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The meaning of apparel quality through the perceptions of apparel production managers and operators

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The meaning of apparel quality through the perceptions of apparel production managers and operators

by

Heidi Patricia Scheller

A Thesis Submitted to the Graduate Faculty in Partial Fulfillment of the Requirements for the Degree of MASTER OF SCIENCE

Department: Textiles and Clothing
Major: Textiles and Clothing

Signatures have been redacted for privacy

Iowa State University
Ames, Iowa

1993

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INTRODUCTION

The quality of apparel products manufactured in the United States is of critical importance to an industry which is currently focused on reducing its costs and improving its domestic and foreign market shares (U.S. Industrial Outlook, 1990). Since 1981, apparel imports into the United States have risen dramatically. Lower labor costs in newly industrialized countries, the value of the dollar, and limits of foreign trade policies have been cited as predominant factors in reducing the competitiveness of the U.S. apparel industry (Ghadar, Davidson & Feigenoff, 1987). In response to the quantitative restrictions of the Multi-Fiber Arrangement, foreign apparel suppliers have upgraded their products by adding more value per square yard equivalent. This is evidenced by a rise of 88.6 percent in the real value of imported apparel, per square yard equivalent, from 1972 to 1980 (Cline, 1987).

Domestic retail buyers recognize foreign made apparel as a good value. For the most part, retail apparel buyers determine the merchandise assortment available to U.S. consumers. In a study of 69 U.S. retail apparel buyers, Sternquist, Tolbert, and Davis (1988) found that all of the buyers strongly believed that imported apparel offered better quality for price than did domestic apparel. In another study of retail buyers' attitudes toward imported and domestic women's sportswear, similar perceptions about the higher quality of foreign apparel were revealed (Atkins & Jenkins, 1988). Domestic apparel manufacturers are concerned about the quality of their products and are developing programs based on quality goals.

Trade journals indicate that apparel firms commonly employ inspection procedures as the primary form of quality control. Kohlbeck (1984) traced the structure of quality control organization from 1914 to the 1980s. He suggested that the traditional processes of quality control in apparel firms may be preventing the identification of quality related problems and are ineffective in controlling costs related to quality. Categories of quality costs include those of internal failures, external failures, appraisal, and prevention. Examples of internal failure costs are those involved in reworking and repairing garments, as well as the lower prices received.
for second quality garments (Knapton, 1990). Appraisal costs involve those of inspection activities, such as incoming materials inspection, and product inspections at various stages of the manufacturing process. External failure costs refer to those of products which fail after purchase. Prevention costs can include those of training, process design, and others which focus on preventing variation in the product (Juran, 1974).

Many apparel firms have written quality standards in the form of product specifications and tolerances. These specifications may constitute the firm's definition of quality for each product, as well as provide a basis in evaluation for acceptability as first quality (Glock & Kunz, 1990). Quality goals of the apparel firm have historically been conceptualized by management, interpreted and supervised by line management, and executed by production operators. However, the quality conceptualized by top management is not always present in the garments produced and distributed. Technical literature from the apparel industry, as well as apparel production textbooks offer many different meanings of quality (Glock & Kunz, 1990; Solinger, 1988). However, research studies have not sought to define quality through the perceptions of people involved in apparel manufacturing.

**Purpose and Conceptual Framework**

The purpose of this study was to develop a perceptual definition of quality in apparel production. The theoretical basis of the study was a behavioral theory of the firm. The role of a "theory of the firm" is to function as a conceptual framework to guide research. Economic theories of the firm have formed the basis for the disciplines of economics, finance, and management, but have demonstrated their limitations when applied to studies of stakeholder and managerial behaviors (Anderson, 1982).

Cyert & March (1963) proposed a behavioral theory of the firm which views a firm as a coalition of individuals who share a common frame of reference and common goals. Coalition members can be workers, managers, customers, suppliers, governmental agencies, and so
forth. By recognition of the existence of unresolved conflict within an organization, this theory provides for members of subcoalitions or constituencies, who, through a process of conflict resolution, negotiate and execute the goals of the firm. In order for constituencies to best negotiate exchanges of resources within and outside of the firm, specialization develops, thus leading to goal conflicts among constituencies. This model contains four major relational concepts: quasi-resolution of conflict, uncertainty avoidance, problemistic search, and organizational learning.

Within the concept of quasi-resolution of conflict, the theory recognizes that most firms operate with considerable and latent conflict of goals. Resolving conflict does not reduce all goals to a common dimension, but instead views goals as independent aspiration-level constraints imposed on the organization by its members. Conflict resolution is then achieved by using local rationality, acceptable decision rules, and sequential attention to goals (Cyert & March, 1963).

This model assumes that all organizations avoid uncertainty through various techniques such as decision rules which emphasize short-term results and arrangement of a negotiated environment. Control of an uncertain environment may be achieved through the establishment of industry-wide conventional practices which have the effect of stabilizing competitive practices and prices. A negotiated internal environment can be achieved through a budget, which as a plan, can act as a series of contracts among constituencies (Cyert & March, 1963).

