.e., SIC 2310 to 2389) can be divided into four major markets: women's, men's and boy's, children's, and miscellaneous apparel and accessories. An analysis of the total number of firms reveals that each market represents approximately 68%, 17%, 10%, and 5% respectively (US Census Bureau, 1995). This composition changes for firms with less than 50 employees (see Table 1). SAMs are more concentrated in the women's wear industry, which consists of high fashion and is characterized by rapid change, differentiated styles, and multiple product lines. Larger manufacturers typically produce standard or basic items with long runs, limited style changes, and large lot sizes, which are products associated with men's and boy's wear. This finding supports previous research that suggests products for SAMs are varied and undergo quick style changes (Christerson, 1994; Christerson & Appelbaum, 1995). In analyzing the shift of the proportion, the miscellaneous apparel and accessories market also increases for firms with less than 50 employees. These products are also considered to have rapid style changes and are often small items and/or customized products (e.g., gloves, hats, belts) that require human manipulation.

The differences between SAMs and large apparel manufacturers in terms of the concentration of the firms within the industry may be indicative of other differences between these two segments. SAMs are typically geographically close to the market for which they produce (Christerson, 1994; Christerson & Appelbaum, 1995). The geographical location of different sized firms in various segments is hypothesized to be related to marketing and manufacturing strategies used by SAMs, which may differ from those reportedly used by large manufacturers.

The next section of this chapter will present discussions of and empirical research on generic marketing and manufacturing strategies, flexibility as a strategy, and small businesses in general. The second half of the review will contain reviews directly related to apparel manufacturers and concludes with a summary of findings of the research presented. An explanation of the impact of the findings on the study also has been included.

Competitive Strategies

Competitive strategies are developed so firms can identify the most efficient, effective, and profitable methods for manufacturing a product or providing a service for consumers. Strategies are usually modified or abandoned over time in response to changes such as new demands from the consumer, new or obsolete trade policies, and availability of resources. Competitive strategies can be implemented at all levels in a firm. If properly implemented, strategies guide firms toward their missions and goals.

Table 1.

Distribution of US Apparel Firms with less than 50 Employees.

SIC Category	SIC	Percentage Firms with 1 to 49 Employees[a]	Percentage Firms with over 50 Employees[b]	Percentage of All Firms
MEN'S and BOY'S	2310 2320	11.32%	38.13%	17.27%
WOMEN'S and GIRL'S	2330 2340	74.18%	46.06%	67.94%
CHILDREN'S	2360	3.83%	8.45%	10.18%
OTHER: Hats/ Caps/Millinery, Fur, Misc. Apparel & Accessories	2350 2370 2380	10.67%	7.36%	4.61%

Note. Data were compiled by researcher from US Census Bureaus - County Business Patterns (US Census Bureau, 1995).

[a] total number of firms with 1 to 49 employees in SIC 2310 to 2389 - 11,215

[b] total number of firms with over 50 employees in SIC 2310 to 2389 - 3,194

Marketing strategies assist firms in positioning image and product so that they are in alignment with the target customer. Manufacturing strategies or operational strategies guide the fundamental processes of producing goods or services. The overall purpose of implementing strategies is to gain a competitive advantage within a market. Competitive advantage has been defined as "the creation of a production-distribution system that has a unique advantage over its competitors" (Lau, 1996, paragraph 6). At this point in the review, summaries of research on strategies, in general, will be discussed followed by research on the implementation and measurement of strategies.

General Marketing Strategies. Marketing strategies have been defined through the terminology of strategic planning, and as such consist of the alignment between the external environment and the internal structures of a firm (Frederickson & Mitchell, 1984; Rhyne, 1986). The marketing strategies define how firms position themselves in a market. Cohen (1991) defines five basic marketing strategies as a function of the firm's product (i.e., existing, modified, new) and its market (i.e., existing, expansion, new).

Miles, Snow, Meyer, and Coleman (1978) suggested four generic marketing strategies (i.e., Defenders, Analyzers, Prospectors, Reactors), which are functions of technology, firm structure, and processes. The defender is concerned with maintaining a relative share of the market by blocking competitors from gaining its market share. The researchers state that the defender is characterized as a firm that prospers in a stable industry where it can capture a narrow niche market and produce goods or services without searching for new markets. The defender is able to compete with economic strategies that involve volume and lowest costs because of its use of specialized equipment to produce the goods. The biggest risk to the defender is inflexibility to market changes. Prospectors are characterized as the opposite of defenders. The prospectors thrive in a changing market, a prospector firm constantly seeks new opportunities to exploit for profit. These firms are known to their market as the firm who is first with the most advanced product, but not necessarily for high profits. The biggest risk for the prospector is the inability to realize profits for new products and the ineffective use of resources while attempting to maintain a flexible environment. Miles et al. state that the analyzer is a composite of the defender and prospector. Conceptually, it is positioned between the extremes of stability and flexibility (Miles et al., 1978). The analyzer waits until new products are profitable before entering into the market and attempts to maintain its existing market. The analyzer strategy has the added risks of the defender and the prospector, thus having the greatest potential for profit and loss. Miles et al. define reactors as a default strategy, it is assessed when firms cannot be categorized in one of the three previous marketing strategies. Reactors are characterized as having no distinct plans to exploit new opportunities or counteract uncertainty in the market. The researchers suggest that firms move into one of the four categories based on the goals of the business.

McDaniel and Kolari (1987) tested the validity of using the Miles et al. (1978) typology for classifying marketing strategies. In a survey of banks, 270 out of 310 respondents were classified successfully using the Miles et al. typology. McDaniel and Kolari used cluster analyses to determine groups and multiple discriminant analysis to

test the significance of the Miles et al. typology. The authors' findings supported of the use of the Miles et al. method of classifying marketing strategies of the banking industry.

A manufacturer's decision of market strategy significantly affects the manufacturing structure of that firm (Kwangseek, Booth, & Hu, 1997). Kwangseek et al. surveyed 170 US manufacturers to gather data on manufacturers' marketing strategies, manufacturing structural complexity, and performance. The manufacturers were grouped into four categories based on their orientation of a cost leader, an innovative product differentiator, a mix between an innovative product differentiator and cost leader, or no defined marketing strategy. Subjects were also profiled on the cost of goods sold relative to sales and their expenditures for research and development relative to sales. The results were reported based on two set of variables (a) market strategy and product and manufacturing process complexity and (b) production competence and manufacturing performance. The authors reported that the analysis of strategy with product complexity revealed the following findings: (a) firms who chose to compete by maintaining the lowest prices had products that were less complex; (b) inversely, firms who were competing based on product differentiation and not price had more complex products; and (c) firms who competed by integrating the concepts of product differentiation and low cost methods have more complex manufacturing processes. From the analysis of strategy with complexity of manufacturing process, the authors reported significant positive relationships for firms competing as a cost leader and those competing with the integrative approach and level of process complexity. This information suggests that firms who are seeking to maximize profits should examine congruency of their manufacturing product processes with their market strategies.

General Manufacturing Strategies. Chase and Aquilano (1995) define operational strategies as, "setting broad policies and plans for using the production resources of the firm to best support the firm's long-term competitive strategy" (p. 24). The authors present four generic manufacturing strategies: (a) cost - firms who are concerned with producing products at the lowest cost within their market and are characterized as large firms use economies of scale, (b) quality - firms who produce "error-free" (p.) goods to the specification of the market via production process or product design, (c) speed of delivery - firms who provide "dependable and fast delivery" (p.) and will often charge more for its products in exchange for the faster delivery, and (d) flexibility - firms who are able to produce a variety of goods using existing production resources.

In Fawcett, Smith, and Cooper's (1997) study of the relationship among strategic intent, operational performance, and measurement capabilities, the researchers reported that most firms implement strategies without examining how the attributes of the strategy align with the firm's goals and operational capabilities. "A fundamental expectation is that the firm's strategic intent should drive both measurement system design and operational performance" (p. 414). Data on the three variables were gathered from senior-level managers of 131 manufacturing firms via a mail survey. The researchers verified that the respondents' surveys were representative of demographics in samples used in prior studies related to competitive strategies. Subjects were asked

to prioritize the importance of five strategies related to logistics: service innovation, cost leadership, flexible logistics, reliable delivery, and high-quality service. Managers ranked high-quality as the highest priority, followed by reliable delivery. For manufacturing processes, subjects were also asked to prioritize innovation, flexible production, dependability, low-cost production, and high-quality production. High-quality production again received the highest ranking followed by low-cost production. Managers reported receiving more information pertaining to their manufacturing functions than logistics and subsequently rated the performance of their manufacturing processes higher than their logistic processes. Fawcett et al. attribute marginality of improvement and the lack of response from workers for implementing new strategies to this inconsistency across logistics and manufacturing.

After examining previous literature on the topic of strategies, Sweeney (1991) determined that concepts for manufacturing strategies were overlooking the possibility that manufacturers can operate under the lowest-price competition and still strive for product differentiation. Sweeney identified four generic market strategies for manufacturing: marketeer, innovator, caretaker, and reorganizer. The strategies are functions of quality, production runs, price, delivery times, product differentiation, innovation and manufacturing flexibility.

In Bordogna's (1996) study of manufacturing infrastructure strategies for the US government. The author presented four paradigms or four manufacturing strategies: customized production, mass production, automated production, and next generation systems (see Table 2). Customized production is characterized by high unit costs and flexibility, small lot sizes, variable quality, long delivery times, low environmental consciousness, and specialized training. Firms using customized production are expected to exist as long as the goods are in demand. Mass production began in the 1800s and is characterized as having low unit costs, flexibility, and environmental consciousness; large lot sizes, good quality, long delivery times, and limited education and training. Manufacturers who operate in the automation production paradigms began in the 1950s. The characteristics of the automation producer are relatively constant or moderate levels of lot sizes, unit costs, delivery times, flexibility, education and training, and environmental consciousness; and good quality. The last category of manufacturers is next generation production, which Bordogna classifies as having high flexibility and environmental consciousness, high and continuous education and training, small lot sizes, short delivery times, low unit costs, and excellent quality. According to the model, next generation producers began in the 1990s and will continue into the near future. The SAM who does not intend to become a mass producer of

Table 2.

Manufacturing Strategies from Bordogna (1996) Model

	Customized Production	Mass Production	Automation Production	Next Generation Production
Time Frame	always	1800s to Present	1950s - present	1990s and Beyond
Lot Sizes	Small	Very Large	Moderate	Small
Unit Costs	High	Low	Moderate	Low
Quality	Variable	Good	Good	Excellent
Delivery Times	Long	Long	Moderate	Short
Flexibility	High	Low	Moderate	High
Education and Training	Apprentice	Limited	Moderate	High, Continuous
Environmental Consciousness	Low	Low	Moderate	High

Note: From "Development of Government Manufacturing Infrastructure Strategy", by J. C. Bordogna, 3rd Annual National Manufacturing Technology Conference, Washington, D.C.

apparel appears to fit into the next generation paradigm, but due to the diversity of products within the apparel industry and the small employee size of most manufacturers, one manufacturing strategy may not fit the needs of the entire population. Bordogna's model of paradigms includes most constructs from other manufacturing strategies models and provides a range with which SAMs can be profiled.

Flexibility As A Specific Market/Manufacturing Strategy. Flexibility in manufacturing has been defined as, "the company's ability to meet the needs of the market without excessive costs, time, organizational disruption, or loss of performance" (Aggarwal, 1997, p. 26). Flexibility can be defined further with Gerwin's (1993) typology of flexibility in an uncertain environment: variety of product mix, varied life cycles and process changeover, product modifications, downtime for machines, lot sizes, input, and delivery times. For the purpose of this study, the focus on flexibility will be limited to product mix, production cycles, consumer specification, and lot sizes in keeping with the variables of the Bordogna (1996) model.

Aggarwal (1997) suggested that flexibility in manufacturing can be used by firms who operate in industries with high competition and where consumers demand high quality products, competitive pricing, diversification of products, all of which should be done in a timely manner. This definition is applicable to the apparel industry, specifically the women's wear market. The researcher touts that flexibility can assist those firms who cannot compete using traditional economies of scales or mass production strategies. By losing the low-cost production strategy (e.g., economies of scale, long production runs, single product equipment, straight line assembly lines), Aggarwal eluded that manufacturers of all sizes can receive some level of benefit from flexibility strategies, but not without some cost. Specifically, the researcher provided a matrix that showed the relationship of the size of a firm to three core activities (i.e., marketing, manufacturing, services). The matrix shows that small firms can gain a competitive edge using flexibility strategies for output. Aggarwal listed the advantages and disadvantages of incorporating flexibility into a firm. Several of those advantages addressed the following concepts: (a) charging higher prices in exchange for product differentiation, (b) reducing of excess inventories, (c) shortening cycle times, and (d) increasing product quality. Disadvantages were: (a) the potential for high costs to implement flexibility measures in certain stages of production and (b) a plethora of technology or use of incompatible technology. Aggarwal, in summary, stated that prior to the implementation of flexible processes, firms should examine their core competencies for ways in which small changes can produce large profitable results.

Lau (1996) discussed how strategic flexibility will play an integral part in firms who intend to be world-class manufacturers. The author stated that firms can no longer depend on becoming leaders solely on the ability to produce products at the lowest cost and through technology advancements. Instead, firms should strive to gain a competitive advantage by examining and exploiting firm's core competencies and that the examination process is continuous. Lau also proposed a three-phase framework that firms could use to achieve strategic flexibility. Phase One encourages firms to recognize the need to change from traditional manufacturing paradigms (e.g., mass

production, automation) to more flexible manufacturing processes. Phase Two suggests that firms gain an understanding of their core competencies, and Phase Three recommends that firms concentrate on developing a skilled workforce, integrating advanced technology, and decreasing vertically integrated firms.

Relationship between Market and Manufacturing Strategies. Research has shown that strategies are often implemented unsuccessfully due to misalignment of marketing and manufacturing strategies (Fawcett, et al., 1997). Fawcett et al. conducted a study that examines the potential misalignment between market strategic direction and manufacturing processes. The authors examined the measurability of strategic goals and the measurability of manufacturing productivity as it relates to the implementation of competitive strategies. They surmised that most firms experience difficulty in defining measurable strategic directions, and as a result, firms that only measure what is measurable are not able to correlate the performance of strategic goals with actual improvements as a result of the implementation of market strategies. The researchers suggest that the measurement of manufacturing processes has to be modified to include logistics as a potential area for gaining competitive advantages.

Sweeney (1991) and Miles et al. (1978) proposed that manufacturers move through each strategy based on their perceived need to make changes in manufacturing processes to maintain, gain, expand, or recover market share. *The caretaker* or *defender* is characterized as the firm who implements strategies to maintain market share. The caretaker uses, processes, and produces products that are stable and those that enable the firm to compete based on cost, while making only enough changes to maintain the market (Sweeney, 1991). The marketeer or analyzer is characterized as the firm who operates in a competitive industry, such as the apparel industry. These firms focus on making small low cost changes to the existing product for market penetration. These changes are invoked based on the actions of its competitors (Sweeney, 1991). Another strategy of the Sweeney typology is the innovator or prospector, who strives to compete based on outperforming competition in product performance and customer service and is similar to Miles et al prospector. Firms classified as reorganizers seek to produce new quality products with faster manufacturing processes as a competitive edge. These firms typically use capital investments to make changes to support the new products and processes (Sweeney, 1991). The reorganizer strategy is for firms who want to “improve the flexibility of production, reduce the uncertainty of the delivery lead time through better throughput control, and reduce operating costs” (Sweeney, 1991, p. 16). Table 3 and Figure 1 show comparisons of the general marketing strategies with previous research on marketing and manufacturing strategies.

The relationship between marketing strategies and manufacturing strategies was the focus of a study from Gupta, Lonial, and Mangold (1991). The study identified

Table 3.

Comparison of Generic Market and Manufacturing Strategies.

Definition of General Marketing Strategies (Cohen, 1991)	Miles, Snow, Meyer, & Coleman, 1978	Sweeney, 1991
Market Retention Strategy Retain market share within existing market with existing products	Defenders	Caretakers
Growth Strategy - A Develop new markets with existing products	Analyzers	Marketeer
Growth Strategy - B Develop new products for existing market	n/a	Reorganizers
New Venture Develop new markets with new products	Prospector	Innovator
Balancing Strategy Retain existing market with modifications to product	Reactors	n/a

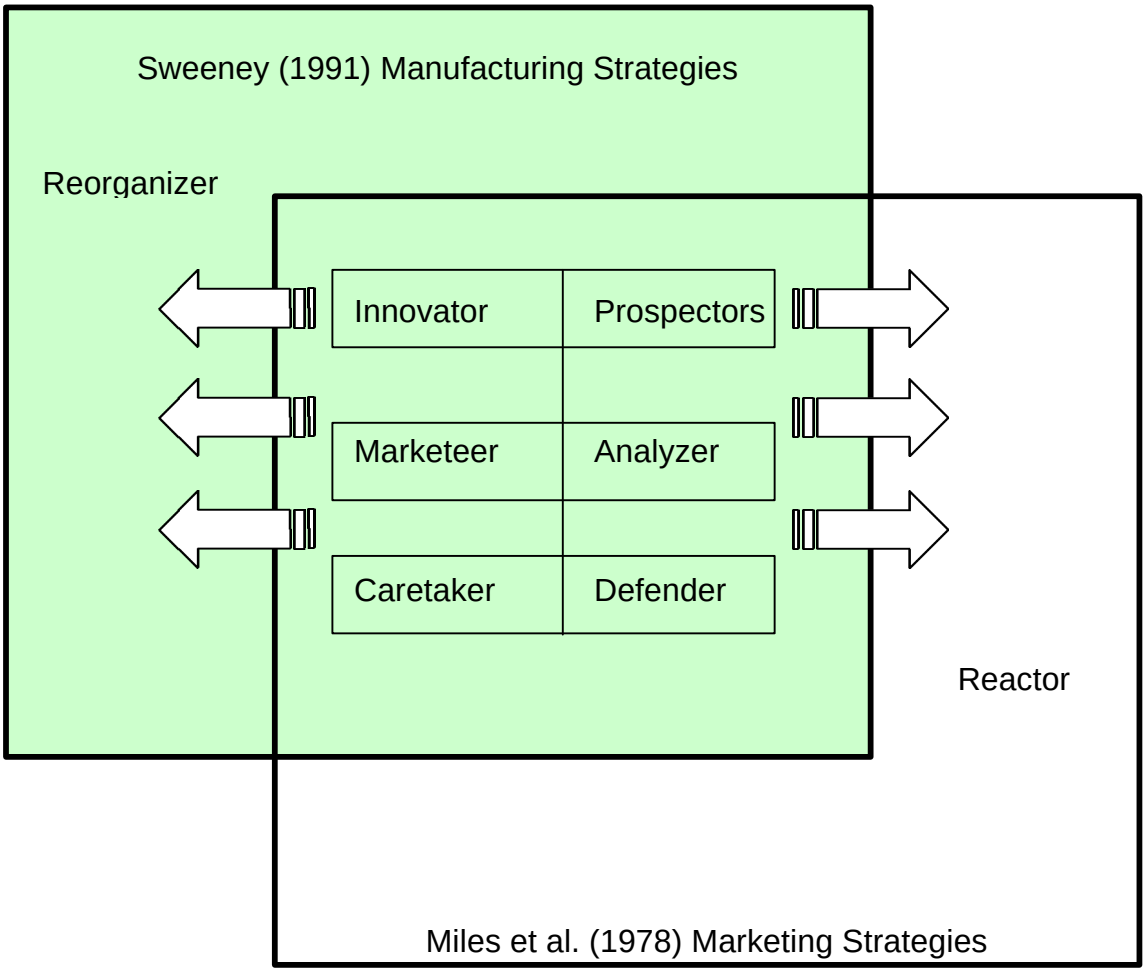

Figure 1. Interpretation of the Interaction of Miles, Snow, Meyer, & Coleman (1978) and Sweeney (1991).

manufacturing strategies that would enable firms to achieve their marketing strategies. Gupta et al. used Kotha and Orne's (1989) three concepts of generic manufacturing as constructs for their manufacturing strategies. These strategies are (a) process structure complexity, (b) product line complexity, and (c) organizational scope. These constructs were compared to three types of market objectives: (a) to gain the dominant share of the market, (b) to be a major competitor, and (c) to be a minor competitor. Data were gathered from 175 chief executive officers and presidents of manufacturing firms. Gupta, et al. reported that manufacturing process complexity and organizational scope were the two significant contributing variables to the variances among the three market objectives. Firms who wish to change market objectives to become dominant shareholders in the market will have to increase mechanization and strive for economies of scale (Gupta et al., 1991). However, the researchers do note that as flexibility increases, firms may have to abandon the strategy of economies of scale and instead strive for economies of scope to gain market share. Ultimately firms should reexamine their goals to be certain that gaining market share is a viable goal for the firm in terms of achieving profits.

Environmental Factors that Influence Small Businesses

Environmental factors are defined as those variables that influence the decision-making process of a firm. These factors may include items over which the firm has control or can influence and are readily measurable, and items over which firms do not have control and have a high degree of uncertainty. Addressing the uncertainty is the premise behind the implementation of flexible marketing and manufacturing strategies (Gerwin, 1993).

Ahire and Golhar (1996) examined the differences between small and large firms in their implementation of ten Total Quality Management (TQM) procedures by comparing large TQM firms with large non-TQM firms and small TQM firms with small non-TQM firms. The researchers surveyed 499 managers of US and Canadian automobile firms of which 275 were small firms (250 or less employees) and 224 were large firms. Using one-tailed t-tests, the researchers reported that regardless of the size, firms were able to implement TQM, and those that had implemented some form of the TQM constructs produced higher quality products. The researchers reported that despite limited access to capital, market share, and other advantages inherent to larger firms, small firms can implement TQM as effectively as large firms. Ahire and Golhar (1996) suggested that small firms can effectively implement TQM because of the closeness of management to its employees and the fact that many firms have employees who perform multiple functions within the firm. This finding suggests that other factors besides size may influence strategy implementation for small manufacturers.

Young, Francis, and Young (1993) studied the geographical proximity of customers, suppliers, and competitors of small manufacturers. The researchers' findings revealed that small manufacturers do not exist in a total oligopoly society of manufacturers as hypothesized in previous research. Young et al. (1993) surveyed 240 manufacturing firms located in two regions in the state of New York and gathered data on the subjects' competitors, customers, owner's background, assistance received, and

financing sources. The researchers used frequency distribution and percentages to report the data. Findings revealed that in the presence of large manufacturing firms, small manufacturing firms not only act as suppliers to the larger firms for sub-contracting purposes, but also sell goods to retailers nationally and internationally.

Jennings and Beaver (1997) discussed the role of managers and owners in the success and failure of small firms. The authors suggest that the owner is the principle factor in the success or failure of small firms and that some previous research on small businesses fail to distinguish entrepreneurs from small business owners. This difference in definitions is supported by Drucker (1985) who states that an entrepreneur "always searches for change, responds to it, and exploits it as an opportunity" (Drucker, 1985, p. 28). As such, entrepreneurs may be small business owners, but small business owners are not always entrepreneurs. Jennings and Beavers (1997) suggested that small firms tend to operate in the reactor mode versus the predictor mode, the firms tend not to anticipate changes but to implement strategies to counteract or to align themselves with the changes in the industry's environment (Jennings & Beaver, 1997). The authors concluded that often in firms where the owner is the manager, personal preferences supersede in the decisions for the good of the firm.

In Lang, Calantone, and Gudmundson's (1997) study of how small firms seek environmental information regarding perceived opportunities or environmental threats, the researchers recommended that small firms not mimic the information seeking patterns of large firms but instead identify trustworthy resources that can be used for information. Lang et al. developed a structural analysis model that was found to be successful for understanding the relationship between (a) information seeking, (b) perceived competitive threat, and (c) perceived opportunity. Using data from 671 small Midwestern businesses, those with less than 100 employees, the researchers concluded that small firms increase their external search for information under conditions for increased opportunities or competitive threats. Lang et al. suggested that the external search for information is prevalent in small firms because they do not have the internal resources as do large firms, who tend to seek external sources for information in perceived opportunity situations but rely on internal resources in instances of perceived threats. The researchers cautioned small firms to find trustworthy and reliable external sources, not only because these sources are relied heavily upon, but also because errors in decision-making have a greater effect on smaller firms than on larger firms who may have reserves to recapture losses due to bad decision-making.

Competitive Strategies in the Apparel Industry

Competitive strategies in the apparel industry include TQM, QR, and JIT and have mainly been associated with large apparel manufacturers. Researchers report that SAMs may not be implementing the strategies in the same way as large manufacturers and that some strategies as defined for the larger producers are not beneficial for implementation by small producers. TQM has been defined as, "managing the entire organization so that it excels on all dimensions of products and services that are important to the customer" and "conformance to specifications" (Chase & Aquilano, 1995, p. 163). QR is defined as the cooperative effort of supplier and retailer such that

products are produced more efficiently, reflect greater quality, and are delivered to the retailer or wholesaler in a timely manner (Chase & Aquilano, 1995; Glock & Kunz, 1990; Kincade, Cassill, & Williamson, 1993). Apparel manufacturers may implement QR through the use of computerized sewing or cutting machines or electronic data interfaces (EDI) with retailers that feed manufacturers data on the retailer's inventory level for a product(s), and once the inventory is reduced data is sent to the manufacturer and replenishment orders are received. The principles of JIT are to produce only the amount of goods needed to satisfy an order and to create products right the first time so that extra inventory is not needed and wasted goods and excess products are not made (Chase & Aquilano, 1995; Glock & Kunz, 1990). Regardless of the strategy, investment on behalf of the firm has to be made (e.g., time, capital, education, training, technology). SAMs may be operating on modified versions of these strategies used by larger firms. The remainder of the review of literature consists of a discussion of market and manufacturing strategies as a unit, as is much of the empirical research in the apparel industry, and environmental factors that affect the apparel industry.