The behavioral theory of the firm also assumes that problemistic search is motivated by a specific problem that the organization recognizes. The search is based initially on the simple perception of cause by looking at the symptoms of the problem and current alternatives. This simple-minded search behavior assumes that a cause will be found near its effect and that a new solution will be found near an old one. When this fails, the organization uses complex (distant) search or searches in vulnerable areas within the organization. Bias in search reflects special training or experience of organization members, the interaction of expectations of
members as well as communication biases resulting from conflicts within the firm (Cyert & March, 1963).

Organizational learning is based on the assumption that organizations display adaptive behavior over time in that they change their goals, shift attention to different priorities, and change their procedures for searching as a result of their experiences (Cyert & March, 1963). Adaptive characteristics of organizational cultures have been discussed by Schein (1984), through a dynamic model of how culture is learned, transferred, and altered over time.

Kunz (1993) has proposed a behavioral theory of the apparel firm which recognizes internal constituencies as related to specialization. The five intermediate constituencies proposed by this model, shown in Figure 1., include merchandising, marketing, operations and finance, production, and executive management.

![Figure 1. Schematic representation of Kunz (1993) model of a behavioral theory of the apparel firm.](image)
In the Kunz model, the roles of executive management relate to the needs of the other four constituencies in establishment of company mission and goals, decision making, and development of business plans. Therefore, the production constituency relies on constraints imposed on it by the executive constituency in carrying out its functions of producing goods, according to specifications and production schedules, as well as constraints related to merchandising, marketing, and finance. Apparel production involves many functions, including pattern making, cutting, sewing, finishing, labeling, ticketing, packaging, and shipping. Efficiencies in these functions depend on interrelationships with other constituencies (Glock & Kunz, 1990). Furthermore, this model accommodates the issue of organizational power through recognition that the most powerful internal constituencies control acquisition of the most critical resources. Equally so, the most powerful external coalitions can control the most critical activities by influencing allocation of the firm's resources (Kunz, 1993).

Goals of the firm

The major goals of the firm relate to production, inventory, sales, market share, and profit (Cyert & March, 1963). The behavioral theory is about human behavior within the firm in achievement of those goals. The assumption of the production goal is that the organization seeks to "smooth" production for control of quantity variance over time as it seeks to meet or exceed a certain production level. This reflects the pressures of stable employment, scheduling ease, cost constraints, and growth. The inventory goal serves as a buffer between sales and production, while the market share goal can be considered an alternative to the sales goal as a measure of the firm's success. Pressure from stockholders, executive managers, creditors, and those within the firm requiring capital investments create and maintain the profit goal.

Economic theories of the firm assume primary goals of profit through return on investment or maximization of stockholders' wealth. Economic goals then emerge from the profit assumption. However, economic theories have demonstrated limited applicability to the real world because they also assume a single product firm operating in a perfectly competitive
environment (Anderson, 1982). Also, economic theories do not recognize limitations imposed on the firm by human beings who are trying to achieve goals.

Product quality and its perceived concomitant benefits can be a means to any and all of the five major goals of the firm. Throughout the manufacturing literature, quality is correlated to profitability, improved productivity, increased sales, increased market share, and inventory control (Evans & Lindsay, 1989). Adoption of quality goals by firms has resulted in long-term organizational changes (Leonard & Sasser, 1982). Historical evolution of U.S. quality systems followed those in Japan with a focus on teamwork within the organization. Now, workplace democracy is expanding to give workers responsibilities of authority and control over their processes and products. Thus, in some industries, the coordination of quality has changed from the specialist function of a quality control department to a labor-management quality system which can successfully fulfill the goals of the firm (Rubenstein, 1991).

Quality is a recognized goal in the apparel industry, but the literature lacks descriptive studies of how quality goals are fulfilled in apparel firms. Therefore, the Cyert and March behavioral theory (1963) was useful in this study as a theoretical backdrop for the qualitative design, instrument development, and data analysis framework. Because the Kunz (1993) model further developed the behavioral theory and related it specifically to the apparel firm, it too, functioned as a conceptual framework for defining the study's objectives and research questions, as well as providing support in the data analysis.

Definitions of Terms

Firm: An association of people who are organized to carry on business activities (Glock & Kunz, 1990).

Apparel production: Division of an apparel firm which plans and executes the conversion of resources into cost-effective finished garments within appropriate time constraints, and controls the production process to meet productivity goals, while striving to maintain
harmonious labor relations (Glock & Kunz, 1990).

**Senior manager:** Person(s) within the firm who is responsible for making decisions which establish and fulfill the goals of the firm.

**Plant manager:** Person(s) within the production plant who is responsible for making decisions which fulfill the goals of the plant. Appropriate titles may be plant manager, production manager, quality control manager, manager of engineering, and managers of other production departments.

**Supervisor:** Person(s) within the plant who is responsible for directly supervising a group of apparel production operators.

**Operator:** Production worker within the plant who is directly responsible for producing a portion of the product through manual methods or equipment operation.

**Inspection:** Process of examining materials, garment pieces, or finished garments to determine acceptability according to specifications.

**Constituency:** A functional subunit of people in the apparel firm who have common goals and who share a common frame of reference (Kunz, 1993).