Market and Manufacturing Strategies in the Apparel Industry. Glock and Kunz (1990), authors of *Apparel Manufacturing: Sewn Product Analysis*, define marketing strategies as a way to "improve growth and profitability of the firm" (p. 50) by manipulating the firm's market composition and/or products. The authors provide four generic strategies: (a) market penetration - increasing sales in its existing markets by increasing visibility, (b) market development - securing new markets or developing alternative uses for existing products, (c) product development - developing new products or modifying existing products for existing markets, and (d) diversification - developing new products for new markets (Glock & Kunz, 1990). These strategies reflect prior research on generic strategies (Cohen, 1991; Miles et al., 1978; Sweeney, 1991) (see Table 3).

Christerson and Appelbaum (1995) suggest that small apparel firms have survived during the decline in domestic production because of the rapid changes in demand for apparel and the use of domestic apparel firms to respond to consumers' needs by US apparel retailers and designers. Retailers recognize that the turnaround time from placement of order to receipt of goods is shorter from US firms than from overseas firms. The researchers gathered data from 184 apparel firms in Los Angeles County. Multiple regression was used to determine the predictability of the amount of sales resulting from off-shore production from the among the variables of firm size, ethnicity of owner, and the number of product lines. In regard to size of firms, Christerson and Appelbaum reported that size was a predictor of the amount of goods produced overseas, in that, overseas producers are more apt to comply and exceed the expectations of large US apparel firms. This is believed because large manufacturers can supply consistently large volume work and in return the US firms can make demands on the overseas firms. In contrast, US SAMs do not have the leverage of large volumes and are often ignored by high quality overseas firms. As a result, if US SAMs use foreign firms, they are often forced to use lower quality overseas firms. Christerson and Appelbaum reported subjects with more than five lines of goods were more apt to

produce within the US because of the need for quick turnaround in orders and that, as in Christerson (1994), the cost of labor was outweighed by the benefit of quick response.

Armfield (1994) addressed the concept of *consumer response* in his examination of flexible manufacturing for apparel manufacturers. The author, and former vice-president of Kurt Salmon Associates of Greensboro, NC stated that, in the apparel industry's effort to produce goods faster with better quality and in smaller lot sizes, all with the inclusion of the employees, several components have been overlooked: (a) the transitions from producing one product to producing another or the transitions of moving from process to process and (b) the flexibility of inventory capacity.

Specific Strategies in the Apparel Industry. QR is a major strategy used in the apparel industry (Kincade, 1988, Kincade & Cassill, 1993; Kincade, et al., 1993; Ko & Kincade, 1998). The five constructs of QR involve marketing strategies (i.e., information sharing, product planning) and manufacturing strategies (i.e., inventory control, bar coding, shade sorting) (Kincade & Cassill, 1993). Kincade et al. (1993) and Kincade and Vass (1998) reported that the adoption of QR techniques has been slow. The constructs typically adopted were related more to improving the manufacturing process than to changing the marketing process. The most frequently used constructs related to the adoption of technology and not technologies that would engage the firms in sharing of information and other market strategies.

Kincade and Cassill (1993) used size of apparel manufacturing firm in their study of the adoption of QR in North Carolina apparel manufacturers. The researchers analyzed data from 66 manufacturers and found that the employee size of a manufacturer and the retail customer had significant effects on the firm's adoption of five QR technologies: (a) inventory control, (b) information sharing (c) bar coding, (d) product planning, and (e) shade sorting. ANOVA was used to determine the differences between employee size and the five technologies and of the five, inventory control and shade sorting were significantly different. The researcher suggested that the difference in the implementation of inventory control technologies was greater for larger firms due to the increased need to control large volumes of products and that larger firms have access to capital to make such investments. Similarly the implementation of shade sorting techniques was higher for larger firms.

Trade case studies have reported on the successful strategies of small, specialized apparel companies. A glove manufacturer in New York attributed his success to the high quality of goods produced and his ability to produce small runs (Rabon, 1998). Other glove firms attributed their success to being innovators in the market (Rabon, 1998). The manufacturers believe that the market exists for sewn products and that consumers would be willing to pay the higher prices to receive high quality, diversified goods. This case study suggests that small apparel firms are succeeding in the United States, in spite of the overall decline in the number of apparel manufacturers, but to gain a broader perspective of small apparel manufacturers, empirical research is needed.

Environmental Factors that Influence Apparel Manufacturers

Christerson (1994) provided research on how aligning location with product and consumer is an integral part of the apparel industry. Christerson reported that for apparel producers, "Proximity to markets and supplies often outweighs the importance of labor costs, particularly or high-end apparel production" (p. 151). Christerson's study examined the validity of the New International Division of Labor hypothesis, which states that cost of labor is the leading determinant in the production of goods. In analyzing the trade data from the United Nations, the gravity model was used to determine the significance of the following variables: gross domestic product of exporting and importing countries, distance from the largest city in the exporting country compared to distance to the largest city in the importing country, average manufacturing wage for the exporting and importing countries, and dollar of the fabric produced in the exporting country. The researcher concluded that for low value products, labor costs were indeed determinants in the trade flows, but labor costs were not found to be a significant determinant in high value products. Christerson suggested that apparel producers of high value goods are better located in developed countries in spite of the higher wages required for labor. The premise behind this suggestion is that proximity to quality suppliers and customers who have the income to pay for the goods outweighs the cost of labor.

Small manufacturers are using innovative methods to reduce the barriers to profit (e.g., lack of capital for equipment, bulk purchases from suppliers, facilities) by using a collaborative effort, one in which the small apparel manufacturers and designers are using shared resources. This concept is similar to the business incubators, which provide new businesses, service or production, with a location for production, administrative services, and at times access to technology such as personal computers. Organizations such as the National Association of Designer-Entrepreneurs (NADE) are assisting small apparel manufacturers by facilitating collaborative efforts to reduce expenses by buying supplies and sharing work equipment and space with peer apparel manufacturers (Wilcox, 1997). Stitches Technology Sewn Products Training Center in Los Angeles is using the incubator concept to develop a pool of cross trained apparel producers by allowing them to have on-the job training in manufacturing and contracting firms owned by the training center.

Kincade and Regan (1994) examined the implementation of QR strategies and reported that apparel manufacturers were more likely to implement QR techniques affecting manufacturing processes (e.g., JIT techniques) and were least likely to adopt products that required the use of computer related technology. Information transfer by computer is a key component to competitive strategies such as QR (Kincade and Vass, 1998). Kincade, Cassill, and Vass (in review) suggest the slow response to the adoption of QR information technologies (e.g., POS, EDI, bar coding) is associated with the barriers perceived by apparel manufacturers. Barriers included high cost of equipment, lack of trained employees, lack of capital funds, uncertain sales volume and retailers in bankruptcy. The researchers examined the levels at which electronic data interfacing (EDI) was used with suppliers and customers, the use of point of sale (POS) technology to gain information from customers, and bar coding information on garments. The results from 66 apparel manufacturers revealed that high cost of equipment could be

attributed to the low usage levels of information technology. The size of the apparel firm was also found to be significant predictor in the use of information technology, where small apparel firms had the lowest usage of information technology. A correlation between size of firm and barriers of high cost is noted in this study.

Summary of Literature

Researchers and analysts recommend that firms who wish to remain competitive in the future will have to turn away from the old traditional ways of gaining competitive advantages. Even those firms who wish to specialize in certain apparel products or act as mass producers on a small scale will have to add some degree of flexibility to their competitive strategies. Businesses, manufacturers specifically, have to learn how to incorporate flexibility into manufacturing processes and business objectives to accommodate the rapid change in consumer demand, changes in composition of the population, as well as, changes in the labor pool.

The limited studies of apparel manufacturers indicate that SAMs may require strategies that are different from ones used by large apparel manufacturers. These strategies may be modifications of existing strategies or totally new strategies. Researchers have reported on how the latest technology has proven to be cost-effective for larger firms (Ahire & Golhar, 1996; Kincade, 1988; Kincade & Cassill, 1993) and how management strategies can be implemented by large and small firms (Ahire & Golhar, 1996). Research also showed that small firms have difficulty in implementing strategies that require capital investment (Kincade & Cassill, 1993) and that differences exist in how small firms respond to external factors (Lang, et al., 1997). From the literature, small businesses that are operating under proactive and knowledgeable management are positioned well to address the needs of the changing market. Most research, including a size variable, examines what small firms are doing or not doing in relationship to the strategies developed for large firms. Yet, little is known about the manufacturing strategies of small firms specifically and less is known about the manufacturing strategies of SAMs. Thus, this study will profile the strategies used by SAMs located in the US with less than 50 employees.

CHAPTER III

Theoretical and Conceptual Frameworks

This study employs several theoretical and conceptual frameworks for guiding the understanding of the research problem, data collection, and data analyses (see Figure 2). The frameworks used for the research problem pertain to marketing and manufacturing strategies (Bordogna, 1996; Miles et al., 1978; Sweeney, 1991). The detailed relationship between marketing and manufacturing strategies is illustrated in Figure 3. The model proposes that manufacturers develop marketing strategies (i.e., defender, analyzer, prospectors, reactors) in response to environmental factors (i.e., customer service, operations, barriers, assistance, customer size, customer location, competitor size, competitor location), and manufacturing strategies are developed to operationalize the marketing strategies. The model also shows that marketing and manufacturing strategies should be continuously assessed and modified based on changes in environmental factors.

The framework for the data collection process is comprised of data collection recommendations of Dillman (1978) and procedures used in Kincade's study morphology of North Carolina apparel manufacturers. Shim and Kotsiopolus' (1993) typology of apparel shoppers was used as the framework for the data analysis. The purpose of this study is to profile SAMs according to their manufacturing strategies and to determine if those strategies differ according to environmental factors known to influence the apparel industry and small businesses and demographic variables.

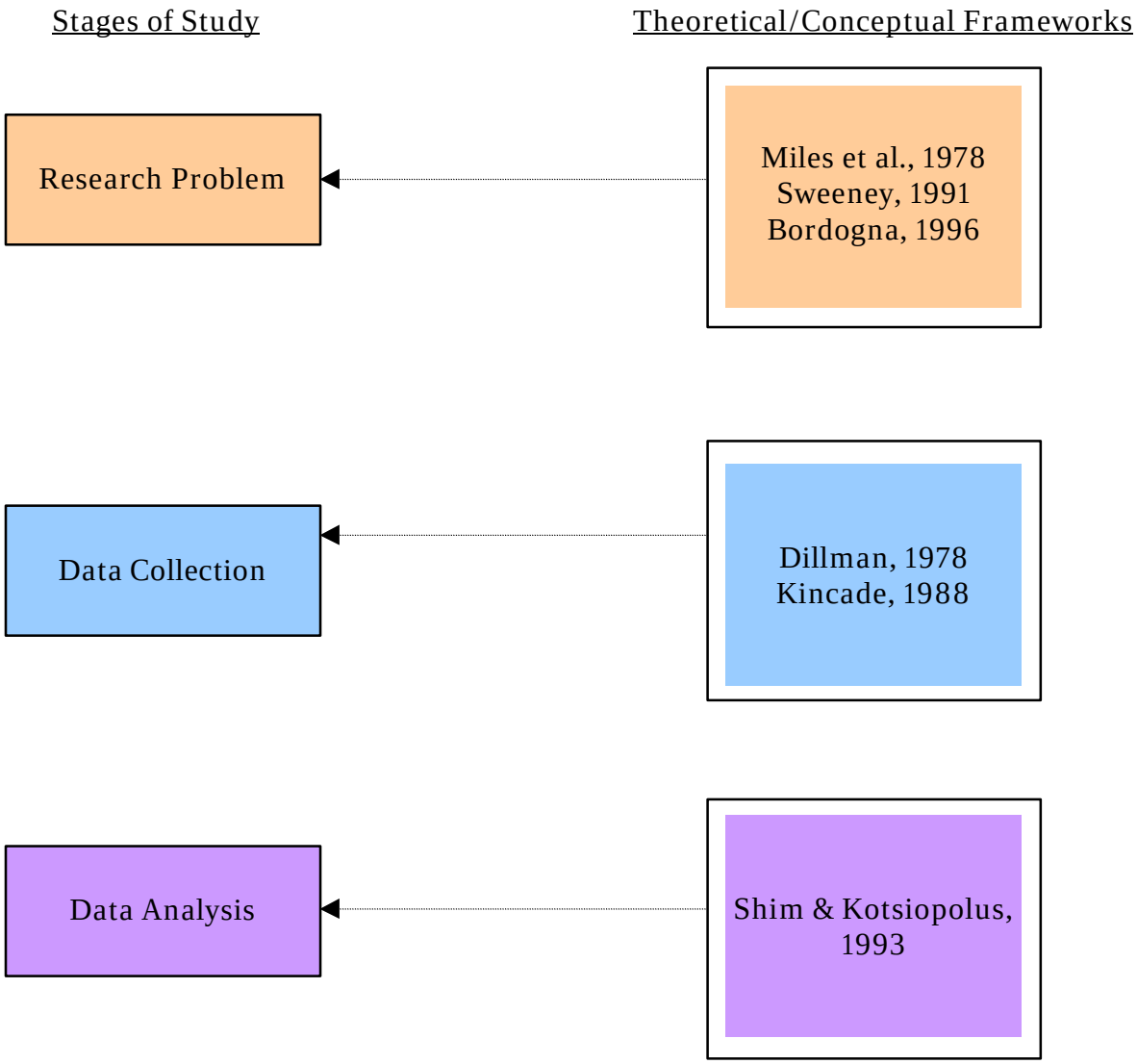

Figure 2. Theoretical and Conceptual Frameworks for Study

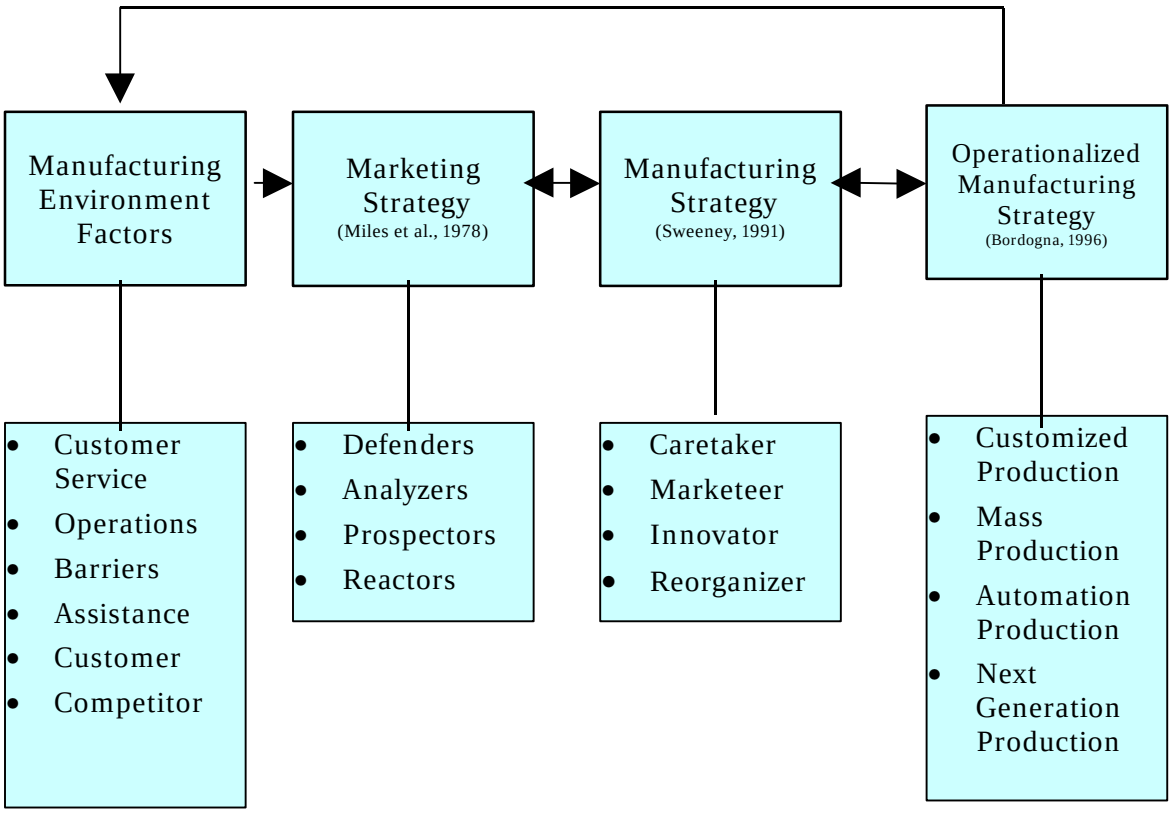

Figure 3. Relationship Between Manufacturing Environment Factors, Marketing Strategies, and Manufacturing Strategies (adapted from McDaniel and Kolari, 1987).

CHAPTER IV

Methodology

The purpose of this study is to develop a typology of small apparel manufacturers (SAMs) in the United States, those with less than 50 employees and who are classified between SIC 2310 to 2389. The typology was used to identify manufacturing strategy segments, for which profiles were developed according to manufacturing environmental factors and demographics. In addition, the relationship between SAMs manufacturing strategies and marketing strategies will be examined. This chapter details the (a) hypotheses; (b) research design, (c) sample and sample selection, (d) instrument, (e) data collection procedures, and (f) data analysis procedures.

Hypotheses

Based on the literature, manufacturing strategies address lot size, delivery times, quality, education and training for the workforce, and flexibility in management and manufacturing processes. This literature supports the use of the Bordogna (1996) model for profiling apparel manufacturers. SAMs represent a major segment of the apparel industry, but manufacturing strategies for the industry are typically discussed in terms of large apparel firms. The Bordogna model indicates that apparel manufacturers may have distinct manufacturing groups, and the unique characteristics of small businesses indicate that these groups may be specialized for SAMs. Therefore, Hypothesis One suggests that manufacturing strategies do exist among small apparel manufacturers and that distinct segments exist within these manufacturers.

Environmental factors (i.e., customer service, operations, barriers, assistance, customer size, customer location, competitor size, competitor location) have an effect on apparel manufacturing and small businesses. These factors were identified from studies of manufacturers, in general, (Ahire & Golhar, 1996; Jennings & Beaver, 1997; Lang, et al., 1997; Young, et. al, 1993) and of apparel manufacturers (Kincade, 1988; Kincade, et al., in review; Kincade & Cassill, 1993; Kincade & Regan, 1994; Kincade & Vass, 1998; Ko & Kincade, 1998). Hypothesis Two states that the manufacturing segments identified in Hypothesis One differ based on environmental factors.

The apparel industry consists of an array of firms that produce apparel and apparel related products. An examination of County Business Patterns (US Census Bureau, 1995) showed that SAMs have a different market concentration (i.e., women's wear, men's and boy's wear, children's wear, miscellaneous apparel and accessories) than larger apparel firms (see Table 1). These firms differ in products, end-use of products, fashion position, type of manufacturing process, most important customer, market strategy, and annual sales. Ko and Kincade (1998), Kincade, et al. (1993), and other industry research found demographics to be related to strategy implementation.

Hypotheses Three states that the manufacturing segments identified in Hypothesis One have different demographic characteristics (i.e., SIC, end-use for products, fashion position, type of firm, manufacturing process, employee size, most important customer, market strategy, annual revenue).

The literature states that manufacturing firms use marketing strategies in response to environmental factors and that manufacturing strategies should be in alignment with those marketing strategies. As shown in Figure 3 and Table 3, relationships can be drawn between the categories of marketing and manufacturing strategies. Fawcett, et al. (1997), Gupta, et al. (1991) and Kwangseek, et al. (1997) in their studies of manufacturers have found significant relationships between marketing and manufacturing strategies. Hypothesis four states that a relationship exists between the manufacturing strategies of SAMs and their market strategies.

Operational Definitions

Small Apparel Manufacturer (SAM) - US apparel manufacturer (not including the District of Columbia or Puerto Rico) classified under SIC 2310 to 2389, with 1 to 49 employees.

Large Apparel Manufacturer - US apparel manufacturers (not including the District of Columbia or Puerto Rico) classified under SIC 231 to 238, with 50 to over 1,000 employees.

Assumptions

- Manufacturing strategies exist in SAMs.

Delimitations

- The study will confine itself to small apparel manufacturers in states where the reported contribution of apparel manufacturing is at least five percent of the total number of manufacturing employees.

Limitations

- Only those SAMs who are listed in the Harris InfoSource Manufacturing Directory and its affiliates were used for sampling.

- Multiple companies owned by the same person, listed differently in the database may not have been identifiable in the data supplied by Harris.

- Responses were only obtained from one person from the company, the survey does not consider multiple responses from a company.

- Common methods variance may exist with data where subjects' perceptions of variables were used to form the independent and dependent variables.

- Data gathered pertain to subjects' perceptions of variables (e.g., degree of flexibility, level of unit costs, level of quality).

- Interpretation of the data is based upon subjects common understanding of the information being asked.

Research Design

The research design of this project is exploratory field study using the mail survey method. In Yin's (1994) analysis of the appropriate strategies for collecting data, he suggested that exploratory research can be achieved using the survey method when the purpose of the research is to explore the *who, what, where, how many*, and *how much* for a particular phenomenon. This method is, therefore, consistent with typology development and has been used by Kincade (1988) and Ko (1993) in examining the US apparel industry.

Sample and Sample Selection

The population consists of US states whose apparel manufacturing sector represents more than five percent of the total manufacturing employees: Alabama, Mississippi, Hawaii, Tennessee, Georgia, New York, Kentucky, South Carolina, California, North Carolina, Virginia, Florida, Pennsylvania, New Jersey, and Texas (see Appendices A1 to A3). According to data compiled from County Business Patterns (US Census Bureau,1995), approximately 15,500 firms are in these geographical locations, 78 percent of the total number of apparel firms with 1 to 49 employees in the United States. Within this population, only those manufacturers who are classified under SIC 2310 to 2389 (see Table 4) will be used in the sample. Manufacturers with SIC 2390 to 2399 are excluded because this classification group is known to include many non-apparel firms (Solinger, 1988).

The suggested sample size for a population of 15,000 is 375 or 2.68 percent of the population (Krejcie & Morgan, 1970). Based on an anticipated response rate of 30 percent, a minimum of 1250 surveys will be mailed. The source of the population list is Harris InfoSource, formerly Harris Publishing Co., who produces an annual directory of manufacturing firms for select US states. Harris was selected for several reasons. First, Harris InfoSource is endorsed by 30 states and their respective Chambers of Commerce or similar agencies. Harris has an information compilation team that continuously gathers data on existing and new manufacturing firms for their database. In addition, Harris has a research team that researches information on new firms that is provided from state Chambers of Commerce. The information is updated annually, and they research information received from state agencies. The second reason was that Harris

Table 4.

List of Apparel and Other Textile Products Under SIC 23

2310	Men's and boys' suits and coats
2320	Men's and boys' furnishings
2321	Men's and boys' shirts
2322	Men's and boys' underwear and nightwear
2323	Men's and boys' neckwear
2325	Men's and boys' trousers and slacks
2326	Men's and boys' work clothing
2329	Men's and boys' clothing, n.e.c.
2330	Women's and misses' outerwear
2331	Women's and misses' blouses and shirts
2335	Women's, junior's, and misses' dresses
2337	Women's and misses' suits and coats
2339	Women's and misses' outerwear, n.e.c.
2340	Women's and children's undergarments
2341	Women's and children's underwear
2342	Bras, girdles, and allied garments
2350	Hats, caps, and millinery
2360	Girls' and children's outerwear
2361	Girls' and children's dresses, blouses
2369	Girls' and children's outerwear, n.e.c.
2370	Fur goods
2380	Miscellaneous apparel and accessories
2381	Fabric dress and work gloves
2384	Robes and dressing gowns
2385	Waterproof outerwear
2386	Leather and sheep-lined clothing
2387	Apparel belts
2389	Apparel and accessories, n.e.c.

InfoSource does not charge a membership fee, which is more likely to be of interest to small manufacturers in contrast to most trade organizations. The third reason for using Harris is the ease of accessibility to stratified data.

The search for apparel manufacturers in SIC 23, with less than 50 employees and located in the selected state, resulted in 8,045 firms, which is 52 percent of the total number of firms suggested by County Business Patterns (US Census Bureau, 1995). The disparity between the totals is not unexpected due to the differences in the time frame of the data and the maintenance of governmental databases. When the data from the government source were tallied, the results showed that 39 percent of the firms, with employees less than 50 were from SIC 2390 to 2399, which is not included in the scope of the study. The Harris report showed 68 percent in this SIC range. To increase the validity of the data from Harris InfoSource, the data were compared to the government source to determine if the proportion of the market share was representative of the market share from the County Business Patterns, (i.e., women's 75%, men's and boy's 11%, children 4%, other 10%). The findings showed that many of the firms from Harris were in women's wear (44.20%), followed by men's and boy's wear (29.75%), children's wear (18.38%), and miscellaneous apparel and accessories (7.66%). The ordinal relationship is similar to the relationship in the government data. A total of 3,563 firms from Harris InfoSource met the criteria for the study, from this a random proportionate stratified sample (i.e., 75%, 11%, 4%, 10%) of 1,250 subjects were selected. A proportionate stratified sample was selected because of the anticipated large variance expected in the number of firms in each three-digit SIC and the known impact of product type variation (i.e., SIC categories) on manufacturing adoption of technology (Kincade & Cassill, 1993; Ko, 1993). External validity is expected to increase through the use of a randomized sample.