**Research Questions**

Within the conceptual framework of the behavioral theory of the firm, the following research questions were developed from a priori themes identified in the literature.

1. What is the concept of quality within the firm's production constituencies?

2. What methods are used to communicate quality goals among the firm's constituencies and within the firm's production constituencies?

3. Is there consistency in interpretation of quality throughout the organization?

4. How is commitment to quality goals demonstrated?

5. What are the responsibilities of constituencies within the firm regarding quality?

6. How are conflicts within the production constituencies regarding product quality resolved?
7. What are the constituents within an apparel firm that are responsible for product quality?

Objectives

1. Identify, describe, and define the meaning of apparel quality through the perceptions, knowledge, and beliefs of people in an apparel manufacturing firm, including senior managers, plant managers, supervisors, and operators in the firm.
2. Compare and contrast the perceptions of apparel quality issues among and between senior managers, plant managers, supervisors, and operators within the firm.
3. Contribute to the development of a behavioral theory of the apparel firm.
The nature of definition

The significance of definition has long been recognized by philosophers and linguists, although not without controversy. Questions about the nature of definition, the existence of indefinables (such as truth, simple feelings, and quality), and the usefulness of definition have extended back to the theory of logic proposed by Aristotle (Robinson, 1950). Definition has been considered as a statement of the entire nature of the thing defined (Oates, 1972). Another explanation of definition offered by Borsodi (1967) is that it is both a process and an end-product of distinguishing what is sought to be communicated by a word from that communicated by other words. This includes making the meaning to be attached to the word explicit. Furthermore, he points to the four canons of definition: (1) adequacy - a definition should strive for distinction and comprehensiveness, thereby making it adequate for communication; (2) differentiation - a definition must specify enough significant properties of the word's referent to prevent confusion with something else; (3) impartiality - a definition should not be biased in that no part of the referent of the word being defined should be stressed out of proportion to other parts of the referent; (4) completeness - a definition must be complete enough to make recognition of the referent possible. There exists a tradition that definition must be only a short phrase or sentence, but adequate definition cannot always be brief (Robinson, 1950).

A quality definition taxonomy

A number of disciplines have addressed the issue of quality from a variety of perspectives. The proposed taxonomy outlined in Table 1, covers selected types of verbal definition, disciplines addressing quality, disciplinary perspectives of quality interpretation, dimensions of product quality identified in the literature, and scholarly approaches to quality definition.
Table 1. Quality Definition Taxonomy

<table>
<thead>
<tr>
<th>Selected Types of Verbal Definition (a)</th>
<th>Disciplines Addressing Quality</th>
<th>Disciplinary Perspectives of Quality Interpretation (b)</th>
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<th>Approaches to Quality Definition (b)</th>
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<tr>
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<td>Aesthetics</td>
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<tr>
<td>Anatomic</td>
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<td>Cultural Influence</td>
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<tr>
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<tr>
<td>Illustrative</td>
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<td>Engineering Applications</td>
<td>Features</td>
<td>User-based</td>
</tr>
<tr>
<td>Ocular</td>
<td>Engineering</td>
<td>Manufacturing Control</td>
<td>Perceived Quality</td>
<td>Value-based</td>
</tr>
<tr>
<td>Operational</td>
<td>Home Economics</td>
<td>Market Equilibrium</td>
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</tr>
<tr>
<td>Qualitative</td>
<td>Marketing</td>
<td>Philosophical Definition</td>
<td>Reliability</td>
<td></td>
</tr>
<tr>
<td>Quantitative</td>
<td>Operations Management</td>
<td>Profit Maximization</td>
<td>Serviceability</td>
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<tr>
<td>Quotational</td>
<td>Philosophy</td>
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<tr>
<td>Recommended</td>
<td>Statistics</td>
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<td></td>
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<tr>
<td>Synonimic</td>
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</table>

References


Selected types of verbal definition

It is within Borsodi's (1967) definition of definition that the words "meaning" and "definition" express the same idea. Knowledge, thoughts, and feelings communicated by signals or symbols is the conveyance of meaning. However, definition starts with a signal or word and communicates it in terms of knowledge, thoughts, and feelings. Robinson (1950) claims that all words are ambiguous because of the flexible nature of our vocabulary, and that a single meaning must precede definition. Borsodi (1967) has discovered twenty-six distinct methods of definition. The methods of verbal definition which seem to have relevance to this study include:

**Recommended Definition:** The linguistic ideal of one word having only one meaning, and one meaning having only one word, based on a consensus of experts.

**Synonimic Definition:** Definition of a word through the use of other words with similar, and perhaps more familiar meanings.

**Antonymic Definition:** Definition of a word through the use of contrasting words.

**Operational Definition:** Definition of a word through description of its activities, operations, or purposes.

**Anatomic Definition:** Definition of a word by specifying parts of the word.

**Qualitative Definition:** Definition of a word by stating the characteristics of that to which the word refers.

**Quantitative Definition:** Definition of a word through the use of mathematical symbols or by describing the dimensions (size, weight, length, etc.) of the referent.

**Illustrative Definition:** A contextual definition in which the word is used in a sentence or phrase to illustrate its referent.

**Quotational Definition:** The definition of a word by quotation of an authority, with its meaning clear from the context.

**Analogic Definition:** Definition of a word by reference to something with similar meaning.
which may be more familiar.

Ocular Definitions: A method of non-verbal definition by pointing to that which it refers, or by pointing to many different things which share common characteristics. Pictorial definition and diagrammatic definition are two special methods of ocular definitions.

Oates (1972) writes that knowledge is organized, and that definition is the combined process of analysis and synthesis. The reality which people attribute to definition is based on their philosophy, and how they experience, know, and interpret the world. A mere list of the qualities something possesses is inadequate as a definition because meaning may be more than an aggregate of qualities. Interrelationships of qualities may reveal the essential nature of the thing to be defined.

Disciplinary perspectives of quality definition

Garvin (1984) found that categories of literature addressing quality span the fields of philosophy, economics, marketing, and operations management. Other definitions of quality can be found in the disciplines of art, architecture, home economics, anthropology, and others. This range of disciplinary perspectives covers quality interpretation through philosophical definition, profit maximization, market equilibrium, consumer behavior, customer satisfaction, engineering applications, and manufacturing control. Consequently, widely differing terminology and varied analytic frameworks have been used to define or describe quality.

Dimensions of product quality

Throughout Garvin's (1984) review of quality literature, eight common themes have been identified as basic elements of product quality. Known as the eight dimensions of quality, they include: aesthetics, conformance, durability, performance, serviceability, reliability, features, and perceived quality.

Garvin's definitions of these eight dimensions are referred to within the contexts of specific products (1987). Performance is defined as referring to a product's primary operating characteristics which can be measured and ranked. Features are known as "the bells and
whistles" of products and services as characteristics which supplement basic functions. Reliability is the probability that a product will fail or malfunction within a certain time period. Conformance is the degree to which a product's characteristics meet established standards. Durability is a measure of product life, or the amount of use the product offers before it breaks down. Serviceability is defined as speed, courtesy, competence, and ease of repair. Aesthetics refers to how a product looks, feels, tastes, smells, or sounds, and is considered to be highly subjective. Perceived quality is primarily reputation of a product. Because people do not always have complete information about a product, inferences about quality may be made based on suggestive criteria (Garvin, 1987).

**Approaches to quality definition**

The five major approaches to the definition of quality identified by Garvin (1984) are: transcendent, product-based, user-based, value-based, and manufacturing-based. These approaches represent a conceptual synthesis of other definitions.

**Transcendent approach to quality definition**  It is a common notion that the term quality implies superiority or innate excellence (Evans & Lindsay, 1989; Glock & Kunz, 1990). Proponents of this vision believe that quality cannot be defined. Objects in the world share in aesthetic ideals and norms of value which provide criteria for judgments that we make (Oates, 1972). Quality is then only recognized through experience, since its properties are not easily analyzed (Garvin, 1984). Dewey (1934) contends that quality cannot be described nor even isolated, because quality is pervasively present. Parts of objects can be discriminated, but when the parts become members of a whole, the sense of totality becomes impossible to differentiate. It is only through intuition that "enveloping quality" becomes a felt presence. He refers to this felt presence as the spirit of the object.

Borrowing from Geoffry Scott's (1974) theories of architecture, evaluation of quality suggests separate schemes of criticism: one based on construction, and another based on aesthetics. The quality of architecture (as well as that of other objects) then can be judged by
its faithfulness to structural laws, and the whole of its beauty and constructive sincerity. He considers beauty as a form of intellectual order whose nature is hidden and implicit, thereby corresponding the act of vision with the act of comprehension. Other writers, too, have referred to the undefinable nature of the idea of quality. In this perspective, quality is an abstract notion and its recognition transcends ordinary experience.

The first century BC architect and engineer, Vitruvius wrote in his *Ten Books of Architecture* (Hawkins Collinge & Ricketts, 1991), about fundamental principles of symmetry, harmony, and proportion, considering appropriate style and proportion for the different types of materials and construction techniques. These works were respected by Renaissance architects, and influenced the successful work of Leon Battista Alberti in *De Re Aedificatoria* (1452) in which he asserted that the intellectual grasp of the theory of architecture was more important to the designer than was manual dexterity or training. Alberti defined beauty as "a harmony and concord of all the parts...so nothing could be added or subtracted, except for the worse" (Hawkins Collinge & Ricketts, 1991).

Aesthetics is the study of physiological and psychological processes relating to the perception of beauty. Dewey (1934) finds the aesthetic experience to be imaginative, with form being the force that supports one's experience of an object, within its context, to its own fulfillment. The process of aesthetic judgment and criteria of criticism were classified by Beardsley (1958) in his three general standards of unity, complexity, and intensity, whereby all aesthetic objects can be evaluated. Unity refers to an object's perfection or imperfections, its organization, and its inner logic of structure and style. Complexity refers to an object's scale, its varieties and contrasts, and its crudeness or subtlety. Intensity refers to the object's vitality, its vividness, or weakness, its beauty, or other qualities such as tenderness, irony, grace, or delicacy.