Instrument

The instrument consists of a questionnaire divided into five sections and was compiled from previous questionnaires used to gather data on apparel manufacturing processes and strategies (Kincade, 1988; Kincade, et al., in review; Ko, 1993; Ko & Kincade, 1998), constructs from the Bordogna (1996) model and findings from DuBois, Toyne, and Oliff (1993), Lang, et al., (1997), Miles, et al. (1978), Sweeney (1991), and Young, et al. (1993). A copy of the questionnaire is included in Appendix C.

Manufacturing Strategy. Manufacturing strategy was addressed in the second section and its variables were used to gather data for clustering the SAMs. The section is comprised of constructs from the Bordogna (1996) model and findings from the review of literature. The subjects were asked to rate their overall unit cost, quality of product, degree of manufacturing flexibility, degree of management flexibility, education/training provided to workers, education/training of owner, environmental consciousness, use of industry trade associations, most frequent lot size, and length of delivery times. The variables were measured on a five-point Likert-type scale where 1 represents *small/low*, 3 represents *medium/moderate*, and 5 *large/high*.

Environmental Factors. Sections three and four measured manufacturing environmental factors and sections one and five measure demographic variables. These questions have been dispersed in the questionnaire according to operational concepts as suggested by Kincade (1988). Data on the changes that have occurred over the past three years with customer service and operations, in section three, were selected from previous studies (Kincade, 1988; Kincade, et al., in review; Kincade & Regan, 1994). SAMs were asked to rate the level of change for customer service for the variables of (a) customer specifications, (b) customer reorders, (c) retailers as customers, (d) customer contacts, (e) target markets, and (f) customer shipments. Likewise, subjects were asked to identify the level of changes occurring in (a) unit costs, (b) quality of product, (c) manufacturing flexibility, (d) management flexibility, (e) education/training provided to workers, (f) education/training provided to owner/manager, (g) environmental consciousness, (h) use of industry trade associations, (i) lot sizes, (j) length of delivery times (k) use of computer technology, (l) number of product lines, and (m) length of production cycles (Bordogna, 1996; Kincade, 1988, Ko, 1993). Changes in customer service and operations were measured using a Likert-type scale of -2 to 2, (i.e., *decrease greatly, decrease slightly, same, increase slightly, increase greatly*).

Subjects' perceived barriers to profitability and assistance (Kincade & Vass, 1998; Young, et al., 1993) were grouped in section four. Barriers were identified as (a) high cost of equipment, (b) lack of trained employees, (c) retention of employees, (d) uncertainty in sales volume, (e) retailers in bankruptcy, (f) lack of capital funds, (g) difficult communication with customers, (h) need for special equipment, and (i) other items not previously listed. The variables were measured on a five-point Likert-type scale where 1 represents *no barrier,* 3 *some barrier*, and 5 *major barrier*.

Assistance was defined as (a) reduce imports of textiles, (b) reduce imports of apparel, (c) improve electronic communications with customers, (d) improve electronic communications with suppliers, (e) training for production workers, (f) better color information, (g) more automated sewing equipment, (h) loans for capital investment, and (i) other items not previously listed (Kincade, 1988; Kincade & Vass, 1998; Ko & Kincade, 1993). These variables also were measured on a five-point Likert-type scale where 1 represents *no assistance,* 3 *some assistance,* and 5 *major assistance*.

The environmental factors of size (i.e., *small, medium, large*) of customer (i.e., apparel manufacturers, department stores, specialty stores, mass merchandiser/discounters, other customers not identified) and customer's proximity to the subject (i.e., *in state, out of the state, out of the US*) are located in part two of section three. The measurement of customer identity and size consisted of multiple response items. Information on customer size and location were included based on findings from Young, et al. (1993), which revealed that small manufacturers exist not only to supply larger manufacturers in their region but also to supply goods to customers outside of their region and to other small customers. Subjects' competitors, where competitor is defined in terms of location (i.e., US apparel manufacturers, Foreign apparel manufacturers, Other Competitors not listed) and size (i.e., *small, medium, large*) were addressed in part two of section four and consisted of multiple response items.

Demographics. In section one, demographic data were collected on the SIC (i.e., *women's wear, men's and boy's wear, children's wear, miscellaneous apparel* and *accessories, other* SIC), end-use of products (i.e., *suits, coats-outerwear, shirts/blouses/tops, nightwear-underwear-lingerie, jeans, trousers-pants, dresses, skirts, fleece-wear/sweatpants/sweatshirts, other product*); and type of manufacturing process (i.e., *progressive bundle, modular, unit production system, other process*). These demographic variables were measured using multiple response items. Additional demographic data were collected on classification of firm (i.e., *manufacturer, jobber, contractor*) and firm's fashion position (i.e., *high fashion, basic fashion*). Most of the demographic questions are from research instruments by Kincade (1988) and Ko (1993), the remainder was included based on findings from the review of literature.

The final section, five, measured the remaining demographic data, which included employee size as categorized by County Business Patterns (US Census Bureau, 1995) (i.e., *1 to 4, 5 to 9, 10 to 19, 20 to 49*). Additional demographic variables included subjects' manufacturing strategies (i.e., *aggressively entering new markets with new products, carefully entering new markets/products, making some changes but few risks, developing the markets/products which currently served*), subjects' perceived image in the market (i.e., *offers select products with high quality, adopts new ideas after careful analysis, reacts to opportunities or threats, innovates and creates new products*), and annual gross revenues. The factors for market strategies and image were taken from Kincade (1988) and were adapted to represent the generic strategies of Sweeney (1991) and Miles et al. (1978). At the end of section five writing space was allotted for subjects' comments.

Reliability and Validity.

Construct validity for the questionnaire was enhanced by developing the questionnaire from questionnaires previously used in industry research (Kincade, 1988; Kincade & Vass, 1998; Ko & Kincade, 1993). Face validity was evaluated by pilot testing the instrument with local SAMs, not in the sample, analysts and researchers, and counselors in the apparel industry and small businesses. The purpose of the pilot testing was to ensure that terms and language in the questionnaire were appropriate for the subjects and that the instrument would gather the intended data. The information from the pilot test was used to revise the questionnaire. Eleven North Carolina SAMs were telephoned and asked to participate in the pilot study. Upon agreement, preliminary questionnaires were mailed to pilot test participants, only five were returned (45%). Five additional firms were called to participate in the pilot study. Permission was obtained from subjects to FAX them a copy of the questionnaire and arrangements were made for a telephone interview; only four participated in the follow up telephone interview.

Telephone Interview. One pilot test subject offered information in addition to questions related to the questionnaire. Information was provided on the services of the participant's firm and his perceptions of the current status of the US apparel industry. The subject, a service contractor, reported that the firm started out as a manufacturer and later evolved into a service contractor. The firm performs a variety of services

farmed out from larger apparel firms. Examples of types of work include changing labels, reworks, and folding garments. The subject reported increased imports to the United States and the inability to compete with imports with the United States' higher labor costs were the major reasons why the subject changed the function of the company to a service contractor. The owner also cited additional barriers or problems facing the small apparel manufacturer, illegal production and federal regulations. Illegal production or "backroom operations" pose a problem to small apparel manufacturers because these are firms who may have legal or illegal immigrants working in sweatshops. These firms do not adhere to the standard work hours, pay fair wages or overtime compensation, nor to they typically offer health benefits or retirement plans, all which translate to lower costs for their final product. The subject stated that these firms have an unfair advantage, low to non-existent labor costs and the avoidance of taxes from unreported profits. The Occupational Safety and Health Association was also viewed as a problem for the small apparel manufacturer. The owner reported that often OSHA will levy a penalty against a small employee size firm, but the firm does not have the resources to hire a lawyer to fight the penalties. The participant offered that if small firms are to continue in the apparel industry, they will have to find a niche market or markets to serve and be willing to perform a variety of functions to serve the domestic the market(s).

Several changes to the questionnaire resulted from the pilot test. One change was switching the Operational Procedures to the first section and the Operational Characteristics to the second section. The characteristics were moved to the first section to allow the subjects an opportunity to start with more familiar terminology and simple questions before answering the more complex questions. Additional changes include allowing multiple responses for product classification categories, product classifications, and manufacturing processes; adding "*fleece-wear, sweatshirts, sweatpants*" and "*jeans*" to the product classification question, and re-labeling "*Out of Region*" to "*Out of State*".

Procedures

A mail survey with questionnaires was selected as the data collection method because the population is wide spread, and mailings are one of the most economical and effective method of reaching the dispersed subjects (Touliatos & Compton, 1988). The questionnaire was mailed to a sample of 1271 SAMs, using the *Total Design Method* by Dillman (1978), and Kincade's (1988) interpretation of the *Total Design Method* as guides for formatting and administering the survey. For an example of the all data collection materials, see Appendices B1- B6. This procedure consistently had resulted in 30 percent or greater return rate (Kincade & Cassill, 1993; Ko & Kincade, 1998) in prior apparel research.

The survey process consisted of twelve-weeks, which began at the beginning of November 1 and ended January 18 of the following year. Due to holidays occurring in this time frame, four extra weeks were added to Dillman's (1978) eight-week suggested time frame. The first contact with the subjects was with a pre-notification letter, which informed subjects of the forthcoming questionnaire. Information included in the letter

was an overview of the purpose of the project, identification of the researchers, and the sponsoring university. During the second week, the questionnaire was sent with a cover letter, a self-addressed stamped return envelope, and a courtesy card that subjects were to return to receive a summary of the findings from the study. The secondary purpose of the return postcard was to track returns. A reminder card was sent during the fourth week thanking those participants who had completed and returned the questionnaire and reminded those who had not returned questionnaires to do so. A follow-up letter explaining the importance of their participation in the study, and a second questionnaire with a self-addressed stamped return envelope and courtesy card were mailed to subjects who had not been identified by a returned postcard during the eighth week. The last phase of the data collection consisted of telephones to a random sample of 91 (10%) non-respondents to determine if the non-respondents were representative of the original sample and to identify reason for non-response was done during the twelfth week.

Data Analysis

Conceptual Framework. The data analysis section used Shim and Kotsiopolus' (1993) study of typologies of female shoppers as a guide for the data analysis. In the study, the researchers used factor analysis to determine the constructs to use as grouping variables. The clustering techniques used by Shim and Kotsiopolus (1993) consisted of hierarchical agglomerative scheduling using the Ward's procedure with Euclidean distances. Once the clusters were identified, MANOVA was used to determine the overall distances between the clusters and ANOVA was used to determine the differences in means between pairs of groups. The researchers then profiled the groups based on shopping orientation factors and demographic by employing MANOVA to determine significant differences between each factor and ANOVA to determine differences between each variable in the shopping orientation factors. LSD was used to determine the significance between the variables. For nominal demographic variables, Chi-square was used to test for significant differences between groups.

Current Study. The initial report of data analysis consists of frequencies. Firm size was used to describe the respondents operation characteristics and demographics.. The remaining analysis pertains to the four hypotheses. SPSS 8.0.1 (1998) for Windows 95 was the statistical package used for the data analyses.

H_0. There is no difference in the manufacturing strategies used by SAMs.

H1. Manufacturing strategies differ among SAMs.

The analysis of manufacturing strategies was done in two steps, factor analysis on the variables from the Bordogna (1996) manufacturing model and cluster analysis using the results from the factor analysis. Since additional variables were added to the Bordogna model, based on findings from the review of literature, factor analysis was used to determine if the constructs for general manufacturing were applicable for the current study. Cluster analyses were used to determine the existence of separate

segments of manufacturing strategies. Specifically, the *Ward's procedures* with squared-Euclidean distances was used to measure similarity of the subjects, and an agglomeration hierarchical schedule was used to provide a step by step report on how the data moved from individual clusters to the larger clusters of similarity (Malhotra, 1993). The use of cluster analyses such as centroids and Euclidean distances and *Ward's procedures* have been used by previous researchers in creating typologies (Germain & Droge, 1994; Shim & Kotsiopolus, 1993). To increase the reliability and validity of the existence of clusters, statisticians suggest that multiple clustering statistics should be employed (Malhotra, 1993). Significant clusters were recognized by examining the agglomeration schedule coefficient for large differences that should coincide with the cluster membership; groups should have more than one case (Malhotra, 1993). Optimizing partitioning method, a nonhierarchical clustering method, was used to test the reliability of the clusters obtained by the *Ward's procedure*. In the event distinct clusters did not emerge from the data, the data would have been reported *a priori* using the Bordogna (1996) model.

H_0. Manufacturing strategy groups of SAMs do not differ based on manufacturing environmental factors.

H_2. Manufacturing strategy groups of SAMs differ based on manufacturing environmental factors.

A two-step process was used to profile the clusters of SAMs according to the environmental factors of customer service and operations variables and barriers and assistance variables. Factor analysis was used first to determine the interdependence among the environmental variables (Kincade, 1988; Kincade & Regan, 1994; Kincade & Vass, 1998; Malhotra, 1993; Shim & Kotsiopolus, 1993). Specifically, principal components analysis was used to examine the total variance within the variables of the environmental factors using an Eigenvalue of greater than 1.0. The total number of factors were identified by selecting those factors whose contribution to the variance summed at least 60 percent, starting with the factor with the highest percentage of contribution and following sequentially in a descending order. A visual examination of scree plots was used to support the interpretation number of factors based on Eigenvalues and percentages of variance. Variables with factor loadings (i.e., correlation between variables and factors) of .6 or greater and less than 3.0 were considered related to a factor (Kincade & Vass, 1998; Shim & Kotsiopolus, 1993). A varimax rotation was used to minimize "the number of variables with high loading on a factor" (Malhotra, 1993, p. 627). Interdependence among the variables associated with a factor was evaluated using a Cronbach alpha of .7 (Kincade & Regan, 1994; Kincade & Vass, 1998; Malhotra, 1993). In the event factors were found to be interrelated, new factors were formed by averaging the scores.

The second step of the data analysis of environmental factors was to determine the differences that exist among the variables within each manufacturing strategy groups. MANOVA was used to determine if differences existed among clusters in relation to factors, and ANOVA was used to determine if a difference existed between the clusters and the factors identified from the factor analysis process**.** If significant

differences were found, a *post hoc* test of LSD was used to determine the where the differences occurred. A probability of $p > .05$ was used to identify significance.

Chi-square was used to profile the clusters of SAMs according the size of (i.e., small, medium, large) and location (i.e., in-state, out of state, out of the United States) of their customers and competitors' (i.e., United States, foreign) and competitors' size (i.e., small, medium, large). A probability of $p > .05$ was used to determine significance for each testing.

H_0. Manufacturing strategy groups of SAMs do not differ based on demographics.

H_3. Manufacturing strategy groups of SAMs differ based on demographics.

To profile the clusters of SAMs using demographic variables Chi-square was used for nominal demographic variables (i.e., products, product classification, manufacturing processes, type of firm, type of fashion, manufacturing strategies, marketing strategies). ANOVA was used for ordinal demographic variables (i.e., firm size, annual gross revenues). An alpha of .05 was used to determine significance.

H_0. Manufacturing strategies used by SAMs have no relationship to their use of market strategies.

H_4. Manufacturing strategies of SAMs are related to their use of market strategies.

The relationship between the manufacturing strategy groups and the reported marketing strategy (i.e., question three, section five) was evaluated using chi-square. An asymmetric Lambda coefficient with a probability of $p > .05$ was used to identify significance between the nominal variables (Malhotra, 1993). With an asymmetric Lambda, both variables are tested as the independent to determine which one is the stronger predictor of the dependent variable (Malhotra, 1993).

CHAPTER V

Results

The purpose of this study was to develop a typology of US small apparel manufacturers (SAMs) using their manufacturing strategies. SAMs were defined as apparel manufacturers with less than 50 employees, and whose products were classified between SIC 2310 to 2389. Subjects were selected from 15 states, whose apparel manufacturing represented at least five percent of the total number of manufacturing employees. This chapter reports on the response rate from the mail survey, general description of the sample using employee size of firms as the defining variable, and concludes with the results of the hypotheses testing.

Response Rate

Of the 1271 surveys mailed to SAMs, 179 were returned (14%). Surveys with (a) an incomplete Operational Procedures section – the section used to define manufacturing strategies, (b) more than 49 employees, or (c) no answer for the employee size were not included in the final sample. The adjusted number of usable surveys was 146 or 11 percent of the original mailing. The number of undeliverable addresses was 128 (10%). Using the total amount of surveys mailed, reduced by undeliverable addresses, the adjusted return rate for useable surveys was 13 percent. The anticipated return rate was 30 percent. The low response rate may be attributed to the time frame, over the winter holiday seasons, during which data were collected and to the comments written on the postcards from respondents who chose not to participate in the study. These postcard-only respondents cited too busy, not interested, not applicable, going out of business, or out of business as reasons for non-participation. Unlike large firms, small businesses sometime use residential addresses as the mailing address for the company. Therefore, the surveys may have been deliverable, but subjects with this type of address may not have responded if they were too busy, their business was closed, or if they decided the survey did not apply for their company. One hundred sixty-one postcards were returned that indicated a survey had been returned. Seventy-three postcards were returned that indicated respondents did not want to participate in the study.

Sample of Non-respondents. Non-respondents (n = 910) of the study, those who returned neither a postcard nor any other form of communication, were sampled to determine if they had similar characteristics as the respondents. A random sample using ten percent of the non-respondents was drawn using the same extraction program used to extract the original sample (i.e., Whittle) (M. Clark, 1997). The sample of non-respondents (n = 91) was called to verify employee size and type of products manufactured. The results, reported in Table 5, show that respondents appear to be reasonably representative of the non-respondents, considering the differences in methods used to obtained the data. Among the non-respondents who completed the telephone interview (n = 63), all manufactured products with SICs between 2330 to

2389, and only one non-respondent had more than 49 employees. As with the respondents, a small number of non-respondents (n = 28) were out of business, did not wish to participate, were no longer manufacturing apparel or apparel related products, or could not be contacted.

Demographics Reported According to Employee Size

Demographic data were reported according to the firm's employee size. Cross tabulations were used to identify frequencies and percentages for multiple response questions (i.e., major product categories manufactured, classification, manufacturing processes), as well as, single response questions (i.e., type of firm, fashion position of products, manufacturing and marketing strategies, firm's image). These results are reported in Table 6 through Table 8. Means and ANOVA were used to describe annual gross revenues.

The majority of the subjects were firms with 1 to 9 employees (57.5%); however, the most frequently reported firm sizes were *1 to 4* (39.8%) and *10 to 19* (28.3%). In an analysis of firm size and product category, the most frequently reported product manufactured by all subjects (60.3%) and by employee size groups was *women's wear*. As reported in Table 6, employee size group *1 to 4* had the highest concentration of women's wear production (66.7%), group *5 to 9* had the lowest percentage (57.1%). These high percentages are representative of previously reported data for the apparel industry. The profile of the respondents is similar to the US data. The majority (74.14%) of US apparel manufacturing firms with less than 50 employees produce for the women's industry, as shown in Figure 4.

The most frequently reported product classifications for all subjects were *shirts/blouses/tops* (19.9%), *dresses* (17.3%), and *skirts* (14.6%). However, the most frequently reported product classifications within the employee size groups differed (Table 7). Employee groups *1 to 4* and *5 to 9* followed the same pattern as the overall frequencies, but group *10 to 19* reported *dresses* as the more frequently, followed by *shirts/blouses/tops*, and *trousers/pants*. Group *20 to 49* reported *shirts/blouses/tops* more frequently than the former three groups, followed by *trousers/pants*, *skirts*. The results support the findings of multiple production classifications by apparel manufacturers of all sizes (Lin, Kincade, & Warfield, 1995).

The most commonly reported type of manufacturing process was the *unit production system*, overall and for each employee size group (53.7%) (Table 8). The *progressive bundle* system was second most frequently reported manufacturing process for all employee size groups except for group *1 to 4*, whom reported using *other* methods of production, see Appendix D3 for a list of *other* items. This finding differs from previous research (Lin, Kincade, & Warfield, 1995), which reported the bundle system, progressive bundle and conventional bundle, as the dominant type of manufacturing process for apparel manufacturers of varying employee size. However,

Table 5.

Comparison of Respondents and Sample of Non-Respondents

	Respondents		Non-Respondent Telephone Interviews	
	N	% of Total	N	% of Total
Useable/Completed	146	37.6	63	69.2
Incomplete	6	1.5	--	--
Over 49 Employees	27	7.0	1	1.0
Non-deliverables/ Could Not Be Contacted	128	33.0	25	27.5
Did not wish to Participate	53	13.7	1	1.0
Out of Business	8	2.0	2	2.2
Not Applicable	20	5.2	--	--
All Forms of Contacts	N = 388		N = 91	

Table 6.

Report of Percentages for the Frequencies of Products by Employee Size

	Women's	Men's	Children's	Other Apparel/ Accessories	Other
1 to 4	66.7	7.1	9.5	9.5	7.1
5 to 9	57.1	14.3	17.1	8.6	2.9
10 to 19	59.2	16.3	10.2	8.2	6.1
20 to 49	58.6	10.3	10.3	8.6	12.1
% of Total Responses	60.3	12.0	11.4	8.7	7.6

Note: Items were multiple response. Percentages represent the of the total number of respondents. N = 145.

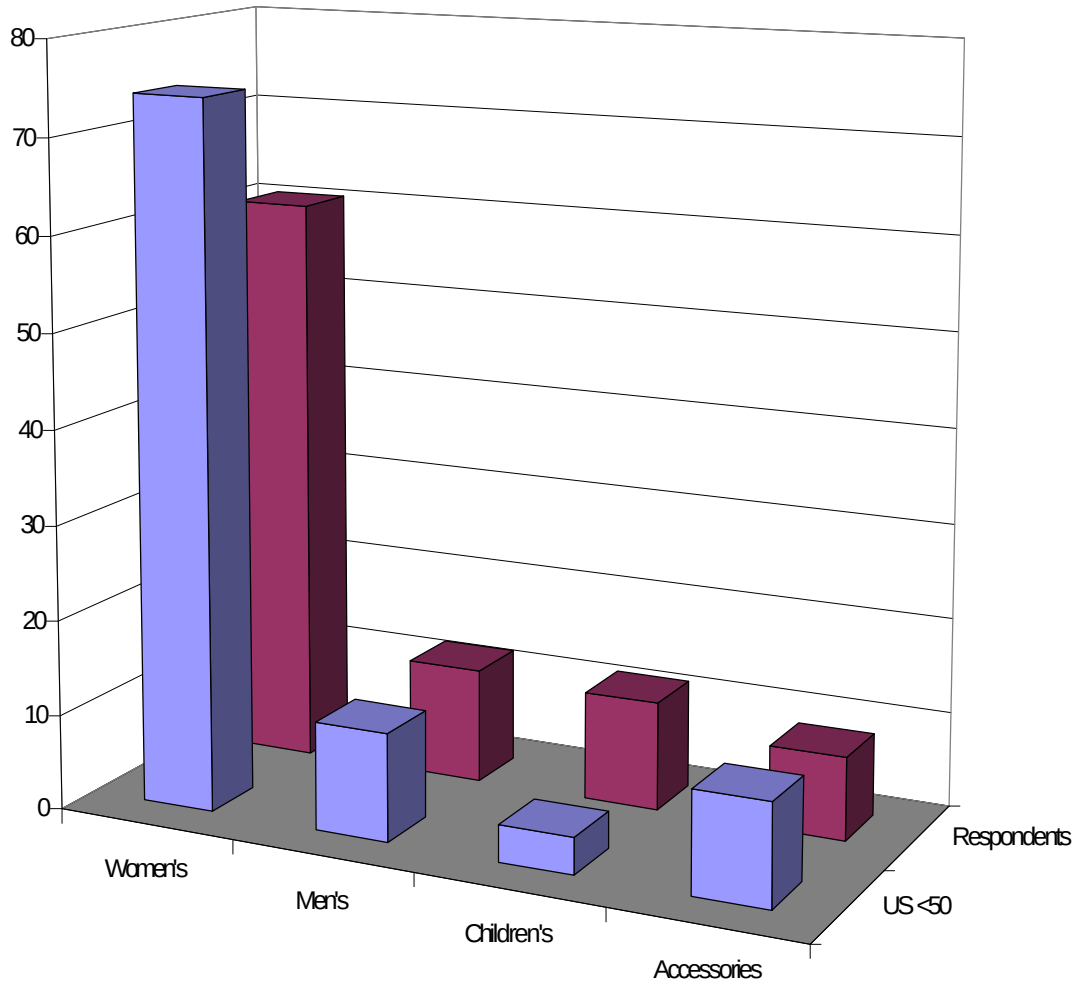

Figure 4. Comparison of Industry Market Concentration and Sample's Market Concentration.

Table 7.