The process of aesthetic experience and perceived quality has been of interest to clothing researchers. The importance of aesthetics in clothing selection and appreciation from a
consumer perspective has been confirmed by research (Eckman, Damhorst, & Kadoiph, 1990). Lennon and Fairhurst (1991) found that clothing quality is categorized by respondents according to both aesthetic and performance criteria. Visual criteria of style, color, pattern, fabric, and appearance had the most influence on selection and purchase of respondents' garments. Fiore and Damhorst (1992) have demonstrated that studies of aesthetic attributes to perceived quality in clothing are inconclusive for several reasons. The infrequent examination of intrinsic cues, the potentially confusing effects of presented product stimuli, and the artificial simplicity of research instruments all neglect to account for the complexity of aesthetic evaluation in apparel purchase decisions.

**Product-based approach of quality definition**

Product-based definitions consider quality as a measurable quantity of a variable or an attribute of a product (Garvin, 1984). By this definition, products earn quality status by the amount of desired attributes they possess. Leffler (1982), asserts that a common distinction made between variants of the same product is that they are of differing quality. The amounts of unpriced attributes within each unit of priced attribute defines quality. Examples of these product characteristics include the size or weight of durable goods, the BTUs of heating fuel (Griliches, 1971), or the knots per square inch in rugs (Garvin, 1984). Clothing which required intensive hand stitching and elaborate boning was considered to be of high quality in the late nineteenth century (Stamper, Sharp & Donnell, 1991).

Product-based definitions of quality appear in economics literature because they assume that quality is objectively measurable and can therefore be easily incorporated into theoretical and mathematical models (Garvin, 1984; Griliches, 1971). Quality change is viewed as vertical product differentiation, in which the absolute quantities of all attributes per unit of good are increased or decreased (Lancaster, 1989). Correlated to this type of definition is the higher cost of better quality and the lower cost of lesser quality. Performance and durability are two elements of apparel quality which emerge from this type of definition (Glock & Kunz, 1990).
Vexler (1976) found in her anthropological study of blouse producers in a Mexican village that quality was defined as "...that which is the result of a high investment of a woman's time, talent, and money." She noted that the producers had standard criteria for judging the expertise in which designs and techniques were carried out, and that the producers viewed quality in terms of their own social, economic, and aesthetic values. In that culture and language, durability and beauty mean "best", so the researcher interpreted long lasting with good and good with pretty. This work reveals the importance of both language and culture in defining quality.

User-based approach of quality definition The user-based perspective assumes that quality can only be defined by individual consumers according to satisfaction of their wants and needs. Goods which best satisfy an individual's preferences would be considered best quality (Garvin, 1984), and vice versa, perhaps with a continuum between these two extremes. Juran (1974) defines quality in this way as "fitness for use", while Edwards (1968) similarly states that quality is the capacity of a good or service to satisfy the wants of its users that are intelligibly related to the product's characteristics in performance.

Lancaster's (1979) analysis of consumer preference variety, potential product variety, and economies of scale in the consumer-products sector is based on horizontal product differentiation, where products are differentiated by variations in characteristics within the same closely defined group of goods. Goods are regarded not as entities, but as bundles of objective properties. The relationship between the good and its attributes is a technical one determined either by its design, or, in the case of a non-synthesized good, by nature. Individuals demand goods for the characteristics the goods possess. Given that complete information about the good's characteristics is available, differences in reactions to the same good are seen as expression of different preferences with respect to the good's attributes, and not different perceptions as to the properties of the good.

Since this perspective is based on customer quality definition, Miller (1991) argues that a
A technically perfect product which does not meet customer expectation will fail in the marketplace, regardless of its innovations. Marketing literature on the subject of quality strategy refers to ideal combinations of product attributes which provide maximal satisfaction to specific segments of the consumer market (Kuehn & Day, 1962; Ratchford, 1975). This strategy is founded in user-based definition and recognizes that subjective elements are determinants of demand (Garvin, 1984). Perceived quality and serviceability (care) of clothing are dimensions which emerge from this definition.

**Value-based approach of quality definition**  
Value in the context of product quality means a measure of worth. Value-based definitions of product quality provide for performance at an acceptable price or conformance at an acceptable cost. Thus, quality is defined in terms of costs and prices (Feigenbaum, 1961). Value analysis is a technique used during product design to obtain the optimum value in a product by providing the necessary features for the lowest possible cost (Evans & Lindsay, 1989). Results of a consumer survey of quality in twenty-eight product categories suggest that quality is being increasingly perceived in relation to price (Garvin, 1984). In a study based on market data over ten years, Takeuchi & Quelch (1988) assert that consumers' priorities and perceptions change over time, and that consumers perceive a product's quality relative to competing products. They also indicate that the trend is toward consumers demanding high quality at low prices, as well as emphasis on values of durability, reliability, craftsmanship, and longevity in products.