Report of Percentages for the Frequencies of Products Classifications by Employee Size

	Suits	Coats, Outerwear	Shirts, Blouses, Tops	Nightwear, Underwear, Lingerie	Jeans
1 to 4	7.7	1.1	23.1	2.2	2.2
5 to 9	3.6	3.6	21.4	3.6	0.0
10 to 19	6.0	4.8	16.9	6.0	2.4
20 to 49	4.5	7.1	18.8	8.9	4.5
% of Total Responses	5.6	4.4	19.9	5.6	2.6
	Trousers, Pants	Dresses	Skirts	Fleece-wear, Sweatpants, Sweatshirts	Other
1 to 4	14.3	17.6	17.6	3.3	11.0
5 to 9	8.9	21.4	14.3	3.6	19.6
10 to 19	13.3	20.5	12.0	6.0	12.0
20 to 49	16.1	12.5	14.3	6.3	7.1
% of Total Responses	13.7	17.3	14.6	5.0	11.4

Note: Items were multiple response. Percentages represent the of the total number of respondents. N = 146.

Table 8.

Report of Percentages for the Frequencies of Manufacturing Processes by Employee Size.

	Progressive Bundle	Modular	Unit Production System	Other
1 to 4	18.2	3.0	57.6	21.2
5 to 9	25.0	0.0	60.7	14.3
10 to 19	36.8	5.3	55.3	2.6
20 to 49	37.5	2.1	45.8	14.6
% of Total Responses	30.6	2.7	53.7	12.9

Note: Items were multiple response. Percentages represent the of the total number of respondents. N = 130.

as suggested by Lin, et al. and Hunter (1990), the unit production system is appropriate for small lot sizes, such as those found in SAMs and larger apparel manufacturers tended to use the bundle system. A closer examination of the frequencies of SAMs according to employee size revealed that the use of *progressive bundle* system increased as the employee size group increased, which supports findings reported by Lin et al. (1995).

In Table 9, the results show that the traditional *manufacturer* dominated (69.2%) the classification of firms category, overall, and for each employee size grouping, several subjects reported dual firms types (1.4%). Sixty-one percent of the subjects manufactured basic style goods, which is a similar profile to product style in the findings of Kincade and Cassill (1993).

The last report of frequencies addresses to what SAMs attributed their increases and decreases in demand and their perceived image of their firm in the marketplace. These results are reported in Tables 10 and 11 and reflect the manufacturing concepts of Sweeney (1991) and marketing concepts of Miles et al. (1978). Overall, respondents reported that their increases in demand were due to their practice of being a Reorganizer – *developing new products for current markets* (48.6%), followed by Caretaker – *making some changes but few risks* (17.6%) (Table 10). These results were the same for groups *1 to 4* and *5 to 9*. Employee size *10 to 19* reported a combination of several manufacturing strategies (22.9%), in addition to the Reorganizer strategy, as a major influence on the increase in demand. Group *20 to 49* reported their practice of being Marketeers – *carefully entering new markets/ products* (25%) as their second most popular reason for their increases in demand**.** The selection of the Reorganizer, by most respondents, supports previous research, whose findings detailed the advantages of market proximity (e.g., access, demand, timing) and flexibility of the domestic apparel firms, such as SAMs (Christerson, 1994; Christerson & Appelbaum, 1995).

Subjects were asked also to identify, using the same manufacturing strategies, what contributed to their decreases in demands. Overall, the respondents reported the practice of the Caretaker (50%) as the reason for their decreases in demand. In examining the groups, only the *1 to 4* and *5 to 9* employees sizes did not report the practice of a Caretaker as the major reason, (e.g., exceeding 50%), for their decreases in demand. Group *1 to 4* cited the Reorganizer strategy (21.4%) and group *5 to 9* cited the Marketeer strategy (27.3%) as a secondary reason for decreases in demand. The selection of the Caretaker as the major influence in decreases in demand suggests that respondents perceive competition exists for current markets, and perhaps traditional measures used to maintain their markets were unprofitable and unproductive. This lends support to the Reorganizer manufacturing strategy as an influence in the increase demand. Twenty-seven percent of the subjects did not respond to this question. This may be indicative of the subjects who had not recently experienced a decrease in demand or did not understand the directions to answer the questions related to increases in demand, as well as, decreases in demand.

Table 9

Report of Responses for Type of Firm by Employee Size.

	Manufacturer	Jobber	Contractor	Other	Multiple Response
1 to 4	22	7	1	3	2
5 to 9	20	4	4	--	--
10 to 19	25	6	3	2	--
20 to 49	34	2	9	1	--
% of Total Responses	69.7	13.1	11.7	4.1	1.4

N = 145

Table 10.

Report of Percentages for Manufacturing Strategies by Employee Size Using Interpretations of Sweeney (1978) Manufacturing Strategies

Increases in Demand

	Innovator	Marketeer	Caretaker	Reorganizer	Multiple
1 to 4	8.6	11.4	28.6	40.0	11.4
5 to 9	7.1	10.7	21.4	53.6	7.1
10 to 19	8.6	14.3	11.4	42.8	22.9
20 to 49	2.3	25.0	11.4	56.8	4.5
% of Total Responses	6.3	16.2	17.6	48.6	11.3

Total Number of Respondents = 142

Decreases in Demand

	Innovator	Marketeer	Caretaker	Reorganizer	Multiple
1 to 4	10.7	17.9	46.4	21.4	3.6
5 to 9	22.7	27.3	40.9	4.5	4.5
10 to 19	9.5	14.3	57.1	19.0	0.0
20 to 49	11.4	17.1	54.3	17.1	0.0
% of Total Responses	13.2	18.9	50.0	16.0	1.9

Total Number of Respondents = 106

The majority of the respondents viewed their image in the marketplace as Defenders – *offers select products with high quality* (56.8%), which is reported in Table 11. This viewpoint was true of all the groups by employee size, except for the *20 to 49* group, which in addition to the Defender image (40.5%), reported the Prospector's image (28.6%). According previous research, manufacturing and marketing strategies should be consonant to be effective (Gupta et al., 1991; Kwangseek et al., 1997). The finding that SAMs' manufacturing strategy was the Reorganizer and the marketing image was the Defender indicates a lack of congruency between the two organizational functions. This indicates that these firms are operating more than likely operating ineffectively. The goals for manufacturing are more aggressive than the goals for marketing, which is concerned with retaining market share with few changes to select high quality products. Having an aggressive product development strategy without an aggressive marketing strategy is inefficient and ineffective for the manufacturing operations. Seven respondents (4.8%) did not answer the question.

An examination of gross revenues for the subjects revealed that as the categories for employee size increased the reported gross revenues increased, as shown in Table 12. The overall mean for all subjects was $\mu = 3.86$. When the means of the employee size categories were tested for significant differences, the ANOVA analysis revealed significant differences did exist between the employee size of the firm and the reported annual gross revenues ($F = 11.85$, $p = .00$), and annual gross revenue means increased as size of employees group increased. This finding supports the previous result that found a relationship between size by employee and size by revenue (Kincade & Cassill, 1993; Ko & Kincade, 1998).

Results of Hypotheses Testing

H_0. There is no difference in the manufacturing strategies used by SAMs.

H1. Manufacturing strategies differ among SAMs.

A two-step approach was used for testing hypothesis one. Using Shim and Kotsiopolus' (1993) study as the framework, factor analysis was used on manufacturing strategy variables from the Operational Procedures section. The variables include ones from Bordogna's (1996) manufacturing strategies model and those identified from the review of literature (DuBois, et al., 1993; Kincade, 1988; Kincade & Cassill, 1993; Kincade & Regan, 1994; Ko & Kincade, 1998, Lang, et al., 1997). Results of the factor analysis were used to cluster respondents using *Ward's procedure* and Optimizing Partitioning.

Factor Analysis. Factor analysis was used to test for similarity among manufacturing strategy variables. Principal components analysis was used to examine total variance within the variables. Significant factors were recognized if they had an Eigenvalue greater than 1.0 and the cumulative percentage of variance of those variables accounted for at least 60 percent (Malhotra, 1993). Prior to examining the

Table 11.

Report of Percentages for Marketing Strategies by Employee Size Using Interpretations of Miles et al. (1978) Marketing Strategies

	Defenders	Analyzers	Reactors	Prospectors	Multiple
1 to 4	55.9	11.8	5.9	17.6	8.8
5 to 9	71.4	3.6	3.6	10.7	10.7
10 to 19	65.7	2.9	2.9	17.1	11.4
20 to 49	40.5	9.5	4.8	28.6	16.7
% of Total Responses	56.8	7.2	4.3	19.4	12.2

Total Number of Respondents = 139

Table 12.

Frequency and Means of Annual Gross Revenues by Employee Size

	1 to 4	5 to 9	10 to 19	20 to 49
Under $100M	9	0	2	1
$100,000 - $299,999	10	7	3	2
$300,000 - $499,999	3	3	2	2
$500,000 $999,999	6	6	6	8
$1,000,000 - $4,999,999	6	11	16	19
Over $5,000,000	1	0	5	13
M =	$2.72^{a,b,c}$	$3.64^{a,d}$	4.11^{b}	$4.69^{c,d}$
	n = 36	n = 28	n = 36	n = 46

Note: Significant differences between pairs are indicated by identical superscripts at $p = \leq .05$.

results of the factor analysis procedure, Bartlett's test of sphericity and Kaiser-Meyer-Olkin's (KMO) measure of sampling adequacy test statistics were examined to ensure that factor analysis was an appropriate test for the variables (Malhotra, 1993). The results the analysis on manufacturing strategy variables revealed high test statistics for Bartlett's test of sphericity (339.446, $p \leq .000$) and KMO (.661), which supports the use of factor analysis for the variables. The results of the factor analysis for variables revealed four factors with Eigenvalues greater than 1.0 and accounted for 67.8 percent of the total variance. A visual examination of the scree plot, shown in Figure 5, supported the emergence of four factors. Varimax rotation was used to minimize the number of variables with high loadings on each of the four factors (Malhotra, 1993). Variables with factor loadings (i.e., correlation between variables and factors) of .6 or greater on one factor and less than 3.0 on the remaining three factors were considered related to a factor (Kincade & Vass, 1998; Shim & Kotsiopolus, 1993). The results, shown in Table 13, reveal 6 of the 10 variables significantly loading on one of the four factors, which then were assigned labels (i.e., *flexibility, environmental consciousness, product attributes, lot size*). The four variables that did not load on one of the four factors (i.e., education or training provided for production workers, education or training provided for owner/manager, use of industry trade associations, delivery times) were excluded from further use in the cluster analysis. However, the variables were retained to describe each cluster's manufacturing strategy.

Interdependence among the variables associated with a factor was evaluated using a Cronbach alpha of .7 (Kincade & Regan, 1994; Kincade & Vass, 1998; Malhotra, 1993). The results ranged from .64 to .79. The factor *product attributes* was kept even though the alpha was below .7 because its contribution to the overall variance among the respondents (12.87%) and the variables that comprise the factor are part of the original manufacturing strategy by Bordogna (1996) and findings from DuBois, et al. (1993).

Clustering Analysis. With the identification of the four factors for the manufacturing strategy model, Ward's procedure with squared-Euclidean distance was used to determine the existence of separate segments of manufacturing strategies within the sample of SAMs (n = 146). An examination of the agglomeration hierarchical schedule was used to determine the point at which differences in stages of cluster groupings began to significantly increase. The examination revealed four possible clusters from the data. Further examination of the Dendrogram chart, Figure 6, revealed four blocks with the widest distances, which supports the interpretation of the agglomeration report. Due to the subjective nature of determining the number of cluster groups from the aggregate data, a non-hierarchical method was employed to ascertain if similar results could be obtained.

The Optimizing Partitioning method of nonhierarchical clustering was used to test the reliability of the clusters obtained by the *Ward's procedure.* The *K-means* clustering analysis in SPSS v8.01 was used by entering preset cluster sizes, starting at

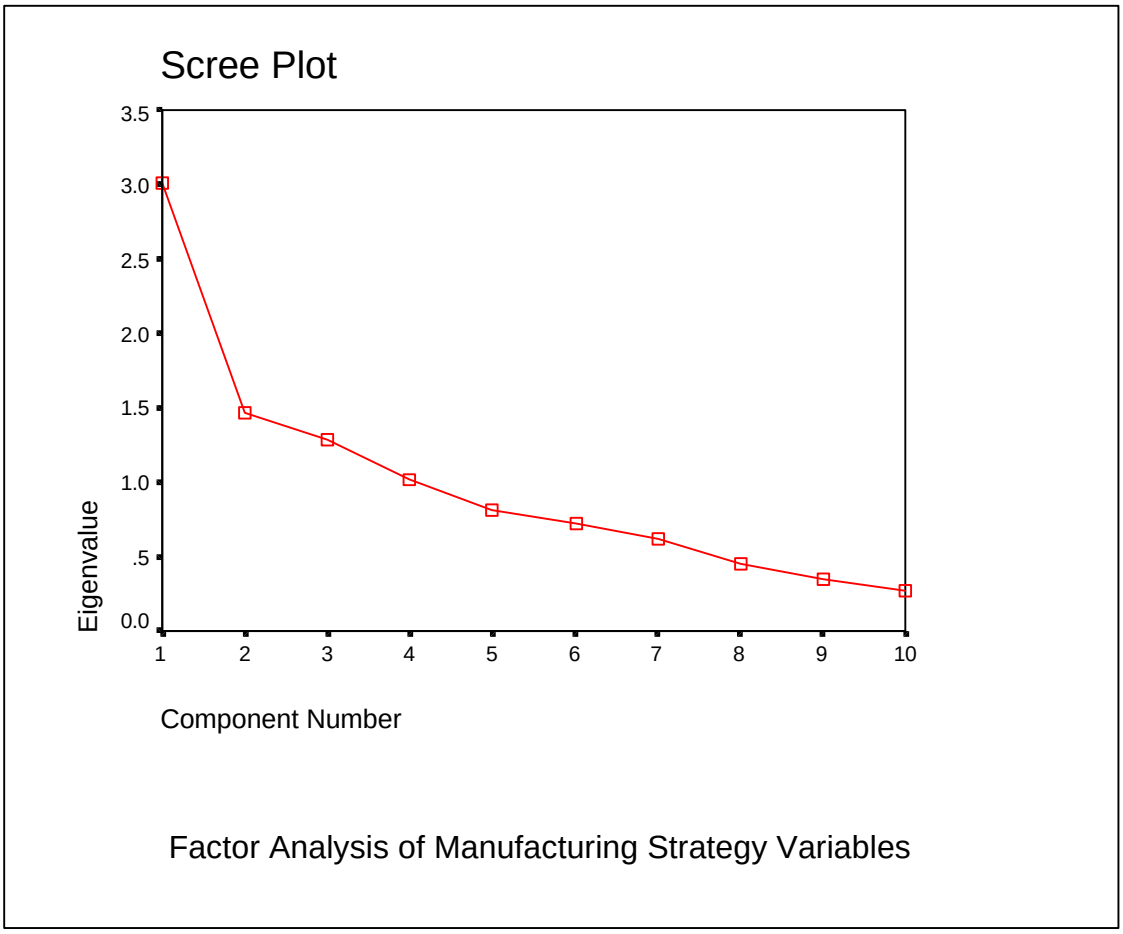

Figure 5. Scree Plot from Factor Analysis on Manufacturing Strategy Variables

Table 13.

Factor Analysis of Manufacturing Strategy Variables

	Factor Loadings	Eigen-value	% of Variance	Cronbach's Alpha Coefficient
1. Flexibility		3.00	30.1	.79
Flexibility in Manufacturing	.83			
Flexibility in Management Style	.90			
2. Environmental Consciousness		1.47	14.66	n/a
Environmental Consciousness	.77			
3. Product Attributes		1.29	12.87	.64
Unit Cost	.73			
Quality of Product	.84			
4. Lot Sizes		1.02	10.15	n/a
Lot Sizes	.89			

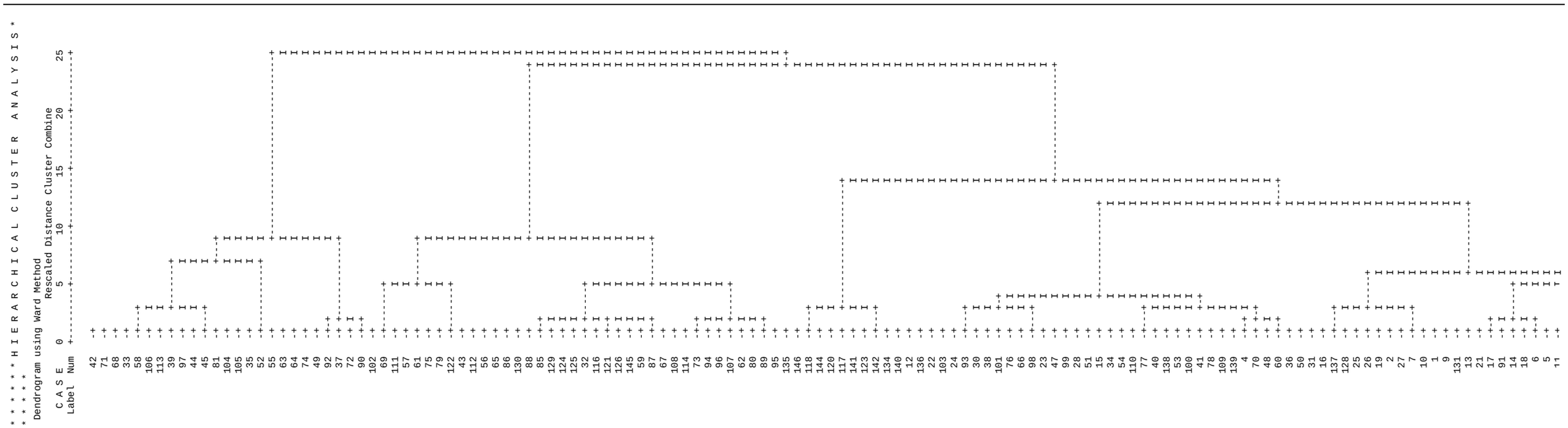

Figure 6. Dendrogram of Clusters of Respondents Using Manufacturing Strategy Factors.

two and increasing the cluster size one integer at a time. After each cluster size was processed, the ANOVA report for the cluster membership was reviewed. A cluster group of four was the point at which significant differences (p = .000) appeared among the manufacturing strategy factors, without creating a cluster with only one member. This further supports the interpretation of four cluster groups (i.e., Cluster A, Cluster B, Cluster C, Cluster D) from the sample. Thus, the null hypothesis that states manufacturing strategy groups of SAMs do not differ based on manufacturing strategy was rejected. The concept of a model of manufacturing strategies as proposed by Bordogna (1996) and Sweeney (1991) is supported in SAMs.

Discussion of Factors. Flexibility, in manufacturing and management style, was found to be a major contributor to the variances in the clusters. Flexibility is a key factor in the competitive structure of being a small business. Research states that being a small apparel manufacturer affords a great advantage over large manufacturers, who in theory, cannot make quick changes in production equipment, labor, processes, and lot sizes (Aggarwal, 1997; Armfield, 1994; Clark, 1997). As reported in Table 14 and graphed in Figures 7 to 10, all of the clusters perceived their manufacturing and management styles to be at least moderately to highly flexible. Significant differences among the means for flexibility did exist, indicating that some clusters perceived themselves as more flexible than did others. Cluster B reported the highest degree of flexibility (μ = 4.77), Cluster D the least flexible (μ = 2.60). Clusters A and C reported a *moderately high* degree of flexibility. Surprisingly, not all clusters that reported more than a *moderate* level of flexibility in reported *moderately small* to *small* lot sizes. This finding may still support previous research findings that suggest the presence of flexibility usually accompanied by smaller lot sizes, if the lot sizes perceived by all clusters would be classified as small when comparing lot sizes to the general population of apparel manufacturers. This situation, uncertainty of lot size as compared to previous literature, is best solved with future research that would quantify the SAMs lot sizes.

Adherence to environmental laws and regulations is an increasing concern for all manufacturers, including SAMs. The United States has increased laws and regulations for the emission of pollutants in the air and water, accumulation of waste products, and the general conservation of all natural resources (Menon & Menon, 1997). The majority of SAMs produce apparel products for the domestic market, one that is technically advanced and educated and has access to national, as well as, to international news on issues of the environment. Clusters A and B reported significantly different levels of *moderately high* environmental consciousness; whereas, Clusters C and D's were similar in their perceived *moderate* levels of environmental consciousness (see Table 14). Environmental consciousness may have emerged as a factor for SAMs' manufacturing strategies because of the limited financial resources available to implement/purchase reduced or pollutant free equipment or processes, and the need to present environmentally conscious behaviors to meet the demands of their customers.

Table 14.

Means for Manufacturing Strategies Factors for Clusters One to Four

	Group Means					Multi-variate F
	A	B	C	D	Uni-variate F	1456.74***
Flexibility	3.93[a,b]	4.77[a,c,d]	3.60[c,e]	2.60[b,d,e]	20.772***	
Environ-mental Conscious-ness	3.75[a,b,c]	4.38[a,d,e]	2.72[b,d]	3.19[c,e]	11.517***	
Product Attributes	3.97[a,b,c]	4.50[a,d]	3.08[b,d,e]	4.38[c,e]	28.199***	
Lot Size	3.24[a,b,c]	1.38[a]	1.97[b]	1.65[c]	27.308***	
	n = 71	n = 13	n = 36	n = 26		

Note: Significant differences between pairs are indicated by identical superscripts at $p = \leq .05$.

***$p \leq .001$

Scale: 1 = low/short, 3 = moderate, 5 = high/long

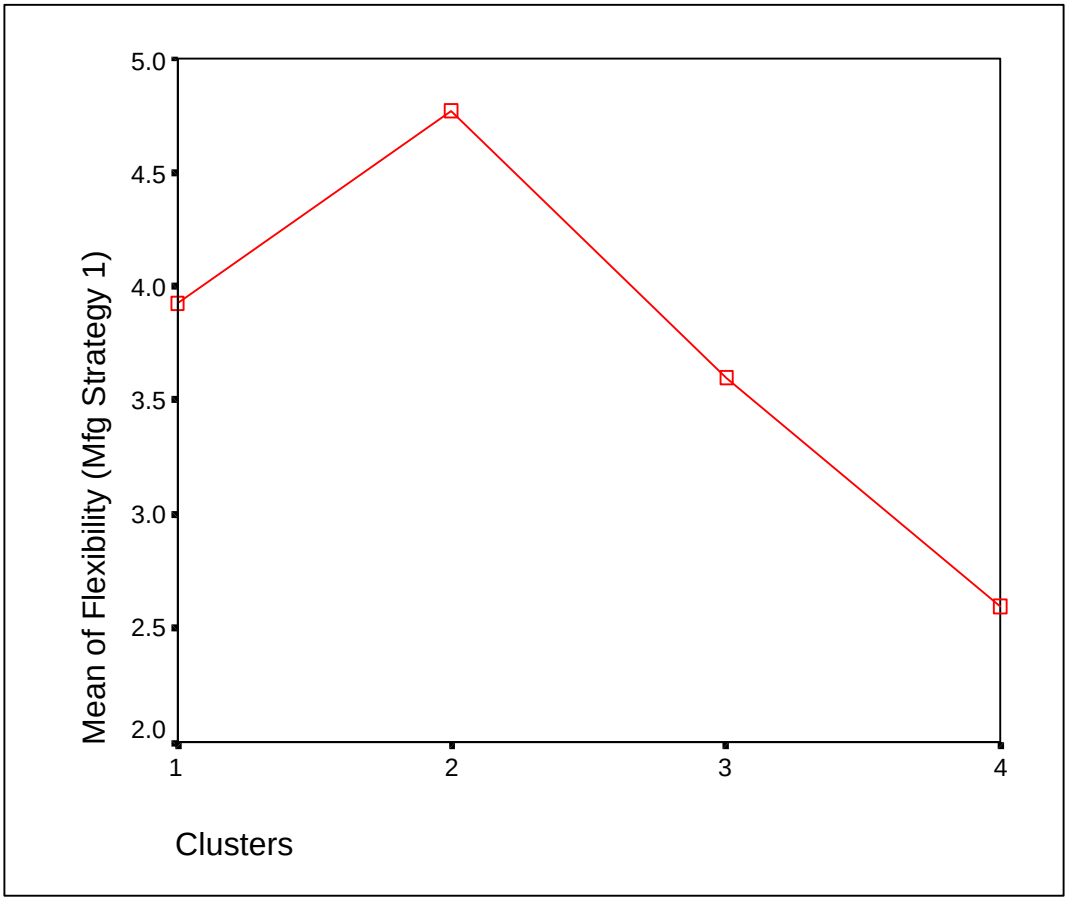

Figure 7. Means Plot of Manufacturing Strategy Factors (Flexibility) Using Original Measurement Scale.