Business analysts have embraced a widely held view that high relative quality position is incompatible with achieving a low relative cost position in an industry. This rationale assumes that higher quality requires the use of more expensive components, less standardized production processes, and the use of management and manufacturing practices which may not be consistent with low costs. A study based on data from six types of businesses showed that achievement of a high quality position does not require cost trade-offs in other value-added areas, and provides strong evidence for the influence of quality on financial performance.
Midas (1982) contends that quality and production are related but are not proportionately related. He defines production quality as the level of production efficiency which is required to meet specifications with a minimum of delays and defects. Product quality, on the other hand, depends on design specifications and is evidenced by the relevance, uniformity, and dependability which satisfies the customer. Productivity is defined as output over input, where input includes capital, labor, material, and energy. A product can meet specifications, yet not represent a high level of production quality. Similarly, a high level of production quality may not represent a high level of product quality. Both production quality and product quality influence productivity through the quantifiable elements of repairs, scrap, waste, warranty costs, service costs, returns, and costs associated with specification changes (Midas, 1982).

Vonderembse and White (1991) correlate quality with productivity and system capacity decisions. In a product-oriented layout, products follow the same path through the production system. A critical step in managing the productivity of the process as a whole is in recognizing where the flow of product is impeded. This point is known as a bottleneck, and the system capacity is limited by the capacity of the bottleneck. A department, operation, or work station can become a bottleneck by restricting the flow of product from upstream departments, and starving downstream departments.

Manufacturing-based approach of quality definition In the manufacturing definition, quality is an outcome of the engineering and manufacturing process as the conformance to requirements (Crosby, 1979). This definition forms the basis for control of production operations because it determines how well the manufacturing process is able to meet the design specifications. Product designs are interpreted for manufacturing through specifications and tolerances, and deviation from those tolerances (variation) is considered a violation of quality (Evans & Lindsay, 1989). This definition lends itself to the practices of reliability engineering and statistical process control (Garvin, 1984), which focus on efficiency in design and
production. In apparel manufacturing, conformance to specifications in raw materials, process, and product is a definition of quality control (Solinger, 1988).

The philosophy of Total Quality Management (TQM) is founded in the ideologies of quality experts such as Joseph Juran, W. Edwards Deming, and Philip Crosby. TQM has been adopted strategically throughout many manufacturing organizations in the past thirty years. Emphasis in TQM extends beyond production, through market analysis, product design, and customer service. Underlying the TQM philosophy, is the assumption that all individuals within an organization have responsibility for quality. Therefore, it is the responsibility of management to provide workers with the necessary environment and tools so that workers can fulfill their quality responsibilities (Evans & Lindsay, 1989).

Statistical process control authorizes production workers to detect variability in the production processes and in the outputs. This system evaluates and improves quality and productivity through techniques of sampling, statistical variation detection, and process refinement. It was developed by Walter Shewart (Evans & Lindsay, 1989) and promoted by W. Edwards Deming (Deming, 1982). Underlying the Deming philosophy is the assumption that all processes exhibit variation, both normal and abnormal. Quality can be defined through the Deming philosophy as low variability. The presence of normal variation alone reflects a process which is in statistical control. Normal variation has been attributed to random occurrences, and can be controlled by managerial actions such as training and preventive machine maintenance. Abnormal variation, on the other hand, reflects a process which is out of control, and appropriate intervention will bring the process back into control. For example, seam widths which are consistently outside of the specified tolerance may reflect abnormal variation which could be corrected through machine adjustment or operator training.

Psychological obstacles which prevent managers from understanding or adopting statistical process control (SPC) techniques have been identified by Levi and Mainstone (1987). Difficulty in recognition of randomness in a sequence of events, a tendency to perceive patterns
or causal explanations for random observations, and a reliance on salient events lead people to confuse types of variation and reject statistical arguments. The illusion of control over a manufacturing process and the causal attribution process are also cited as barriers to the adoption of SPC (Deming, 1982; Levi & Mainstone, 1987).

Relevant Concepts

Throughout the technical and academic literature, six themes were identified as being relevant to the concept of product quality and to the achievement of production quality in the manufacturing environment. The research questions were developed from these a priori themes. In addition to the concept of quality, the other a priori themes included consistency in quality definition, commitment to quality, communication of quality, responsibility for quality, and conflicts of quality.

Consistency in quality definition

Garvin (1984) alleges that there is a discrepancy among functional units within manufacturing firms regarding the definition of quality. However, he believes that different stages of the design and manufacturing process require different quality definitions. Inconsistency in quality definition may also stem from a common confusion of the concepts of quality and grade. Freund (1985) notes that grade refers to the inclusion or exclusion of features to achieve a higher or lower cost level, while quality refers to "...satisfying the totality of needs, including price...". He refers to the early conflicts in communication of quality definition as being a basis for the development of common terminology and standards.

Various organizations, such as the American Society for Quality Control (ASQC), the European Organization for Quality Control (EOQC), and the International Organization for Standardization (ISO) have developed standards and language for quality control which are applicable in a wide range of industries (Freund, 1985). The textiles and apparel industries have used various private and governmental standards for performance, flammability, and raw
materials (Solinger, 1988). Hudson (1983) writes that many people in the apparel industry are aware that some aspects of garment quality are elusive, making them difficult to measure, and that the effort to quantify all elements of a garment into specifications is based on the hope that those elusive properties of quality will emerge if the garment conforms to those specifications.