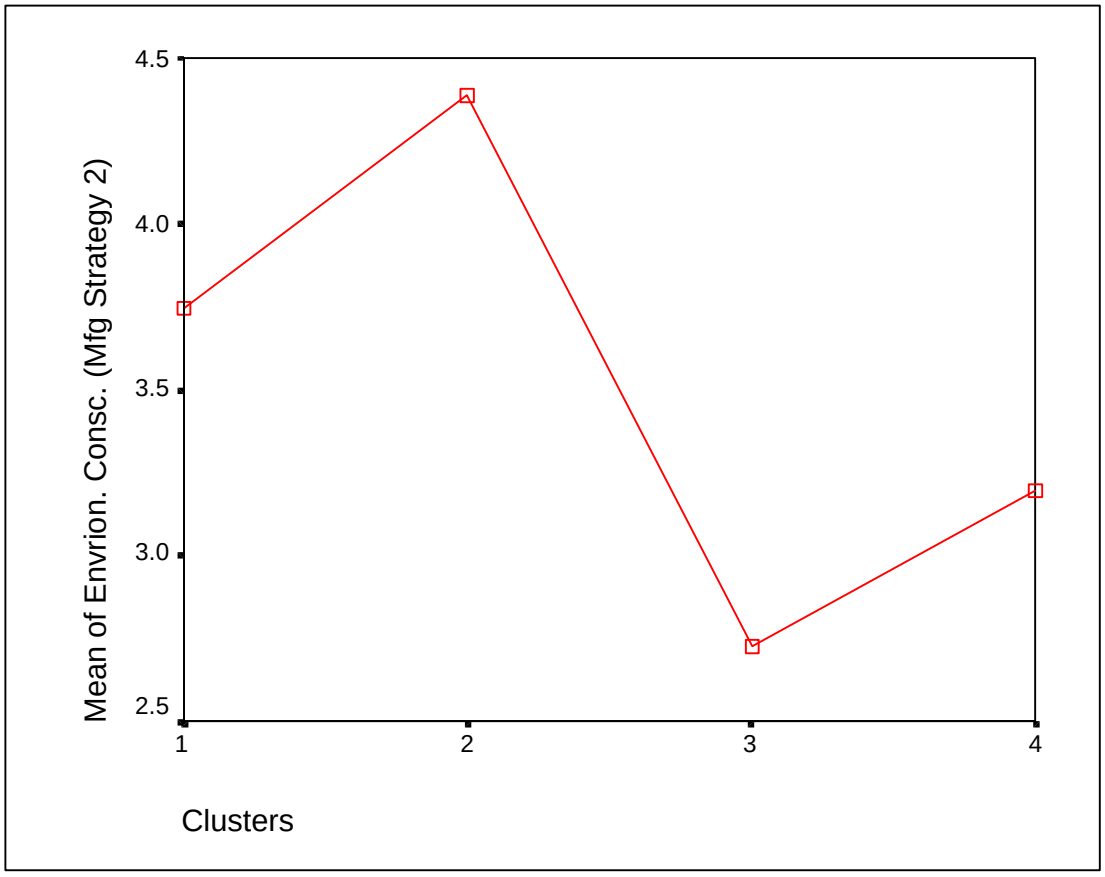

Figure 8. Means Plot of Manufacturing Strategy Factors (Environmental Consciousness) Using Original Measurement Scale.

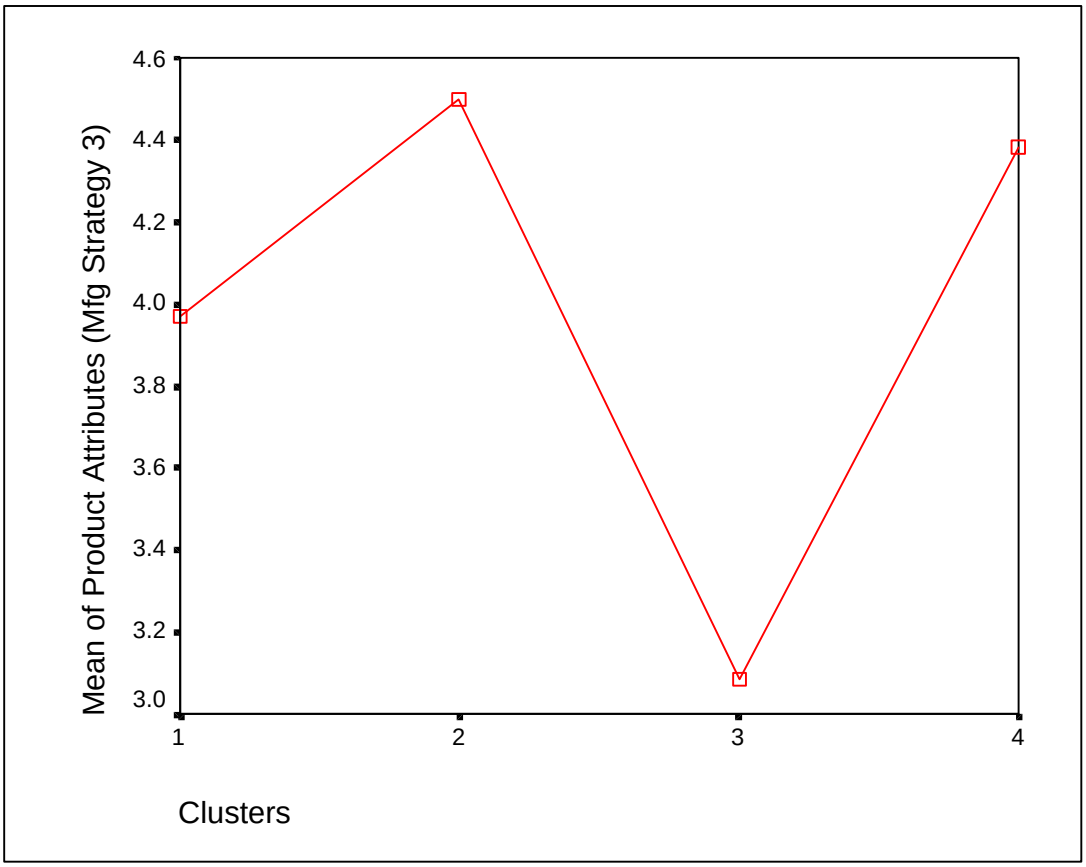

Figure 9. Means Plot of Manufacturing Strategy Factors (Product Attributes) Using Original Measurement Scale.

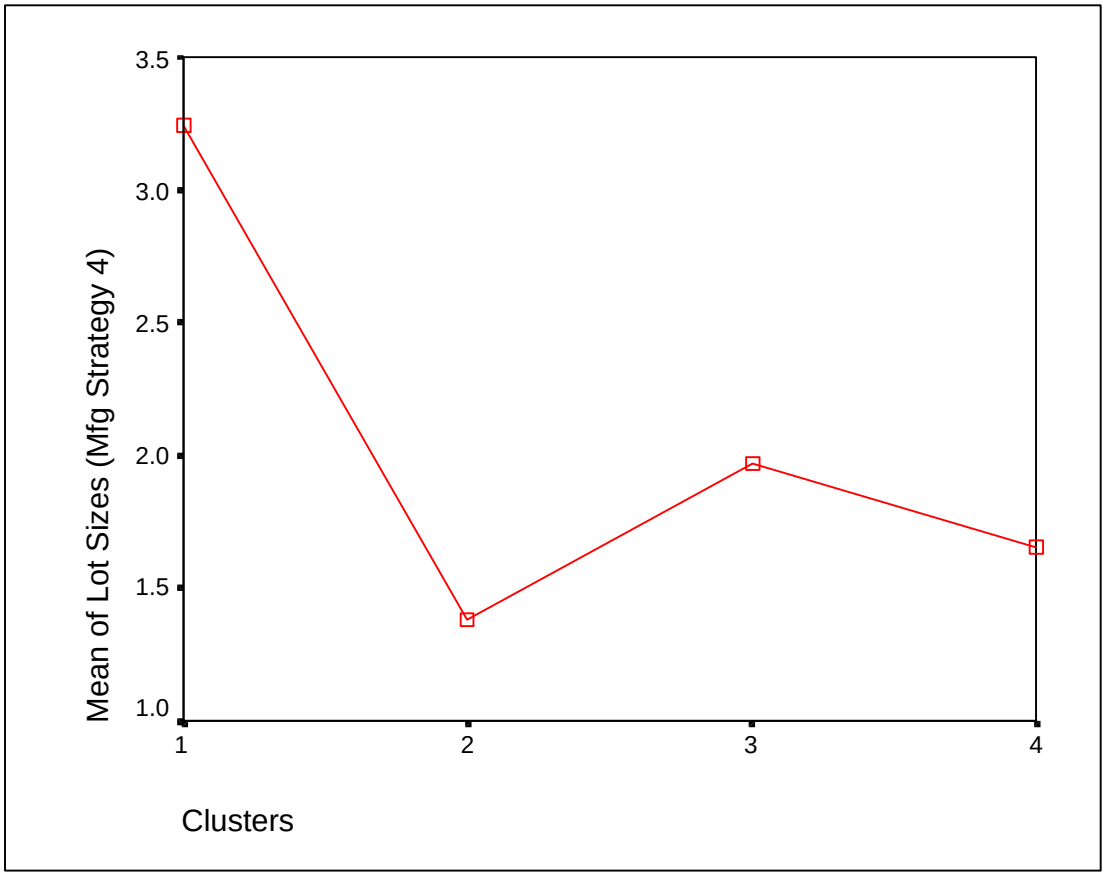

Figure 10. Means Plot of Manufacturing Strategy Factors (Lot Size) Using Original Measurement Scale.

The product attributes factor emerged as a combination of unit costs and product quality. No significant differences existed between Cluster B's perceived *high* level of product attributes and Cluster D's *moderately high* level of product attributes (see Table 14). But, a significant difference did exist between Cluster A and D's *moderately high* product attributes, where Cluster D had the higher product attribute. The significance of product attribute parallels research findings on small manufacturers, which suggest that in addition to flexibility, domestic firms, as well as, small firms should focus on competing with quality, often unattainable from low cost production or imports from less developed countries (Christerson, 1994; DuBois et al., 1993). This also supports the finding that the women's wear accounted for the largest percentage of product classifications for all employee size groupings.

The final factor, lot size, is a pivotal issue for two other manufacturing factors, flexibility and product attributes. Lot sizes of a product can predetermine the degree of flexibility production and accepting new production contracts (Lin, et al., 1995). Lot sizes also can dictate the degree to which unit costs can be reduced. Clusters B, C, and D perceived their product attributes to be *moderate* to *high* and lot sizes *moderately small* (see Table 14). Cluster C's product attributes, although the lowest of all clusters (i.e., moderate), their lot sizes were as *small* as Clusters B and D. Cluster A's lot size was significantly higher than the other three clusters, and had the third highest level of product attributes. Unlike larger apparel manufacturers, it is difficult for SAMs, in general, and the less automated SAMs to realize economies of scale in production. Therefore, the overall smaller lot sizes produced by SAMs may contribute to the reports of higher product attributes; even for specialized or customized products and mass-produced products.

H_0. Manufacturing strategy groups of SAMs do not differ based on manufacturing environmental factors.

H_2. Manufacturing strategy groups of SAMs differ based on manufacturing environmental factors.

Factor analysis was used first to determine the interdependence among the environmental variables for customer services and operations and for barriers and assistance (Kincade, 1988; Kincade & Regan, 1994; Kincade & Vass, 1998; Malhotra, 1993; Shim & Kotsiopolus, 1993). Principal components analysis was use to examine the total variance within the variables.

Customer Service and Operations. The results of the customer services and operations variables revealed high test statistics for Bartlett's test of sphericity (1050.351, $p \leq .000$) and KMO (.826), which supports the use of factor analysis for the customer service and operations variables. The results of the factor analysis for customer services and operations variables revealed five factors with Eigenvalues greater than 1.0 and that accounted for 64.9 percent of the total variance. A visual examination of scree plots, shown in Figure 11, supported the emergence of five factors.

The results of the varimax rotation, shown in Table 15, indicate 15 of the 19 variables significantly loading on one of the five factors. The four variables (i.e., customer specifications, lot sizes, use of computer technology, number of product lines) that did not have a significant association with any of the factors were discontinued from further analysis. The Cronbach alpha test for interdependence among the variables associated with a factor ranged from .67 to .89, where the timing factor received less than .7. This factor was included in subsequent testing due to research showing the importance of domestic production in proximity to the customers and retailers (Christerson & Appelbaum, 1995; DuBois, et al., 1993). This finding confirms the factors found in previous research on a more diverse population of apparel manufacturers (Kincade & Regan, 1994; Kincade & Vass, 1998).

To report on the factors using the original scale, variables that loaded onto a factor were averaged, creating the five new variables: (a) *customer services*, (b) *education/industry awareness*, (c) *flexibility*, (d) *timing*, and (e) *unit costs*. MANOVA was used to determine the overall difference in means for the five factors and the four clusters, the result was $F = 25.44$ ($p = .000$). The results of the MANOVA and Univariate testing are reported in Table 16, means are graphed in Figures 12 through 16. Univariate testing with post hoc Least Square Differences (LSD) was used to determine which factors were significantly different among clusters and where those differences occurred. The testing revealed significant differences between clusters for all factors except for unit costs factor ($F = .277$, $p = .842$), where all respondents reported unit costs *increasing slightly* over the past three years.

The group of variables that represent the customer services, supports findings from previous research that used the variables to define customer service (Kincade & Regan, 1994; Ko & Kincade, 1993). Cluster A reported the highest mean for all of the factors for customer service and operations factors. On average, respondents in Cluster A reported slight increases in customer service, education/industry awareness, flexibility, timing, and unit costs over the past three years. The respondents in all four clusters perceived that unit costs and flexibility were *increasing slightly*.

Only Clusters A and B reported an increase in the use of education/industry awareness, and both reported the highest levels of increases for flexibility. The increase in education and industry awareness may account for Cluster A's increased customer service, who with the larger lot sizes of all the clusters, may not be able to compete on speed, and for Cluster B's decrease in delivery times and/or length of production cycles, who reported the lowest level of lot sizes and the highest degree of flexibility. These findings, when viewed with the results of perceived levels of unit costs for the manufacturing strategies, suggest that as SAMs have become more specialized and niche-oriented (e.g., smaller lot sizes, increased flexibility, relatively high quality

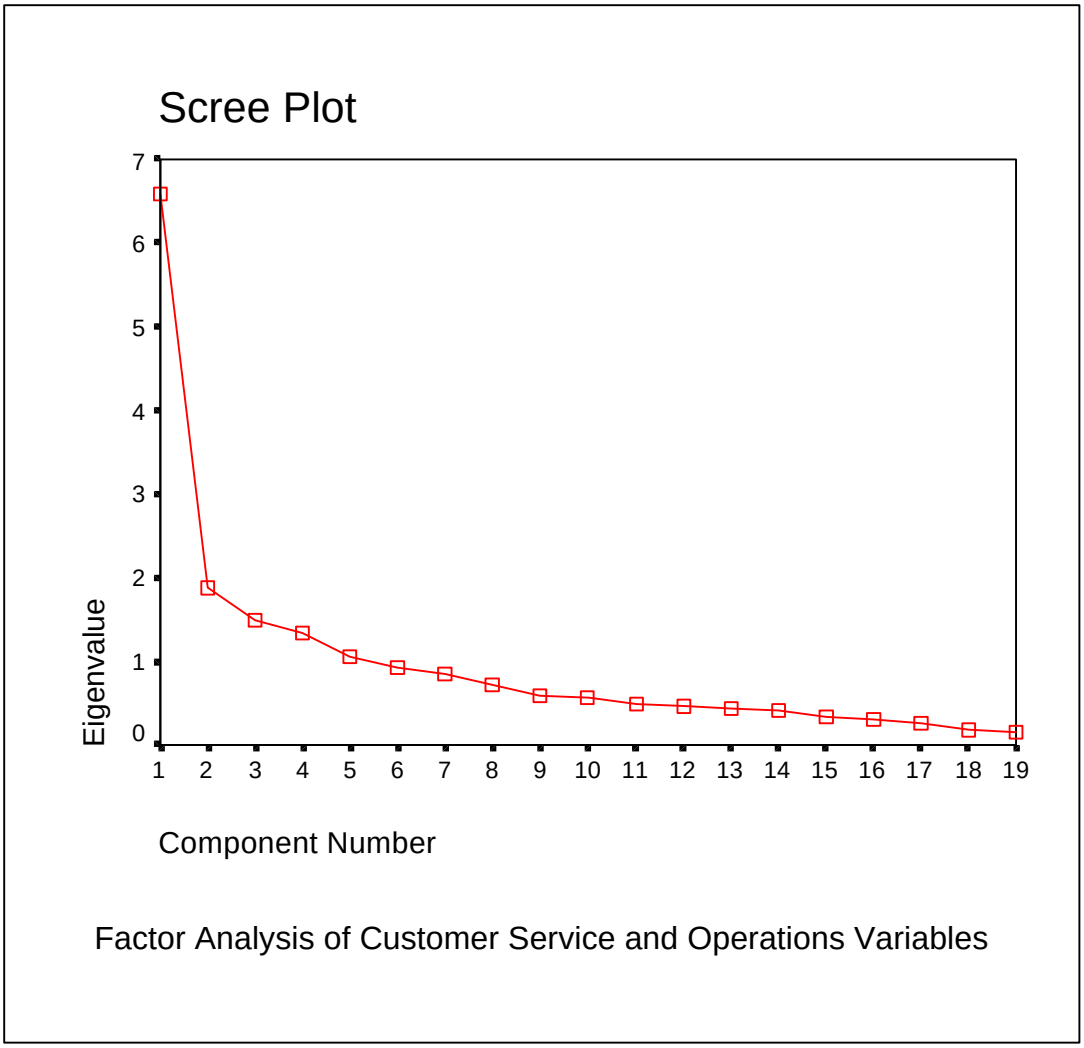

Figure 11. Scree Plot of Factor Analysis on Customer Service and Operations Variables.

Table 15.

Factor Analysis of Customer Service and Operations Variables

	Factor Loadings	Eigen-value	% of Variance	Cronbach's Alpha Coefficient
1. Customer Services		6.60	34.7	.89
Customer Reorders	.72			
Retailers as Customers	.79			
Customer Contacts	.82			
Target Markets	.77			
Customer Shipments	.83			
2. Education/Awareness		1.87	9.86	.77
Worker's Education/Training	.78			
Owner/Manager Education/Training	.77			
Environmental Consciousness	.67			
Use of Trade Associations	.76			
3. Flexibility		1.48	7.79	.83
Quality of Product	.79			
Flexibility in Manufacturing	.82			
Flexibility in Management Style	.80			
4. Timing		1.32	6.98	.67
Delivery Times	.70			
Length of Production Times	.84			
5. Unit Costs		1.06	5.60	n/a
Unit Costs	.68			

Table 16.

Multivariate and Univariate Results for Customer Service and Operations Factors

	Group Means					Multi-variate F
	A	B	C	D	Uni-variate F	25.44***
Customer Service	.57[a,b]	.00	-.00[a]	-.44[b]	8.99***	
Education/ Industry Awareness	.43 [a,b]	.31[c]	.00[a]	.00[b,c]	8.71***	
Flexibility	.88[a,b]	.49	.37[a]	.41[b]	5.92***	
Timing	.33[a,b]	-.35[a]	.00[b]	.00	3.59***	
Unit Costs	.74	.62	.58	.69	.28	
	n=68	n=13	n=36	n=26		

Note: Significant differences between pairs are indicated by identical superscripts at $p = \leq .05$.

***$p \leq .001$

Scale: -2 = decrease greatly, -1 = decrease slightly, 0 = same, 1 = increase slightly, 2 = increase greatly

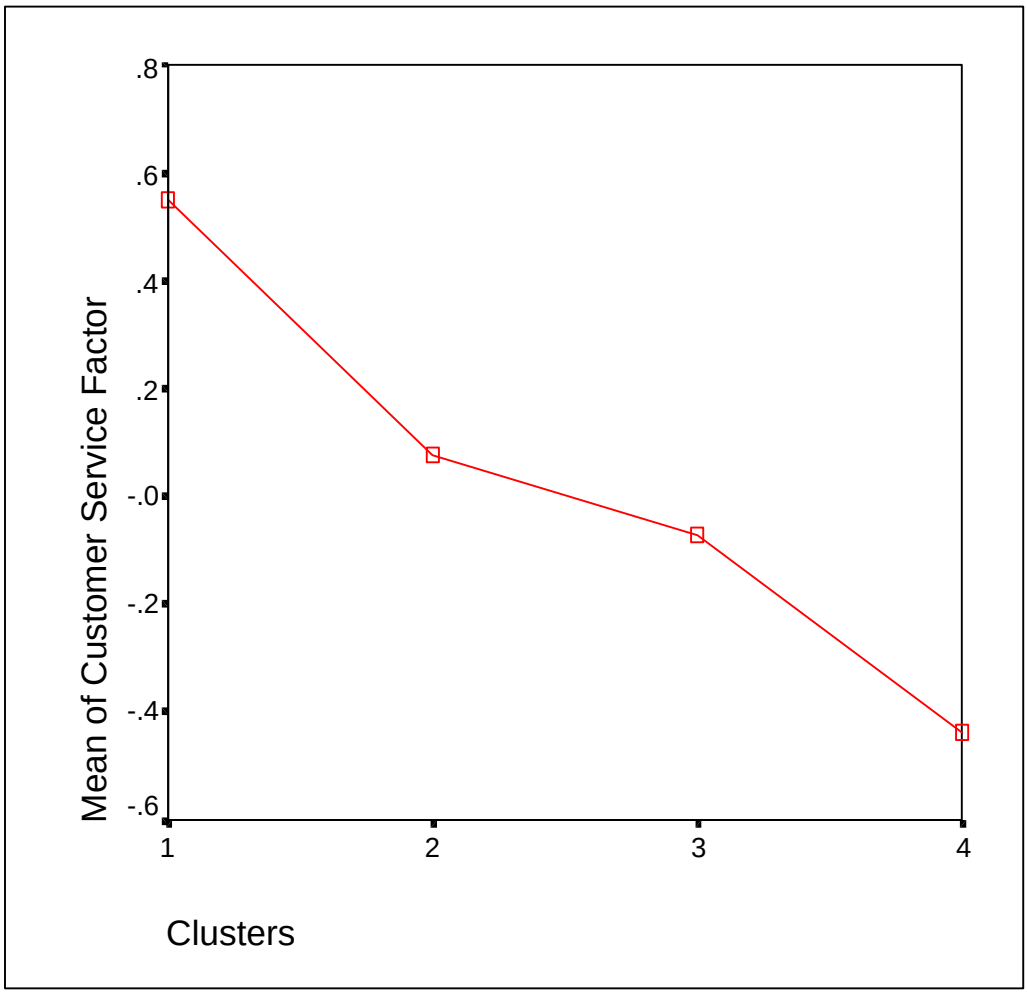

Figure 12. Means Plot of Environmental Factors (Customer Service) Using Original Measurement Scale.

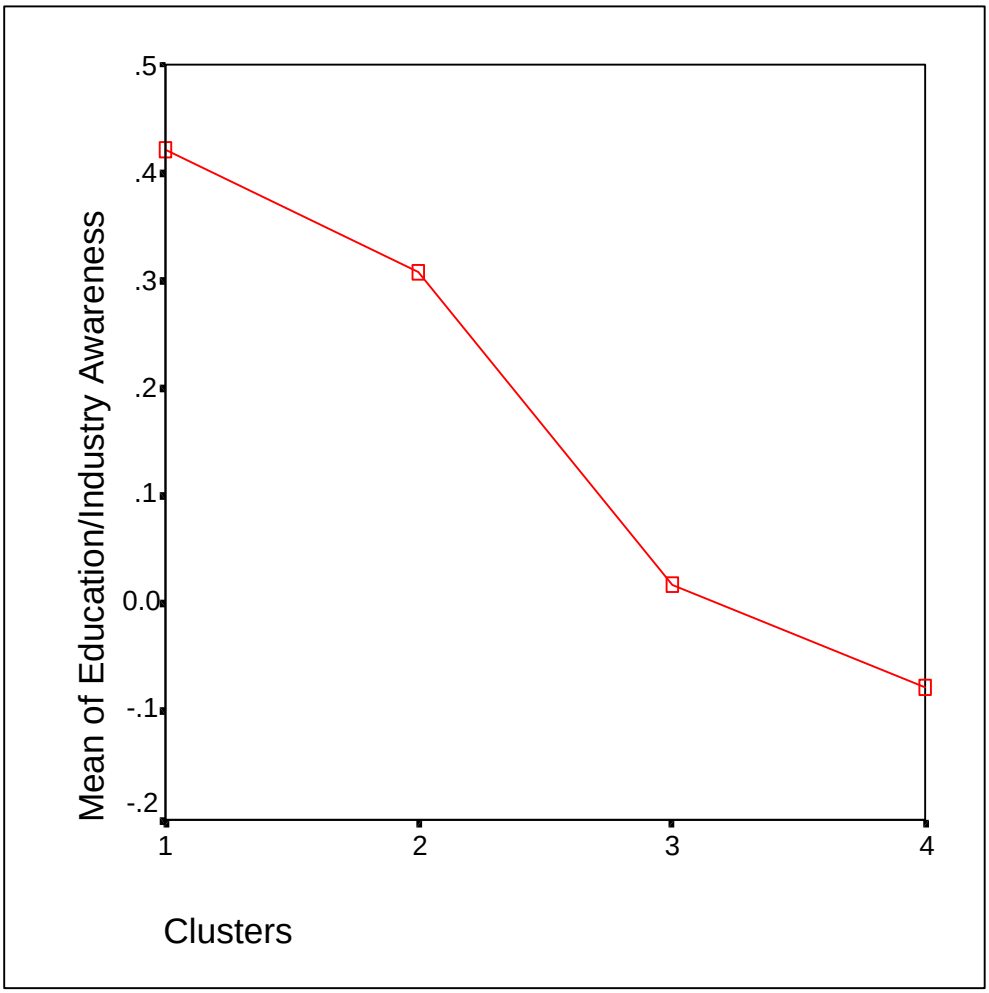

Figure 13. Means Plot of Environmental Factors (Education/Industry Awareness) Using Original Measurement Scale.