The process of establishing quality standards for apparel products considers the needs and expectations of target customers. Attributes which make up garments, such as fabric, style, and complexity of construction determine the level of quality. Product specifications are detailed descriptions of the materials and operations which establish the intrinsic quality of the product. A product of acceptable quality conforms to these standards and specifications (Glock & Kunz, 1990).

**Commitment to quality**

Successful apparel manufacturers have realized that responsibility for good quality in their products lies with management, and that the total commitment of top management is necessary for best quality despite the efforts of a quality control department (Hudson, 1988). Gilbert (1987) wrote that the importance of quality to an organization can be measured by what the organization will sacrifice to achieve it. High levels of commitment to quality have been achieved through programs to instill values and train workers, as well as through control and evaluation systems (Garvin, 1986). In a study of quality problems and attitudes in U.S. and Japanese manufacturers of air-conditioners, Garvin found support for the view that differences in quality performance (as measured by supervisors' reports of percentages of specific category defects) are correlated to differences in attitude. Among U.S. manufacturers, and between Japanese and American manufacturers, high levels of quality were associated with strong manager and worker commitment to quality. American supervisors overall reported that production schedules took priority over quality, whereas, in the Japanese companies, the importance of quality was evident through workers' strong commitment to quality goals.

Results from the Ebrahimpour & Lee (1988) study also showed a positive correlation
between commitment to quality and quality practices. In one type of firm, all managers wanted to improve quality, but the degree of support and commitment varied. They also noted that even with reported top management commitment to quality in some firms, actual quality leadership was delegated to lower level managers, thereby suggesting that quality was merely a secondary issue. Each of these studies revealed that the meaning of commitment to quality in an organization can vary significantly, and that perceived quality commitment can be demonstrated in different ways. Likewise, Gilbert (1987) found in a survey, a great deal of confusion among executives regarding the nature of their involvement in quality.

**Communication of quality**

Communication is a common theme throughout the quality literature. In Gilbert's (1987) values oriented approach to quality, he stresses that quality must first be addressed as a general corporate value, followed by communication of the firm's direction, and specific strategies and programs which support the quality goals. He provides examples of companies where quality technology and programs which were adopted without the support of organizational commitment had failed.

A study of quality problems in American and Japanese firms conducted by Garvin (1986) showed that quality was infrequently the dominant theme in the American companies, and its importance was not communicated to the factory floor. However, Japanese managers emphasized quality as a primary manufacturing objective. Policies were reported to be formulated and communicated with a focus on that quality objective. In a similar study of quality in three types of firms operating within the U.S. electronics industry, Ebrahimpour & Lee (1988) found that traditional American firms had a lack of, or extensive delay in communication among managerial levels. The firms' internal documents and publications also revealed numerous barriers to quality improvement: lack of understanding and support of quality from senior management, lack of communication among managers, lack of employee trust in supervisors and other managers, inadequate systems to evaluate people, and
insufficient training. In the same study, Japanese firms operating in the U.S. used group
decision making to help management communicate with workers and line supervisors more
effectively. Senior management involved everyone in manufacturing problems and maintained
comprehensive knowledge of quality control techniques. The critical nature of communications
in quality performance in manufacturing firms was revealed in both of these studies.

Communication is a critical element in organizational culture. Spradley and McCurdy
(1987) define culture as acquired knowledge which people use to interpret their world and
generate social behavior. The system of knowledge is learned through communication, and is
based on values which are relative to the society (organization) in which they occur.

Clark & Fujimoto (1990) take another perspective on communication as an essential element
in development of products with integrity. They define internal product integrity as the
consistency between a product's function and its structure. External product integrity is the
consistency between a product's performance and the customer's expectations. They assert
that development of products with integrity requires organizational integrity, which is
accomplished by cross-functional coordination within the company and with the firm's
suppliers. In their six year study of product development within the auto industry they found
that outstanding product developers are fluent in the languages of customers, marketers,
engineers, and developers because product concepts cannot be adequately communicated in
written documents. They found that the real work of product development went on within the
firms' informal organization, and that consistency in communication between the firms' formal
structures and the informal structures distinguished development of high quality products.
"The integration that leads to product integrity does not surface in organization charts alone...."
Leadership, they found, is the key to product integrity.

In a presentation sponsored by the World Future Society, Weiner (1991) asserted that
quality will continue to be a cornerstone of business in the 1990's. However, it is integrity that
she believes will be responsible for long-term company survival. Quality flows from
organizational integrity, which is an attitudinal and value-based method of doing business.

Responsibility for quality

In a series of surveys of manufacturing firms, Gilbert (1987) found that in firms where quality was pursued as a matter of technique common characteristics emerged: top management felt that responsibility for quality was something that could be delegated as a staff function which required minimal management involvement, there was intermittent adoption of quality fads, and the firms lacked the commitment of organizational resources for quality improvement. One of the most important findings in one of Gilbert's executive surveys was confusion and lack of consensus among executives on management's role in quality. The term involvement was often used, but inconsistently defined through a spectrum which ranged from support to participation.