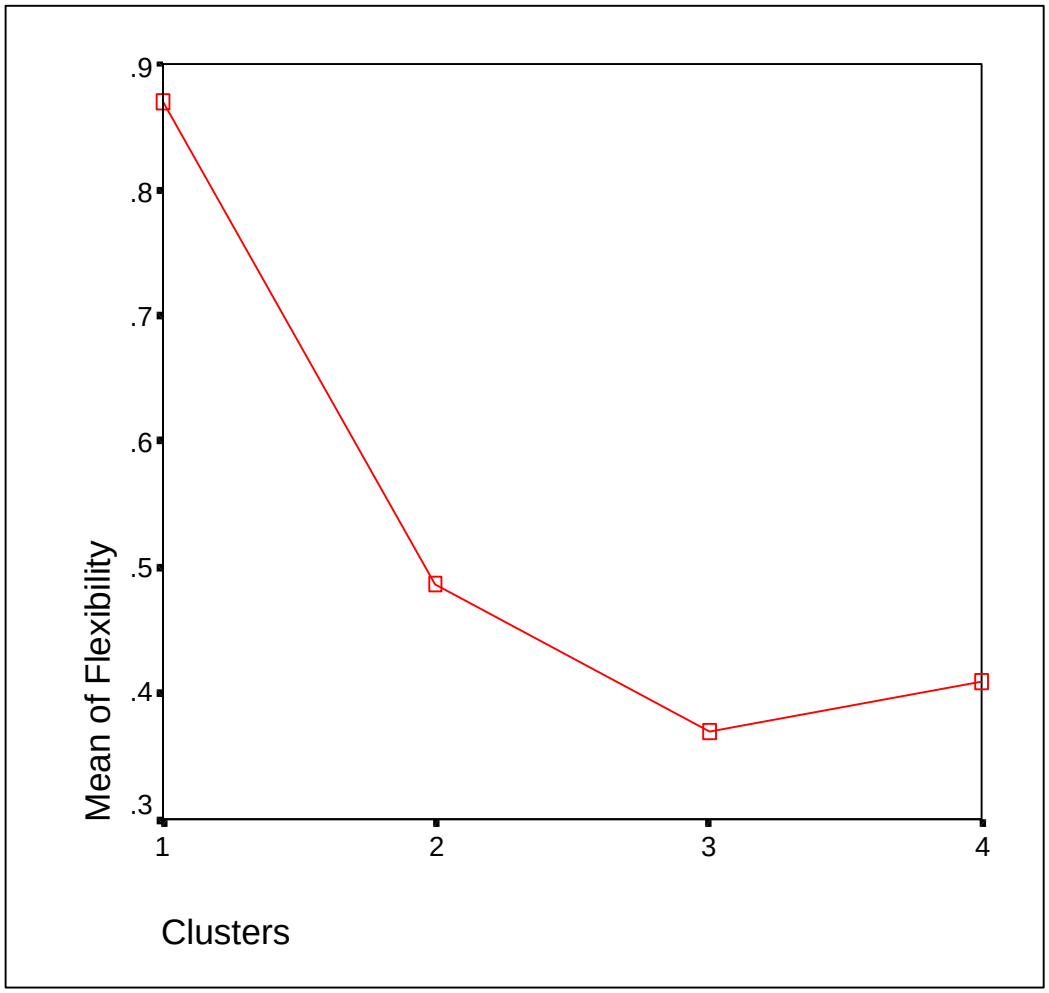

Figure 14. Means Plot of Environmental Factors (Flexibility) Using Original Measurement Scale.

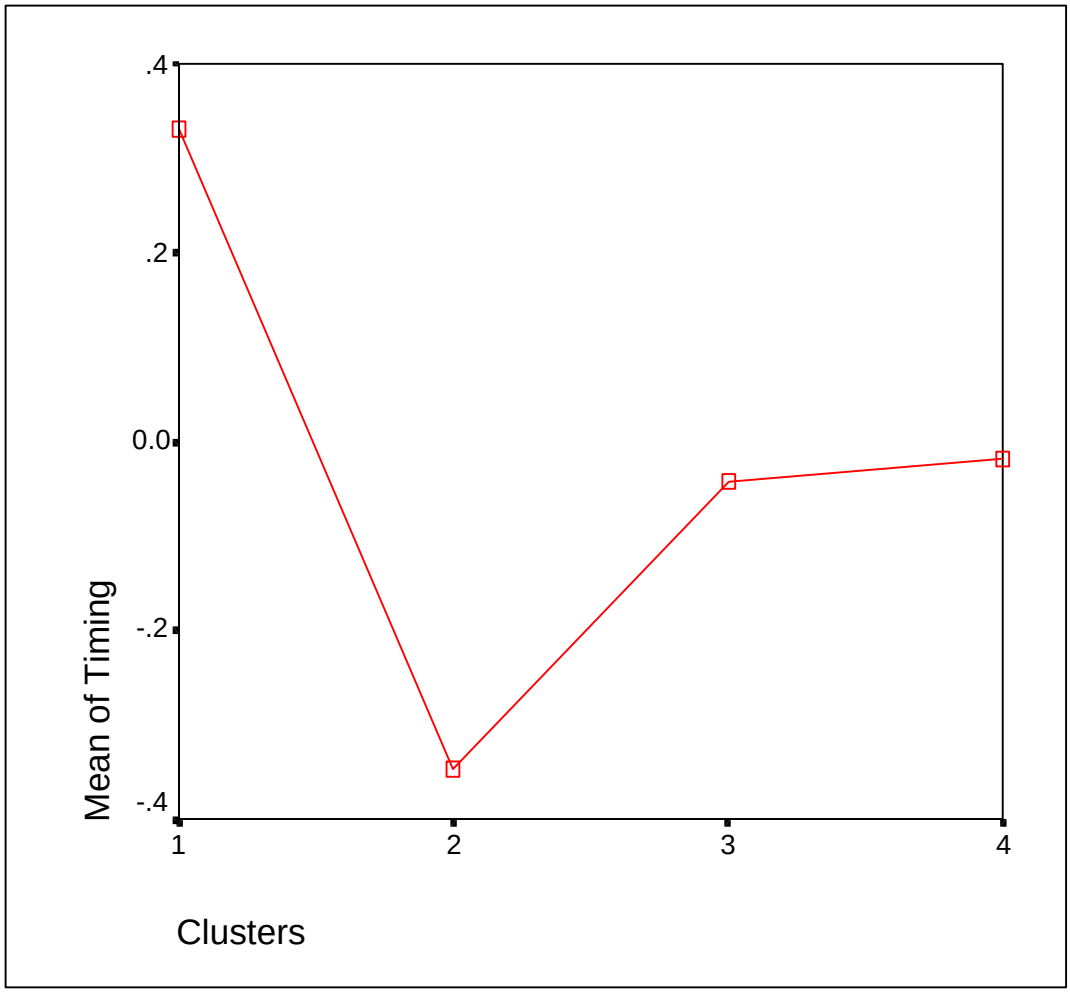

Figure 15. Means Plot of Environmental Factors (Timing) Using Original Measurement Scale.

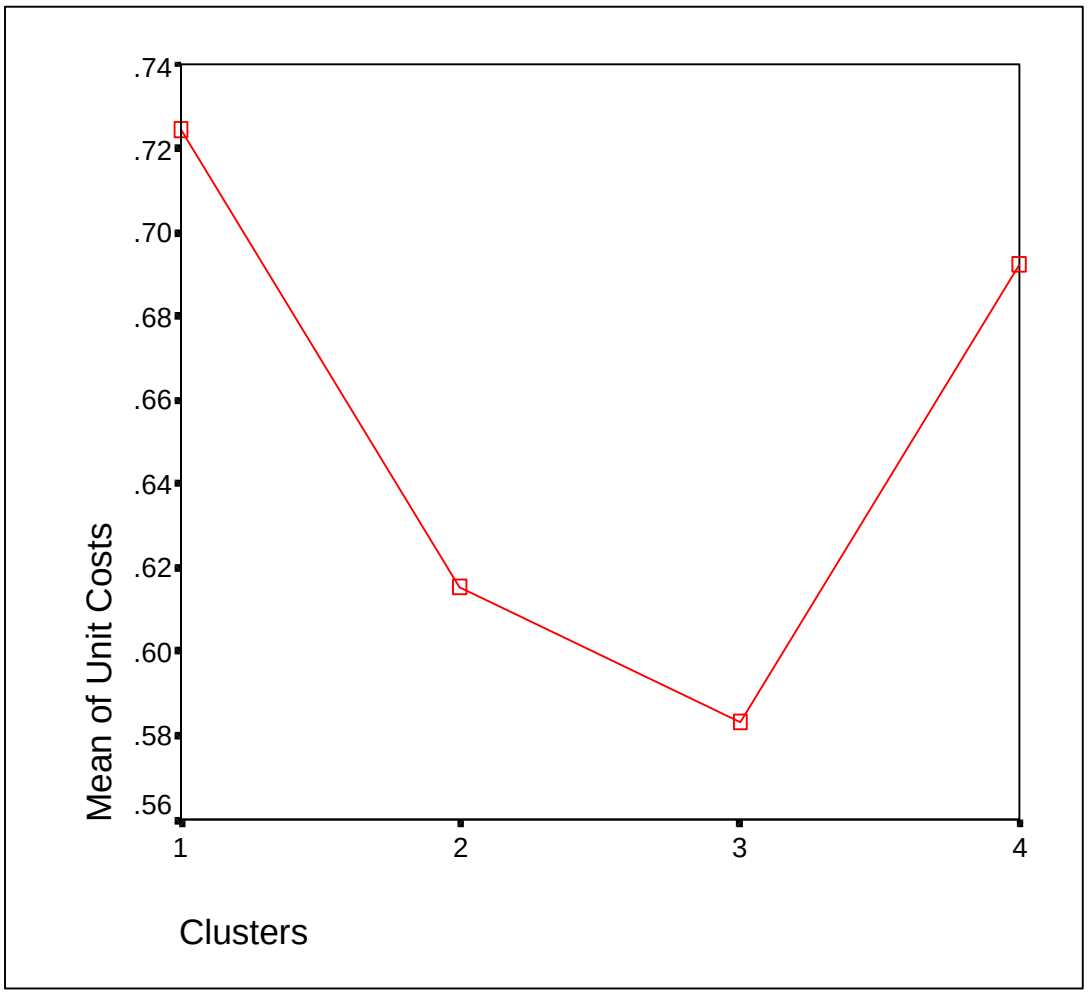

Figure 16. Means Plot of Environmental Factors (Unit Costs) Using Original Measurement Scale.

products) unit costs have increased. The findings support previous research on how smaller domestic manufacturers can compete in a cost based industry, without having to compete with cost (Christerson, 1994; Christerson & Appelbaum, 1995; DuBois, et al., 1993).

Barriers and Assistance. The results of the factor analysis for barriers and assistance variables revealed high test statistics for Bartlett's test of sphericity (956.348, $p \leq .000$) and KMO (.747), which supports the use of factor analysis for the barrier and assistance variables. The results of the factor analysis revealed six factors with Eigenvalues greater than 1.0 and accounted for 66.3 percent of the total variance. A visual examination of scree plots, which are shown in Figure 17, supported the emergence of six factors. The results of the varimax rotation, reported in Table 17, show 14 of the 18 variables significantly loading on one of the six factors. The range of alphas for the six factors was .51 to .81. The three factors with the highest Eigenvalues were (a) production resources, (b) technology/automation, and (c) consistency in sales. These factors are similar to those found by Kincade and Vass (1998): high costs and uncertainty in demand. The four variables (i.e., difficult communication with customers, other, training for production workers, better color information) that did not have a significant association with any of the factors were discontinued from further analysis.

Import reductions was retained based on prior research indicating that imports have had a significant impact on the US apparel industry (Kincade, 1988; Dickerson, 1999) and comments from respondents who perceived imports as a factor in the reduction of the apparel production in the United States. Likewise, uncertainty in sales [demand] was retained based on prior research (Lin, et al., 1995) and comments from respondents. A complete list of respondents' comments reported in Appendix D1, a list of comments from respondents with 50 or more employees are included in Appendix D2. The sixth factor, other, was dropped from the analysis because of the inconsistency of the items reported by respondents. In addition, several respondents specified other barriers or assistance, but failed to indicate a rating on the appropriate scale, these items are reported in Appendix D3.

The second step of the data analysis of environmental factors was to determine if differences in the remaining five new factors for barriers/assistance existed among the four clusters of manufacturing strategy groups. As in the factors for customer service and operations, the barrier and assistance variables for each factor were averaged, creating the five new variables: (a) *production resources*, (b) *technology/automation*, (c) *consistency in sales*, (d) *investment capital*, and (e) *import reductions*. Results from MANOVA testing revealed $F = 137$ ($p = .000$), indicating significant differences did exist between the cluster based on the factors. The results of ANOVA testing, which are reported in Table 18, indicated that the significance between the variables were attributed to technology/automation ($F = 4.64$, $p = .004$) and import reductions ($F = 3.66$, $p = .014$), specifically Cluster A viewed technology as more of a barrier than did

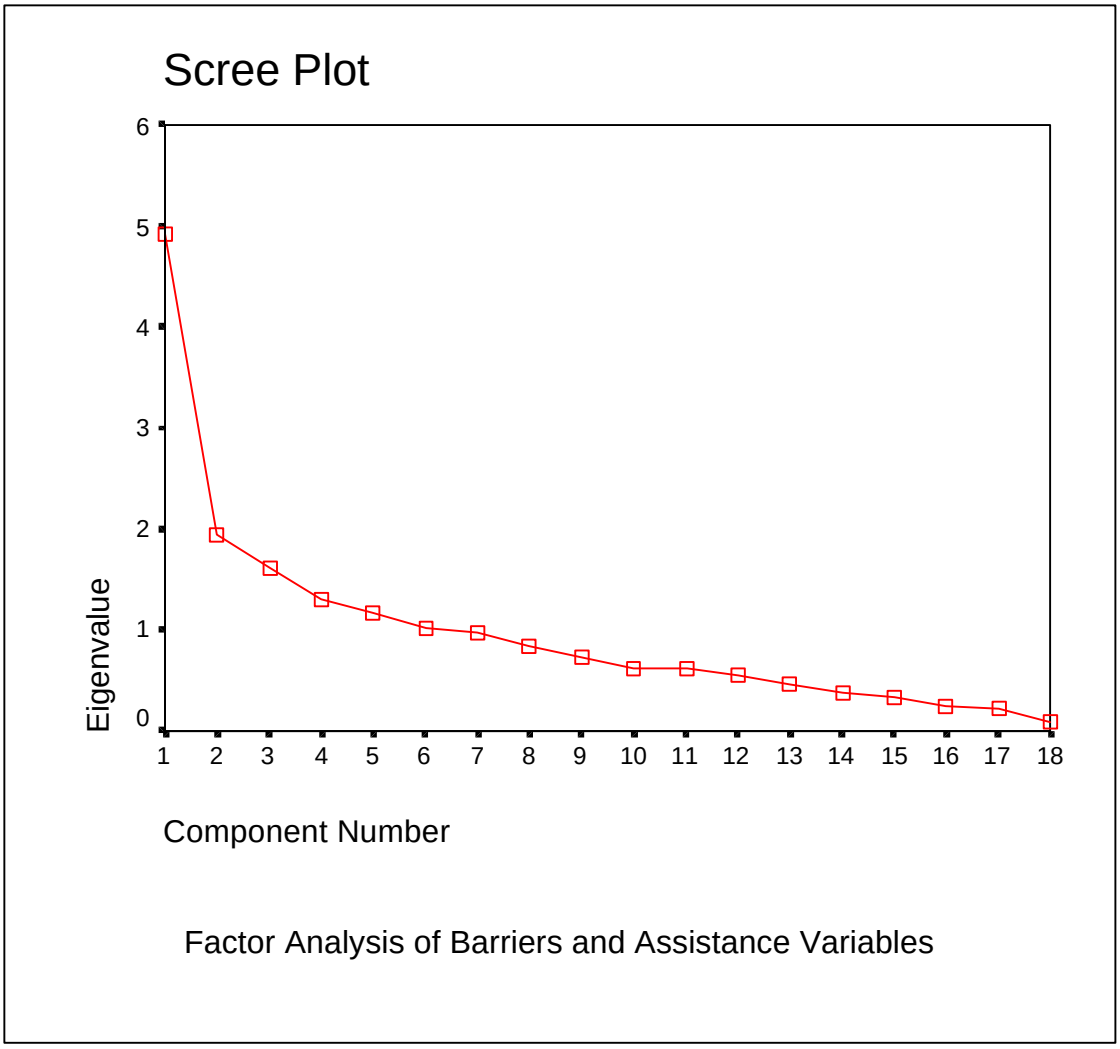

Figure 17. Scree Plot of Factor Analysis on Barriers and Assistance Variables.

Table 17.

Factor Analysis of Barriers and Assistance Variables

	Factor Loadings	Eigen-value	Variance	Cronbach's Alpha Coefficient
1. Production Resources		4.92	27.37	.77
High Cost of Equipment	.67			
Lack of Trained Employees	.82			
Retention of Employees	.72			
Need Specialized Equipment	.65			
2. Technology/Automation		1.94	10.78	.81
Improve Electronic Communication With Customers	.87			
Improve Electronic Communication With Suppliers	.88			
More Automated Sewing Equipment	.63			
3. Consistency in Sales		1.60	8.89	.57
Uncertainty in Sales Volume	.62			
Retailers in Bankruptcy	.69			
4. Investment Capital		1.30	7.23	.80
Lack of Capital Funds	.85			
Loans for Capital Investment	.81			
5. Import Reductions		1.16	6.47	.68
Reduce Imports of Textiles	.71			
Reduce Imports of Apparel	.85			
6. Other		1.00	5.58	n/a
Other Assistance (subject defined)	.90			

Table 18.

Multivariate and Univariate Results for Barriers and Assistance Factors

	Group Means					Multi-variate F
	A	B	C	D	Uni-variate F	171.67 ***
Production Resources	2.41	2.27	2.23	2.11	.698	
Technology/ Automation	2.60[a,b]	2.31	2.00[a]	1.77[b]	4.642*	
Consistency in Sales	2.87	2.92	2.89	3.33	1.076	
Investment Capital	2.70	2.50	2.38	2.48	.423	
Import Reductions	2.91[a,b]	1.73[a,c]	2.75[c]	2.13[b]	3.658*	
	n=71	n=13	n=36	n=26		

Note: Significant differences between pairs are indicated by identical superscripts at $p = \leq .05$.

***$p \leq .001$, *$p \leq .05$

Scale: 1= no barrier, 3 = some barrier, 5 = major barrier (Scale: 1= no assistance, 3 = some assistance, 5 = major assistance)

Clusters C and D. The means for each factor are graphed in Figures 18 to 22. Clusters A and C reported the need for the reduction of imports more so than Clusters B and D.

No significant differences existed among the four clusters for production resources, consistency in sales, and investment capital, where all four perceived the factors as somewhat a barrier. The high cost of equipment, lack of trained employees, retention of employees, and the need for specialized equipment supports research findings that domestic apparel labor is competing with other domestic industries. Smaller firms are less likely to implement the latest time saving equipment or processes due to the lack of capital and the skill level needed by employees (Kincade & Vass, 1998). A factor that is related to the perceived barrier of production resources is the barrier of uncertainty in sales [demand]. Smaller firms may be less likely to invest in learning versus training based education, fixed assets, or software that may be rendered obsolete, due to changes in customer requirements for products or services, and changes due to technological advancement. Clusters C and D viewed technology and automation as less of a barrier to profit than did Clusters A and B, who reported *some barrier*. Overall, respondents in each of the four clusters viewed the need for investment capital as a barrier to profit.

The clusters were not uniform in their response to the perception of import reduction. Significant differences existed among the clusters where Clusters A and C perceived the need for the reduction of imports; whereas, Clusters B and D perceived only *somewhat* a need for the reduction of imports. This suggests that Clusters A and C produce general or basic goods that can be produced globally; therefore, their products compete on price which would support reported larger lot size for Cluster A, in addition to the remaining manufacturing strategy factors (i.e., flexibility, environmental consciousness, product attributes). The respondents in Cluster A appear to be competing with imports. They cannot compete on price, but appear to be using high levels of flexibility and higher product quality (i.e., product attributes) to offset the higher required price. However, Cluster C's lot size is significantly smaller than the size reported by Cluster A, which might indicate a loss of competitive edge due the inability to produce larger lot sizes. Clusters B and D reported the least amount of need for the reduction of imports, which would indicate that they produce specialized products or products for niches. This is supported by the clusters' rating *decrease slightly* in customer services to no change in customer service over the last three years. In addition, the low levels of reported increases in education and industry awareness may be attributed the specialized or customized products. It is possible that the education and industry involvement at which they operate are at levels where only marginal efforts are required to maintain competitive standing, or due to the specialized nature of the manufacturing process, educational and industry organizations to support the process are limited. Further analysis via focus groups or interviews are required to further understand the impact of education and industry awareness on this group.

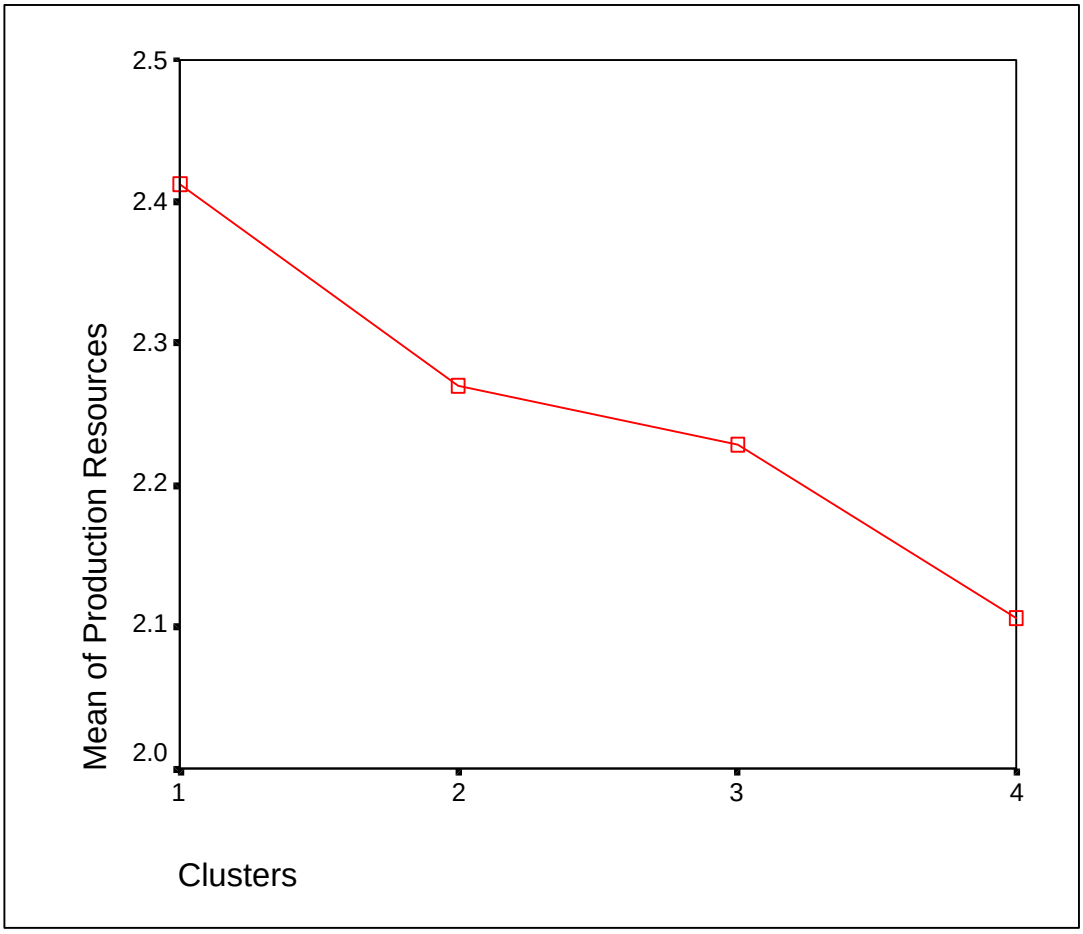

Figure 18. Means Plot of Environmental Factors (Production Resources) Using Original Measurement Scale.

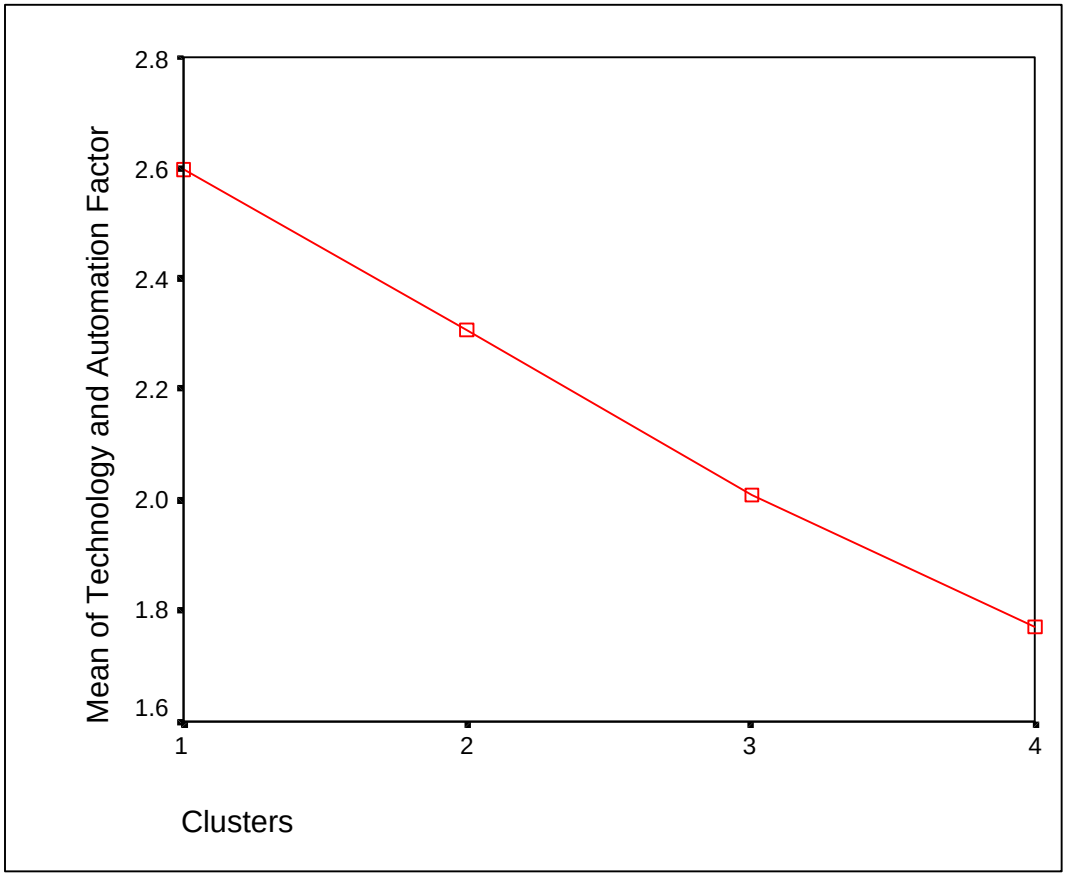

Figure 19. Means Plot of Environmental Factors (Technology/Automation) Using Original Measurement Scale.

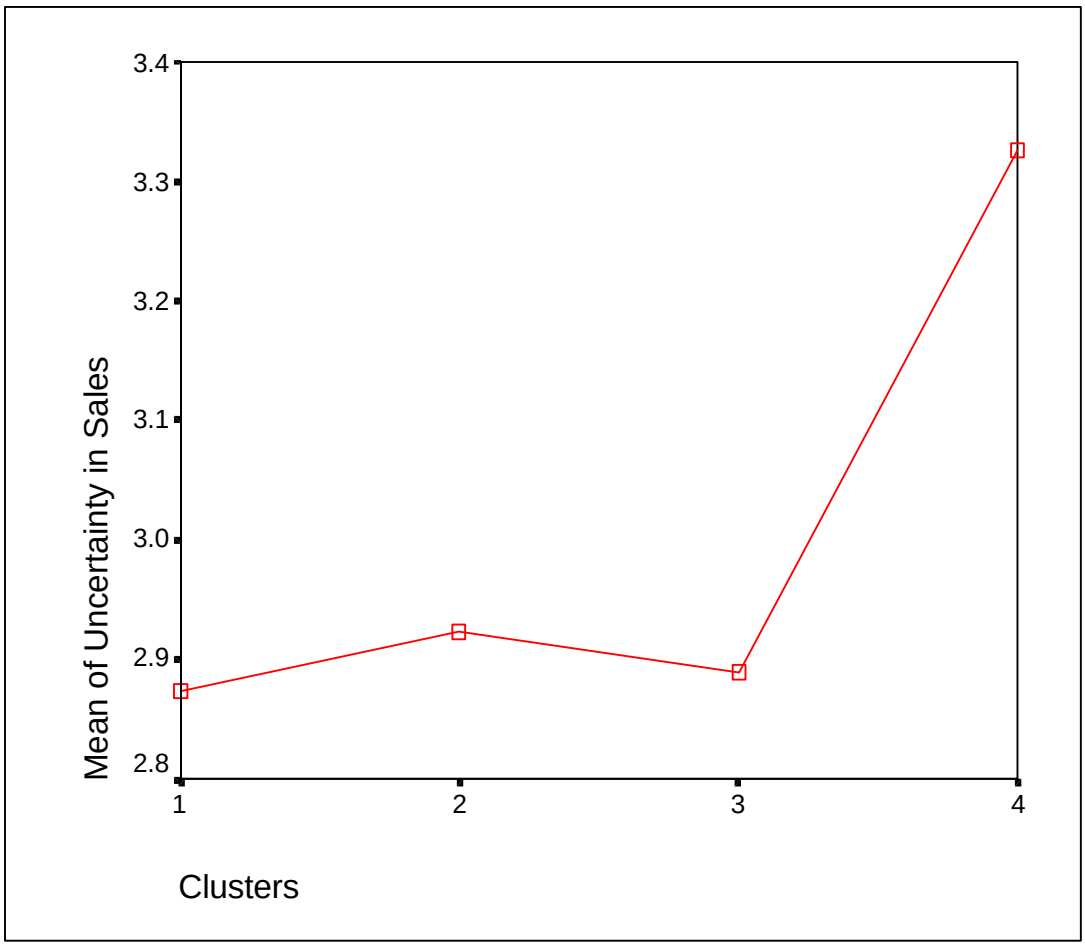

Figure 20. Means Plot of Environmental Factors (Uncertainty in Sales) Using Original Measurement Scale.

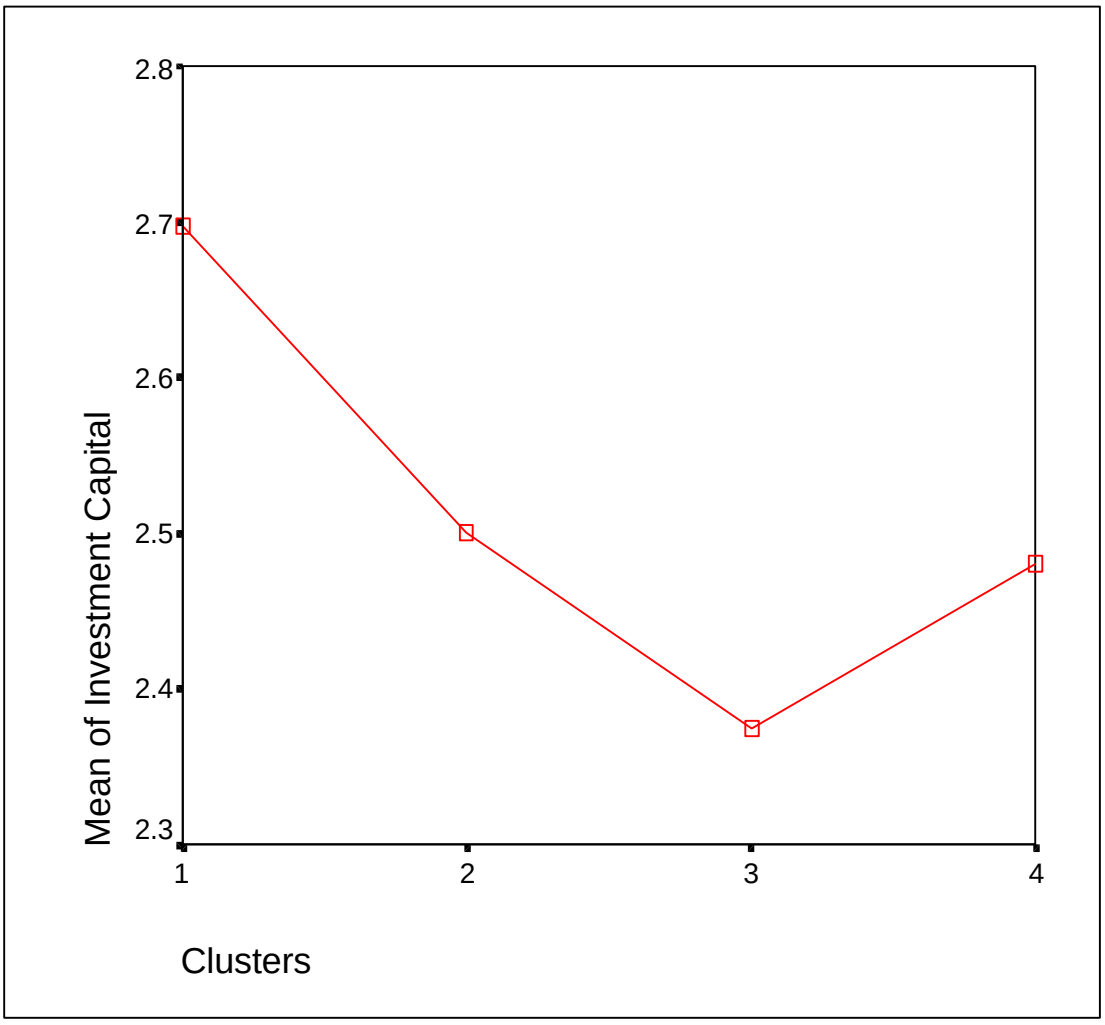

Figure 21. Means Plot of Environmental Factors (Investment Capital) Using Original Measurement Scale.

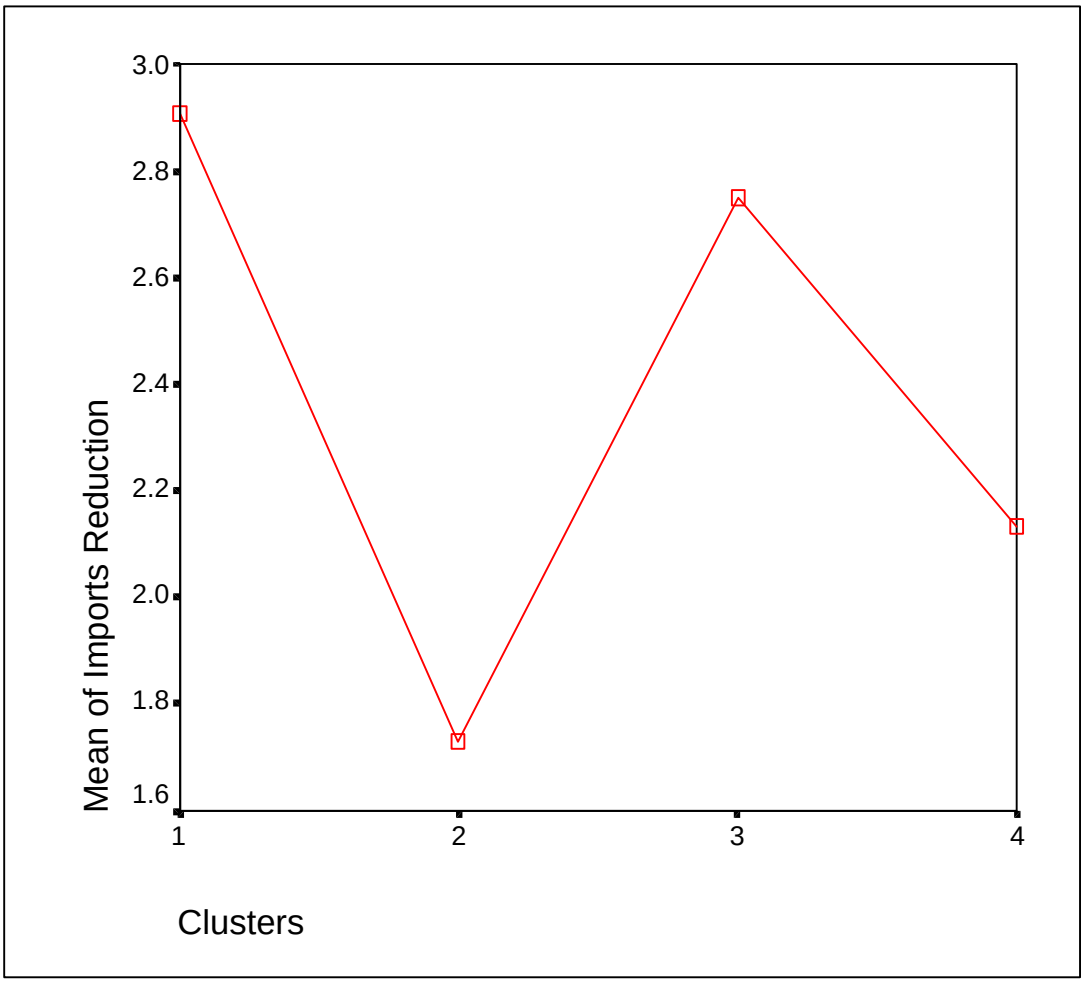

Figure 22. Means Plot of Environmental Factors (Imports Reduction) Using Original Measurement Scale.

Customers and Competitors. The last step in analyzing the environmental factors was to test for differences among cluster groups in regards to how respondents perceived their customers' and competitors' sizes and customers' locations. The questions related to sizes were multiple responses and were analyzed two ways. The first analysis addressed the differences in the number of multiple responses for each customer type (e.g., apparel manufacturer, department store, specialty store) by clusters.

To determine if a difference existed in the number of multiple responses by cluster, the responses for each customer type were summed and assigned a new label (i.e., *apparel manufacturers, department stores, specialty stores, mass merchandisers/discounters, other*). Chi-square was used to determine if a difference existed for the multiple responses for customer types and the clusters. The results revealed that a significant difference existed between the clusters and the number of multiple customers for mass merchandisers (X^2 = 15.833, p = .015); whereas, only Cluster A indicated having multiple sizes of mass merchandisers as customers. This continues to support industry profile that the mass merchandisers order standardized products and the findings of Kincade (1988) for a range of apparel manufacturers. In addition, the findings are consistent with those from Hypothesis One, which suggest that Cluster A produces basic goods with larger lot sizes, and is being affected by imports of similar or substitutable items.

The second analysis addressed the differences in the responses for each customer and competitor size (i.e., *small, medium, large*) by cluster. Chi-square results, which are reported in Table 19, indicated no significant differences in the customer sizes and the clusters. Cross tabulation was used to profile clusters based on the individual counts for each size within the customer types (i.e., *small, medium, large*). The frequencies reveal, that of the respondents who identified apparel manufacturers as customers, the majority of apparel manufacturers were perceived to be *small* (37.5%) and *large* apparel manufacturers (35%). The results were similar for department stores, specialty stores, mass merchandisers, and other types of customers, where *small* and *large* customers received the highest frequencies. The reported customers for Cluster A were represented in all customer categories, which supports Cluster A's perception of *moderate* levels of lot sizes. Clusters B and D were concentrated in the Department Store and Specialty Store customer types, which supports their specialization of product or service profile and their *moderately high* to *high* levels of flexibility. Specialized fashion items have more frequent inventory turnover, due to obsolesce or fast sellers, therefore are produced in smaller quantities. The more rapid fashion cycle typically occurs at more for women's wear and fashion forward department stores and specialty stores than for mass merchandisers, whose products tend to be more basic and have a longer shelf life. Cluster C's customers are similar to Cluster A, but in re-examining the changes in customer service, operations, barriers, and need for assistance, this further supports the hypothesis that Cluster C is losing its manufacturing competitiveness.

Table 19.

Frequencies and Chi-square Results for Customer Type by Clusters.

Customer Type	Cluster A	Cluster B	Cluster C	Cluster D	X^2
Apparel Manufacturers					
Small	7	--	7	1	5.951[1]
Medium	9	--	1	1	5.430[1]
Large	11	1	2	--	6.342[1]
Department Stores					
Small	17	3	8	3	1.821[1]
Medium	11	2	3	7	3.943[1]
Large	14	4	4	2	4.691[1]
Specialty Stores					
Small	21	5	16	9	2.401[1]
Medium	18	5	6	10	4.673[1]
Large	23	4	6	5	3.909[1]
Mass Merchandisers/Disc.					
Small	12	--	6	1	5.248[1]
Medium	8	--	6	--	6.447[1]
Large	12	1	1	1	6.837[1]
Other					
Small	3	2	1	2	3.431[1]
Medium	6	4	3	6	7.949[1]
Large	6	2	4	3	.697[1]
	n = 71	n = 13	n = 36	n = 26	

Note. [1] indicates test included cells with less than 5 counts, where responses were *1* or *0*.

Chi-square analysis of competitor type and clusters revealed no significant differences in the multiple responses among the clusters. However, chi-square analyses did indicate a significant difference between the clusters for the individual sizes within the competitor types. Proportionately, more respondents in Cluster A (61%) perceived *large*-size US Apparel Manufacturers as competitors than did the other three clusters (X^2= 8.539, p = .036). Cross tabulation of the competitors according to size by clusters and the Chi-square statistic are reported in Table 20.

Chi-square was also used to determine if a difference existed between customer locations (i.e., *in-state, out of state, out of the United States*) and the four clusters. The chi-square statistic revealed a significant difference in cluster and customers outside of the United States (X^2 = 12.00, p = .007), which is reported in Table 21. Of the respondents who reported having customers outside of the United States, respondents in Cluster B fully participated in global exchanges (76%) followed by Cluster D (53%), which supports the profile of the two clusters as producing specialized products without regard for import competition. Therefore, Clusters B and D appear to be apropos as exporters. As such, Cluster A appears to participate more in the exportation of their basic products as a way of counteracting imports of similar or substitutable products. Further analysis is needed to conclude on the actual reasons for the cluster's participation in exporting. Based on the significant differences reported among the clusters for environmental factors, perceived customer size and location, and perceived competitor, the null hypothesis that suggests that differences do not exist among manufacturing strategy groups of SAMs and environmental factors was rejected.

H_0. Manufacturing strategy groups of SAMs do not differ based on demographics.

H_3. Manufacturing strategy groups of SAMs differ based on demographics.

Chi-square and ANOVA were used to determine if differences existed among Clusters A through D and demographic variables (i.e., products, product classification, manufacturing processes, type of firm, type of fashion, manufacturing strategies, marketing strategies, firm's employee size, annual gross revenues). Chi-square analysis revealed similarities among all clusters for products manufactured, manufacturing processes, type of firm, and perceived manufacturing strategy for increased or decreases in demand, and are reported in Tables 22 through 25. Results from ANOVA revealed that similarities among clusters for employee size (F = 9.763, p = .066) and annual gross revenues (F = 8.188, p = .413). The frequencies for these variables are reported in Tables 26 and 27. The majority of the respondents produced *women's wear*, used *unit production systems*, and were classified as a *manufacturer*. Most respondents attributed their increases in demand to their use of *developing new products for current market* – Reorganizer, and decreases to *making some changes but few risks* - Caretaker. The average employee size for each cluster was *10 to 19*. The average annual gross revenue for each cluster was *$500,000 to $999,999*.

Table 20.

Frequencies and Chi-square Results for Competitor Type by Clusters.

Competitor Type	Cluster A	Cluster B	Cluster C	Cluster D	X^2
US Apparel Manufacturers					
Small	22	5	11	10	.754[1]
Medium	19	2	16	8	5.135[1]
Large	27	4	4	9	8.539[1]*
Foreign Apparel Manufacturers					
Small	11	4	3	3	4.146[1]
Medium	19	3	3	7	5.246[1]
Large	38	3	22	13	5.662[1]
Other					
Small	1	--	--	--	1.064[1]
Medium	--	--	--	2	9.359[1]*
Large	3	1	1	1	.592[1]
	n = 71	n = 13	n = 36	n = 26	

Note. [1] indicates test included cells with less than 5 counts, where responses were *1* or *0*.

* $p \leq .05$

Table 21.

Frequencies, Percentages, and Chi-square Results for Customer Location by Clusters.

Frequencies

Location	Cluster A	Cluster B	Cluster C	Cluster D	X^2
In State	63	13	31	24	2.263[1]
Out of State	63	12	31	25	1.846[1]
Out of the United States	32	10	9	14	12.004*

Percentage

Location	Cluster A	Cluster B	Cluster C	Cluster D	X^2
In State	88.7	100	86.1	92.3	2.263[1]
Out of State	88.7	92.3	86.1	96.2	1.846[1]
Out of the United States	45.1	76.9	25.0	53.8	12.004*

Note. [1] indicates test included cells with less than 5 counts, where responses were *1* or *0*.

* $p \leq .05$

Table 22.

Report of Percentages for the Frequencies of Products by Cluster

	Cluster A	Cluster B	Cluster C	Cluster D	X^2
Women's	80.3	76.9	69.4	73.1	1.691[1]
Men's	19.7	--	11.1	15.4	3.948[1]
Children's	18.3	--	11.1	15.4	3.407[1]
Other Apparel/ Accessories	9.9	15.4	13.9	7.7	.950[1]
Other	9.9	15.4	8.3	7.7	.683[1]
	N = 71	N = 13	N = 36	N = 26	

Note. Items were multiple response answers. [1] indicates test included cells with less than 5 counts, where responses were *1* or *0*.

* $p \leq .05$

Table 23.

Report of Percentages for the Frequencies of Manufacturing Processes by Cluster.

	Cluster A	Cluster B	Cluster C	Cluster D	X^2
Progressive Bundle	33.8	15.4	33.3	26.9	2.041[1]
Modular	5.6	--	--	--	4.3344[1]
Unit Production System	52.1	76.9	52.8	57.7	2.904
Other	12.7	15.4	11.1	15.4	.316[1]

Note. [1] indicates test included cells with less than 5 counts, where responses were *1* or *0*. Columns do not total to 100 percent, items were multiple response answers.

* $p \leq .05$

Table 24.

Report of Percentages for Responses to Type of Firm by Cluster

	Cluster A	Cluster B	Cluster C	Cluster D
Manufacturer	62.0	92.3	75.0	69.2
Jobber	12.7	--	13.9	19.2
Contractor	18.3	--	8.3	3.8
Other	2.8	7.7	2.8	7.7
Multiple Response	2.8	--	--	--
No Response	1.4	--	--	--

N = 146

Note. $X^2 = 14.957^1$. [1] indicates test included cells with less than 5 counts.

Table 25.

Report of Percentages for Manufacturing Strategies by Cluster Using Interpretations of Sweeney (1978) Manufacturing Strategies

Increases in Demand

	Innovator	Marketeer	Caretaker	Reorganizer	Multiple
Cluster A	5.6	16.9	15.5	46.5	12.7
Cluster B	15.4	--	23.1	61.5	--
Cluster C	5.6	22.2	11.1	47.2	11.1
Cluster D	3.8	11.5	26.9	42.3	11.5
% of Total Responses	6.2	15.8	17.1	47.3	11.0

Total Number of Respondents = 142

Decreases in Demand

	Innovator	Marketeer	Caretaker	Reorganizer	Multiple
Cluster A	12.7	16.9	31.0	9.9	1.4
Cluster B	--	7.7	30.8	30.8	--
Cluster C	11.1	8.3	38.9	13.9	2.8
Cluster D	3.8	15.4	50.0	3.8	--
% of Total Responses	9.6	13.7	36.3	11.6	1.4

Total Number of Respondents = 106

Table 26

Percentages of Employee Size by Cluster

	Cluster A	Cluster B	Cluster C	Cluster D
1 to 4	18.3	23.1	30.6	34.6
5 to 9	18.3	7.7	19.4	26.9
10 to 19	22.5	38.5	27.8	19.2
20 to 49	40.8	3.8	22.2	19.2
M =	2.86	2.77	2.42	2.23
	n = 71	n = 13	n = 36	n = 26

Note: Significant differences between pairs of means are indicated by identical superscripts at $p = \leq .05$.

Table 27.

Percentages of Annual Gross Revenues by Cluster

	Cluster A	Cluster B	Cluster C	Cluster D
Under $100M	7.0	7.7	8.3	11.5
$100,000 - $299,999	18.3	7.7	13.9	11.5
$300,000 - $499,999	5.6	--	8.3	11.5
$500,000 $999,999	18.3	15.4	22.2	11.5
$1,000,000 - $4,999,999	26.8	53.8	41.7	42.3
Over $5,000,000	19.7	15.4	5.6	3.8
No Response	4.2	--	--	7.7
M =	3.86	4.46	3.92	3.50
	n = 71	n = 13	n = 36	n = 26

Note: Significant differences between pairs of means are indicated by identical superscripts at $p = \leq .05$.

Differences did exist among clusters for product classification and fashion type. Cluster B was the only cluster with no reported production of *trousers/pants* (X^2 = 10.342, p = .016) or *skirts* (X^2 = 9.012, p = .029) (see Table 28). Clusters were significantly different in fashion position of product (i.e., *high, basic*), frequencies are reported in Table 29. Chi-square statistic (X^2 = 17.407, p = .043) revealed the majority of the respondents in Clusters A, C, and D classified themselves as producers of basic products; whereas, Cluster B reported fashion products (69.2%). The results support the cluster profiles developed from Hypotheses One and Two. The findings also parallel the total population of SAMs, see Table 1, and support the findings from Kincade and Cassill (1993) and Ko and Kincade (1998), which found differences in technology usage across product and fashion variables.

Significant differences were reported for the clusters' perceived marketing image, which are shown in Table 30. Respondents in Clusters B and D perceived themselves to *offer select products with high quality*, supports the finding that these two clusters offer specialized products or services. Whereas, Clusters A and C each perceived that it *offers select products with high quality* and *innovates and creates new products* as their image in the marketplace. The Chi-square interpretations are limited in that 17 of the cells had less than 5 scores. Based on differences in market image, fashion position, and employee size, the null hypotheses, which states that manufacturing groups of SAMs do not differ based on demographics, was rejected.

H_0. Manufacturing strategies used by SAMs have no relationship to their use of market strategies.

H_4. Manufacturing strategies of SAMs are related to their use of market strategies.

The relationship between the manufacturing strategy groups and their reported marketing strategy was evaluated using chi-square. An asymmetric λ coefficient, with a probability of p >.05, was used to identify significance (Malhotra, 1993). The results comparing marketing strategy to manufacturing strategies for increases in demand were a λ = .078 (p = .255) and λ = .075 (p = .175) for decreases in demand. Based on the test statistics, no significant relationships exist for the respondents manufacturing strategies and their reported marketing strategies. Neither the responses to the manufacturing strategies nor the marketing image was shown to be a predictor of one another. The null hypothesis was not rejected. The findings from previous research indicate that manufacturing strategies and marketing strategies of a firm should be consistent. However, the inconsistency in manufacturing and marketing strategies may not be indicative of the success or failure of the firms, but may constitute new strategies that may be unique to SAMs.

Table 28.

Report of Percentages for the Frequencies of Products Classifications by Clusters

	Cluster A	Cluster B	Cluster C	Cluster D	X^2
Suits	19.7	7.7	5.6	7.7	5.564[1]
Coats, outerwear	8.5	15.4	13.9	7.7	1.323[1]
Shirts, blouses, tops	52.1	30.8	44.4	42.3	2.436
Nightwear, underwear, lingerie	9.9	15.4	13.9	19.2	1.601[1]
Jeans	9.9	--	2.8	3.8	3.485[1]
Trousers, pants	42.3	--	25.0	30.8	10.342[1]*
Dresses	43.7	30.8	30.6	50.0	3.258[1]
Skirts	42.3	--	30.6	34.6	9.012[1]*
Fleecewear, sweatshirts, sweatpants	12.7	--	16.7	7.7	3.064[1]
Other	22.5	38.5	33.3	23.1	2.531[1]

Note. Items were multiple response answers. [1] indicates test included cells with less than 5 counts, where responses were *1* or *0*.

*$p \leq .05$

Table 29.

Report of Percentage for Responses to Type of Fashion by Cluster

	Cluster A	Cluster B	Cluster C	Cluster D
High fashion	36.6	69.2	16.7	38.5
Basic fashion	57.7	23.1	80.6	61.5
Multiple Response	2.8	--	--	--
No Response	2.8	7.7	2.8	--

N = 146

Note. $X^2 = 17.407^1*$. [1] indicates test included cells with less than 5 counts.

*$p = \leq .05$

Table 30.

Report of Percentages for Marketing Strategies by Clusters Using Interpretations of Miles et al. (1978) Marketing Strategies

	Defenders	Analyzers	Reactors	Prospectors	Multiple
Cluster A	43.7	5.6	4.2	25.5	19.7
Cluster B	76.9	15.4	--	7.7	--
Cluster C	44.4	11.1	5.6	22.2	8.3
Cluster D	84.6	--	3.8	7.7	--
% of Total Responses	54.1	6.8	4.1	18.5	11.6

Total Number of Respondents = 139

CHAPTER VI

Discussion and Summary, Implications, and Recommendations

Small apparel manufacturers (SAMs), firms with less than 50 employees and who produce between SIC 2310 and 2389, represented approximately 83 percent of the total number of apparel manufacturers in the United States in 1995. Yet, no empirical research was located on SAMs as a separate segment of the apparel industry. Information provided in trade journals, statistical data, and industry regulations often focus on apparel giants and include SAMs in the aggregate reports. The purpose of this study was to gain an understanding of SAMs by profiling their manufacturing strategies, and describing their operations characteristics, customers, barriers to profit/productivity, and assistance needed. This chapter reports on the findings from the study of 146 SAMs, implications of the findings, and recommendation for future research on SAMs.

Discussion and Summary of Results

Manufacturing strategies are an integral factor in determining the competitiveness of apparel manufacturers. As such, manufacturing strategies were used to cluster 146 SAMs into manufacturing segments. The constructs of the variables used to define manufacturing strategy were derived from Bordogna's (1996) model of manufacturing strategies, DuBois, et al. (1993), and findings as reported in the review of literature (i.e., lot size, delivery times, quality, education and training for the production workforce and management, flexibility in management and manufacturing processes, use of trade associations, unit cost, environmental consciousness) (Kincade, 1988; Kincade & Vass, 1998; Young, et al. 1995). The results of factor analysis on the manufacturing strategy variables revealed four factors, which are supported by DuBois, et al.'s recommendations of components of manufacturing strategies: flexibility, environmental consciousness, product attributes, and lot sizes. These four factors were used to cluster the respondents into manufacturing segments. From the employment of *Ward's procedure* with squared-Euclidean, four clusters emerged. The number of respondents in each cluster was 71, 13, 36, and 26, respectively, for clusters A through D. An Optimizing Method was used as a secondary verification of the existence of the four clusters. The associated ANOVA analysis was used to determine, the analysis revealed significant differences between the clusters for all of the manufacturing strategy factors. This supports the interpretation of four clusters from the agglomeration and Dendrogram chart.

Factor analysis was also used to ascertain the existence of similarities among the environmental factors of customer service/operations and barriers/assistance. The results for the customer service and operations variables were five factors: (a) customer services, (b) education/industry awareness, (c) flexibility, (d) timing, and (e) unit costs. Five factors also were retained from the barriers and assistance variables (a) production

resources, (b) technology/automation, (c) consistency in sales, (d) investment capital, and (e) import reductions. The discussion of results begins with a comparison of the clusters to Bordogna's (1996) model of manufacturing strategies. The remainder of this section discusses the findings as they relate to the four clusters, with the implication for each profile.

Description of the Relationship of SAMs Clusters to Bordogna (1996) Model.

Bordogna's (1996) model of manufacturing strategies was presented as the operationalized manufacturing strategies in the theoretical framework (see Figure 3). To compare the results of the study to the Bordogna (1996) model of manufacturing strategies, the variables for education and training of the worker and owner were averaged to obtain one mean for education and training. Similarly, flexibility in manufacturing and flexibility in management were averaged to obtain a composite mean for flexibility. For comparison purposes, the means were calculated using the original scale on the questionnaire (Table 31), and then rounded to the nearest whole interval and labeled according to the measurement scale. Table 32 provides the textual interpretation of the mean scores for the clusters in the Bordogna model format.

Cluster A appears to use a combination of Automation Production (43%) and Next Generation Production (29%) manufacturing strategies. The cluster's strategies resembled Automation Production by reporting moderate lot sizes, unit costs, and education/training and Next Generation Production with its *high* quality and moderately environmental consciousness. Cluster B clearly split between the Customized Production strategy and the Next Generation Production strategy. Forty-three percent of the cluster's responses were comparable to Next Generation Production (i.e., high quality products, *moderately short* delivery times, *moderately high* environmentally consciousness), and 43 percent were applicable to Customized Production and Next Generation Production (i.e., small lot sizes, high flexibility, moderately high education and training). Cluster C differs from clusters A and D, by resembling Automation Production (43%) with its *moderate* unit costs, education, and environmental consciousness and Next Generation Production (29%) with *moderately high* quality in products and *moderately short* delivery times.

The findings of the study indicate that separate manufacturing strategies exist within apparel manufacturers that have less than 50 employees. Overall, Cluster A appeared to resemble the Automation strategy, while Clusters B and C's manufacturing strategies appear to coincide with Next Generation Production. The last cluster, Cluster D, has levels that resemble Automation Production (29%) with *moderate* flexibility and environmental consciousness and Next Generation Production (29%) with *moderately small* lot sizes and *high* quality.

Table 31.

Means for Manufacturing Variables for Clusters One to Four Using Original Scale from Questionnaire.

	Cluster A	Cluster B	Cluster C	Cluster D
Unit Cost of Production	3.41[a,b,c]	4.31[a,d]	2.67[b,d,e]	3.92[c,e]
Quality of Product	4.54[a,b]	4.69[c]	3.50[a,c,d]	4.85[b,d]
Flexibility in Manufacturing	4.03[a,b,c]	4.77[a,d,e]	3.64[b,d,f]	2.62[c,e,f]
Flexibility in Management Style	3.83[a,b]	4.77[a,c,d]	3.56[c,e]	2.58[b,d,e]
Education or Training Provided for Production Workers	3.03[a,b,c]	4.23[a,d,e]	2.11[b,d]	1.92[c,e]
Education or Training Provided for Owner/Manager	3.37[a,b,c]	4.38[a,d,e]	2.89[b,d,f]	1.88[c,e,f]
Environmental Consciousness	3.75[a,b,c]	4.38[a,d,e]	2.72[b,d]	3.19[c,e]
Use of Industry Trade Associations	2.90[a,b]	2.54[c,d]	1.69[a,c]	1.73[b,d]
Lot Sizes	3.24[a,b,c]	1.38[a]	1.97[b]	1.65[c]
Delivery Times	3.56[a,b]	2.08[a,c]	1.83[b,d]	3.62[c,d]

$F = 739.041$, $p = .000$

Note: Significant differences between pairs are indicated by identical superscripts.

Scale: 1 = low/short, 3 = moderate, 5 = high/long

Table 32.

Interpretation of Means for Manufacturing Strategies for Clusters A to D

	Cluster A	Cluster B	Cluster C	Cluster D
Unit Cost of Production	Moderate	Moderately High	Moderate	Moderately High
Quality of Product	High	High	Moderately High	High
Flexibility	Moderately High	High	Moderately High	Moderate
Education	Moderate	Moderately High	Moderate	Moderately Short
Environmental Consciousness	Moderately High	Moderately High	Moderate	Moderate
Lot Sizes	Moderate	Small	Moderately Small	Moderately Small
Delivery Times	Moderate High	Moderately Short	Moderately Short	Moderate High

Description of Clusters.

The findings from the study revealed four types of manufacturing strategic groups among the SAMs. The groups, which were defined based on functions of the respondents perceptions of their firm's degree of flexibility (i.e., manufacturing, management style), environmental consciousness, product attributes (i.e., unit cost, quality), and lot size, are described below.

Cluster A – Global Competitor Mass Production. Cluster A was labeled Global Competitor - Mass Production. The average firm in Cluster A has a *moderately high* degree of flexibility, environmental consciousness, product attributes, and moderate lot sizes. The significant difference between Cluster A's lot sizes and the other three clusters, suggests that Cluster A is the mass producer of the four manufacturing strategies. Further examination of the changes that have occurred for its environmental factors supports this assumption. Respondents in Cluster A reported *increase slightly* for customer service efforts, education and industry awareness, flexibility, timing, and unit costs. This cluster reported being traditional manufacturers, who produce basic women's wear, specifically *shirts/blouses/tops*, primarily using the unit production assembly system. The average employee level for Cluster A is *20 to 49*. The average annual gross revenue level for the cluster was *$500,000 to $999,999*, which is similar to the other three clusters. Their customers are *in state, out of state,* and *out of the United States* and have the widest spectrum of customers (i.e., apparel manufacturers, department stores, specialty stores, mass merchandisers/ discounters, other). They view other US apparel manufacturers, as well as, Foreign apparel manufacturers of all sizes as their competitors.

Cluster A attributes their increased demand to the practice of the Reorganizer – developing new products for the existing market. Based on Cluster A's concern with imports, apparently the market that they service is also being serviced by global apparel producers. The United States has had continued increases in its consumption of apparel and apparel related goods (source in Dickerson), thus with the global increase in the number of producers, there are more firms going after the same market share. Respondents in Cluster A appear to be using flexibility, high quality products, customer service, education and industry awareness. Cluster A reported the need for assistance in acquiring technology for communicating with suppliers and customers, but lacked capital for investments. This interest in increasing their technology and automation may be in response incorporate Quick Response components (e.g., EDI, POS, JIT) to compete in its market. Their perceived market image is the Defender – makes few changes to products for existing market, this is incongruent with the cluster's reported manufacturing strategy of Reorganizer. In order to remain competitive, the marketing strategy should be as aggressive as the manufacturing strategy.

Cluster B – Customized Production. Cluster B was easily defined by the high ratings for its manufacturing strategies and was labeled *Customized Production*. Cluster B reported the highest degree of flexibility, which might indicate the absence of dedicated machinery and the ability to produce a variety of products, but at higher cost to the customer. Cluster B also reported *high* unit costs, *small* lot sizes, *high* quality

products, and the use of the *unit production system*. The cluster reported relatively the *same* level of customer service, education, and timing factors for the last three years. The lack of change is not necessarily a negative factor for this cluster. The nature of customized production is to provide goods to the customer's satisfaction; therefore, the level of customer service may be such that only marginal increases are needed to maintain the market. Similarly, the education of the workers or owner/manager may require perpetual updating, so substantial increases in education are unwarranted. Another view on the relatively flat change in education for the workers and owners addresses production as a craft. Workers who have perfected a production process or skill, such as tailoring, may not need the additional education; part of the appeal of the product may because of the traditional production processes used to create the product (e.g., eveningwear, hats, suits). This also may explain the lower level of need for or interest in assistance with technology/automation. The respondents in the cluster described themselves as traditional *manufacturers* of *high fashion, women's wear*, specifically, *shirts/blouses/tops* and *dresses*, in addition to a variety of *other types* of products (e.g., bridal, special occasion, fur coats). The average employee size level was *10 to 19* and the average, annual gross revenue level was *$500,000 to $999,999*. The customers of Cluster B were reported to be individuals (e.g., other), department stores, and specialty stores, that are located *in state, out of state,* and *out of the United States*. Domestically produced goods under intense competition typically are best located in close proximity to the market that it serves. Proximity to market may not be as great a factor for Cluster B because of the uniqueness of its products, and the implied global appeal. Cluster B views its competitors as US apparel manufacturers and Foreign apparel manufacturers of all sizes. Barriers for this cluster included uncertainty in sales and access to investment capital, the least reported level for a barrier was for import reductions. This suggests that products made by Cluster B are perceived to be unique, high value, marketable goods.

Given the uniqueness of the product and respondents *moderately low* concern for import reduction, it is not surprising that respondents in this cluster reported domestic, as well as, international customers. As the number of developing countries cross into more developed stages, opportunities for expanding into new markets are generated. Unlike Cluster A, who produces apparel goods that can be made globally, Cluster B could expand its market boundaries to include these newly developing markets. But, to do so, the respondents in this cluster would need to align their marketing and manufacturing strategies more to the Marketer manufacturing strategy and the Analyzer or Prospector marketing strategy. The respondents in Cluster B identified mostly with the Reorganizer strategy, creating new products for the existing market, and attributed this manufacturing strategy as the major influence in increases in product demand. The practice of Caretaker and Reorganizer strategies were equally identified as the reasons for decreases in demand. When asked to identify their market strategies, the clusters identified with the Defender strategy – retaining market share with existing products. Regardless of the cluster's desire to expand the current state, the manufacturing direction of the organization appears to be misalign with the goals of the marketing direction. More explanatory research is warranted to determine if these customized producers intend to remain small and/or exclusive or to expand production

to reach larger or different markets. A potential drawback for a Customized Producer is expanding beyond its capabilities or resources, such that the qualities that currently appeal to the market are compromised for the need to produce more, faster, and cheaper.

Clusters C and D. The profiles of Clusters C and D do not fit with any of the known theories for small manufacturers. Extended research is required to properly define the manufacturing strategies. To avoid speculation on the success or failure of the current status of these respondents, only the cluster attributes for C and D are provided.

Cluster C reported *moderately high* levels of flexibility, *moderate* levels of environmental consciousness and product attributes, and *moderately small* lot sizes. A report of changes, over the past three years, to customer service and operations revealed relatively no change in customer service, education/industry awareness, and timing factors. Cluster C did report *slightly increase* for flexibility and unit costs; however, the change in units costs were statistically the same for all four clusters. Likewise, production resources, consistency in sales, and assistance with investment capital were equally important to all four clusters. Cluster C's level of concern with technology and automation was significantly less than Cluster A but equal to Clusters B and D. Conversely, Cluster C's level of concern for the reduction of imports was equivalent to Clusters A and D, but was significantly higher than Cluster B's.

Cluster C can be described as a traditional *manufacturer* of *basic* style *women's wear,* whose customers are similar to Cluster A's (i.e., apparel manufacturers, department stores, specialty stores, mass merchandisers/discounters, other). Over 85 percent of the respondents in Cluster C reported customers within their own state and in the United States. Twenty-five percent of the respondents had international customers. Respondents in Cluster C primarily use the unit production system for apparel assembly; *shirts/blouses/tops, dresses,* and *skirts* were the most frequently selection apparel classification.

As with Clusters A, B, and D, the Reorganizer manufacturing strategy was selected most frequently as the major influence in their firm's increased demand; Marketer strategy was the second most identified strategy. Decreases in demand were attributed to their practice of the Caretaker and Reorganizer. The most frequently reported market image for Cluster C was the Defender, followed by the Prospector.

The profile for Cluster D somewhat resembles that of Cluster B, except for the flexibility factor. Cluster D reported *moderate* levels of flexibility, a level significantly lower than the other three clusters. *Moderate* levels of environmental consciousness were reported by Cluster C, as well as, *moderately high* levels of product attributes and *moderately small* lot sizes. In regard to the previous three years, Cluster D reported relatively no change in level for production resources, education and industry awareness, flexibility and timing factors. As with the other three factors, Cluster D did report a *slightly increase* for unit costs. None of the barriers identified as having

significant differences among the clusters rated above *somewhat* a concern, such as assistance with technology and automation or the reduction of imports.

Customers identified by Cluster D consisted primarily of department stores, specialty stores, and other types of customers (e.g., catalogs). Of the respondents in Cluster D who identified customers, the dominant area of location was the United States; however, the majority of respondents did report having international customers. The perceived competitors were apparel manufacturers from the United States and foreign countries. Respondents in Cluster D are primarily *women's wear manufacturers* who use the use the *unit production system* to produce *basic* style apparel such as, *dresses, shirts/blouses/tops,* and *skirts.* The average employee size group of the respondents in is *5 to 9*, with the majority of the respondents in the 1 to 9 level. The average, annual gross revenue level was *$500,000*.

The manufacturing strategies for respondents in Cluster D are Reorganizer and Caretaker for the increases in demand and Caretaker for the decreases in demand. Of the four types of market strategies provided, respondents perceived their image in the market place to be Defender.

The analysis and profiling of the four clusters revealed two distinctly identifiable manufacturing strategies (e.g., Cluster A, Cluster B). Using previous constructs for manufacturing and specifically apparel manufacturing, Cluster A was identified as the Mass Producer of the two. Its level of flexibility as a small manufacturer, larger lot sizes, higher product attributes (e.g., unit cost, quality), basic goods, request for assistance for technology and automation, and vulnerability to imports are classic characteristics of mass producers and more specifically smaller mass producers (Aggarwal, 1997; DuBois, et al, 1993; Lin et al., 1995). Cluster B was identified as the Customized Producer. Its characteristics of high flexibility, small lot sizes, high quality goods and unit costs, fashion forward – assumable unique goods, and lower level of concern with imports and customer service all would be acceptable as a customized smaller, production unit.

However, to profile Clusters C and D requires much speculation on the deviations from traditional manufacturing frameworks and theories that appear within the two unidentifiable clusters. Issues of lack of flexibility when producing low lot sizes, the lack of change in the level of customer service and operations, and low levels of concern with imports when producing basic goods could indicate a lack of interest, lack of knowledge, or sufficient knowledge, which negates the need for more than marginal increases in such factors. In reviewing the Dendrogram graphic, Figure 10, the graphic clearly depicts two distinct clusters, Clusters A and B, while the next two significantly sized blocks are more closely related in size to one another than to the larger two blocks.

It should be noted that the deviations from the traditional manufacturing constructs and frameworks are not necessarily indicative of failure for the respondents in Clusters C and D. Additional research is required first to gain an understanding of the mechanics of these two manufacturing strategies in their current state, and then to perform substantive testing to assess financial productivity, manufacturing and managerial efficiencies and effectiveness to determine if these strategies are valid

strategies for implementation by other SAMs, or if these respondents are ineffectively operating without any defined framework.

Implications

Based on the amount of theories and practices for manufacturing in general, 44% of the subjects in this study are operating under questionable manufacturing strategies or frameworks. However, several commonalties did evolve from the study. Within a sample of 146 SAMs, the number of employees did not appear to have an affect on the reported answers to the questionnaire (i.e., size within this grouping was not a significant factor). This finding leads to further questions. Can SAMs be considered as one group, or is it true that what is applicable for one SAM, in terms of size-based decisions, may not be true for all SAMs with less than 50 employees.

Funding opportunities and technical assistance that may use size as a criteria could benefit by knowing how to define this population. Annual gross revenue also did not have significance within the respondents in this study. Financial based decisions, such as the ones used by banks in lending or in state funded financial support programs could benefit by knowing that size may not be a predictor of earnings for SAMs. Before blanket implications are endorsed, further research to quantify the levels used in the study are required.

In reviewing the theoretical framework for the study, rearrangement in the order of manufacturing and marketing strategies is suggested. Figure 23 shows the relationship between the two strategies proposed by the findings. If the strategies should be consistent, then the changes in environmental factors should affect both strategies similarly versus in sequential order as indicated in Figure 3.

Future Research

Several recommendations for future research resulted from the study. The study used respondents' perceptions for the levels for the manufacturing strategies. The next step would be to quantify the measurement scale of the manufacturing strategies (e.g., *small/low, medium/moderate, large/high*). Focus groups should also be used in conjunction with or in addition to the attempt to quantify the scale. Focus groups would be useful in providing explanation of the findings and would provide support for interpretations included in the current study. Additional factor analyses should be run once the measurement scale is quantified, to determine if the same four factors emerge from the ten manufacturing strategy variables. Focus groups also could be employed to define additional variables that impact SAMs. Interviews with SAMs representative of Clusters C and D would provide clarification of the responses and would assist in identifying the strategies reported by respondents.

The response rate for the study, although sufficient for research purposes, was lower than anticipated. Future studies should include the consideration of developing a shorter instrument or dividing the instrument into two parts. The shorter survey, for example a one page, double-sided questionnaire, may increase the response rate. The

study also should be replicated at a different time during the year to determine if the winter holiday seasons were a factor in the low response rate.

Data should be collected on subjects' performance measures, such as return on sales, ratio of assets to liabilities, and inventory turnover. Performance measures used in conjunction with measurements for manufacturing and marketing strategies would provide a more accurate assessment of the success of SAMs with reported strategies. Finally, future research on SAMs' participation in exporting. With the increased demand for the US market, some SAMs may be positioned to venture into exporting.

Three major audiences were identified for this study (a) organizations, (b) SAMs, and (c) academia. For organizations established to assist small businesses, the study can be used to gain an understanding of SAMs' perceived concerns for their firm or the industry, as well as provides demographic profiles of SAMs. SAMs would be best served by the reporting of the findings in trade periodicals and information that has been operationalized for implementation or assessment. For academic organizations, publication outlets dedicated to the investigation and research of the apparel industry, advancement and support of small businesses, and business research in general. The results of the study provide a foundation from which future studies on the population can be formulated.

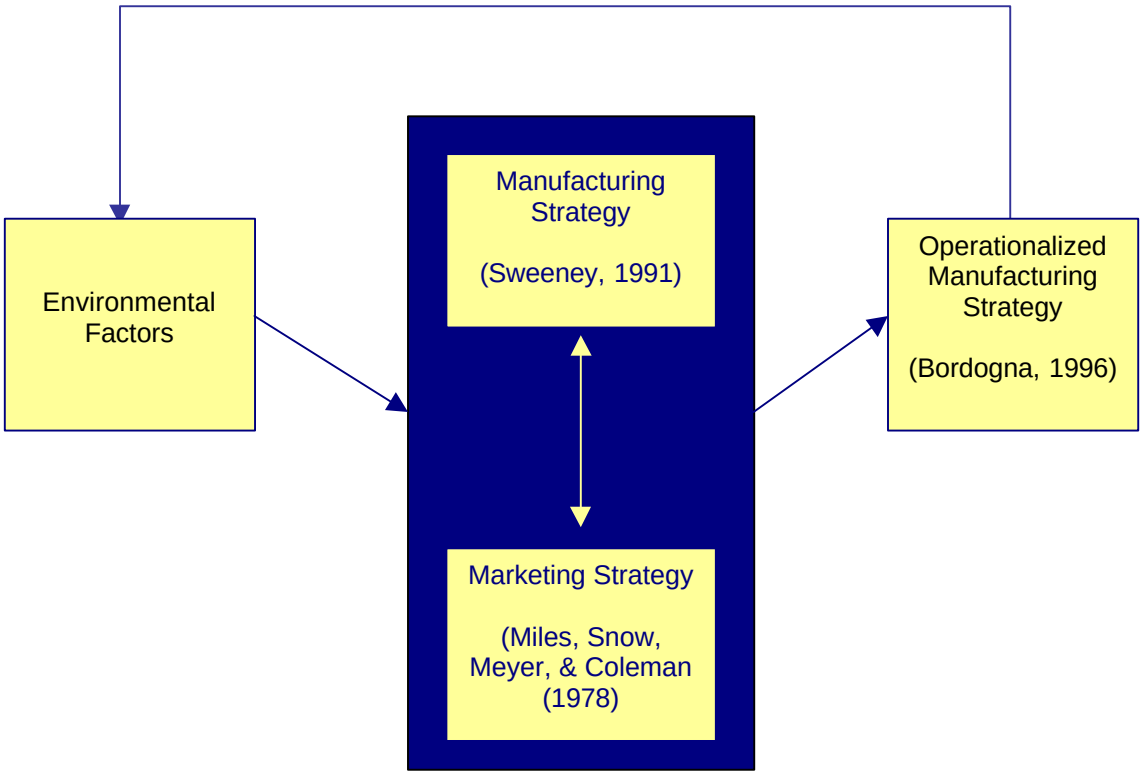

Figure 23. Proposed Revision to Theoretical Framework

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