Kohlbeck (1984) traced the history of quality control in American apparel manufacturing and suggests an organizational structure where quality is an autonomous function responsible for the organization's output. He notes that the common process of inspectors reporting quality problems to production supervisors or to manufacturing managers does nothing to prevent defective work. A movement has taken place to change the full-time inspector role, and return the responsibility for quality inspection back to the production worker (Sears, 1983).

Conflicts of quality

Literature on quality in manufacturing exposes several types of conflict. Traditional American corporate practices are based on a defined hierarchy founded in the Taylor scientific method (McGregor, 1960). Policy decisions flow from the top management, through the middle and lower managers as directives and down to line workers for implementation. Within this structure, American corporations have attempted to adopt Japanese-developed quality control programs. A fundamental conflict arises when these quality control activities shift decision-making and problem-solving to the level of production workers (Conners &
Romberg, 1991). Since policy is both determined and implemented at the line worker level, management's role becomes one of support of quality control and of sharing company information to better enable workers to make decisions. The incompatibility of these two production concepts result in creative adaptations and superficial implementations of quality programs which fail to address the core of the conflict. Middle and lower level managers face fears of losing authority to line workers, and fear of exposure of their departmental problems. Additionally, managers are held accountable for the failure of the programs and may be eliminated if the programs succeed (Conners & Romberg, 1991).

Another conflict in quality practice stems from product and operation specifications. In his discussion of specifications, Pitt (1981) offers the advantages of using specifications as laws, and the problems with using them as mere guidelines. The disadvantages of flexibility include inconsistency in finished goods, loss of control and discipline, undocumented procedures, and an inability to determine realistic specifications. He believes that by treating specifications as laws, real control over materials, process, and products can be realized. This philosophy may be contrary to the laws of natural variability.

Summary of Literature Review

In summary, the review of quality related literature revealed that product quality has been defined generically (i.e.; not by specific product) through many different disciplines in a wide variety of technical sources. The perspectives of economists, engineers, industrial managers, product designers, and consumers offered five product definition categories which proved to be a useful frame of reference for interpreting the meanings of apparel quality which emerged in this study. The literature also revealed a lack of descriptive research studies of apparel production behaviors related to the achievement of quality goals. No research studies of apparel quality definition within the apparel industry were found, despite the presence of numerous studies of apparel quality perceptions among consumers. There were, however,
studies of quality related issues in other types of manufacturing industries which were relevant to this study, and which helped in the development of a priori themes and in the interpretation of the data.

Apparel industry trade publications indicate that quality has been an important source of competitive advantage for producers. However, these publications have not focused on the potential significance of a specific apparel quality definition and its influence on the apparel production process. Implicit in apparel technical literature is the operational definition of quality as conformance to specifications. Throughout the literature of the identified disciplines, quality is a complex concept which has been constitutively defined by other concepts.

Overall, the literature review was valuable to this study in that it identified where quality related research has been focused, and what types of definitions of product quality have been proposed. The literature also provided a basis for the development of research questions upon which the a priori themes of concept, consistency, commitment, communication, responsibility, and conflict were founded. Review of theories of the business firm suggested an appropriate conceptual framework for the study.

Positivistic studies of apparel quality elements from the consumer perspective helped to provide a limited conceptual definition of quality for the design, development, and production of apparel. However, consumer quality studies have demonstrated their limitations (Fiore & Damhorst, 1992). The absence of research studies on apparel quality definition from a production perspective provided support for a descriptive study using qualitative methods and seeking a wide range of responses. The review of themes relevant to quality in other industries helped to reveal the potential contribution of this research to the apparel industry and to the academic field of textiles and clothing.
METHOD

The Research Approach

The purpose of this study was to develop a perceptual definition of quality among people who work in the apparel production plants of a large apparel manufacturing firm. Methods for the study were selected to reveal knowledge, behaviors, and perceptions related to the study's objectives. Therefore, firm and participant sampling, instrument development, data collection procedures, and data analysis techniques were designed to facilitate the gathering of and inquiry into a wide range of topics relating to the research questions.

Qualitative research in a field setting

Naturalistic research is characterized by an inceptive focus, which may change during the inquiry, but which establishes the boundaries of the investigation. The design of the study emerges as the study unfolds (Lincoln & Guba, 1985). Because this study was approached without firm assumptions about the relationships among the variables, qualitative methods of data collection were selected. Qualitative methods allow for less formality in studying phenomena in their natural state and are holistic in their contextual approach (Touliatos & Compton, 1988). Lincoln and Guba (1985) assert that the interview is best for naturalistic research because of human responsiveness and adaptability as well as the interviewer's ability to process information quickly and emphasize the context of the data.

Qualitative research is comprised of three major components: data gathered from various sources, with interviews and observation being the most common; interpretive techniques used to conceptualize the data; and written or verbal reports of the findings (Strauss & Corbin, 1990). Grounded theory is an analytic procedure whereby the qualitative data is conceptualized and built into a richly explanatory theory which sensitively integrates and represents reality (Strauss & Corbin, 1990). Hypotheses and theory are not proposed before the inquiry, but emerge from the data, as data analysis is inductive and open-ended (Lincoln & Guba, 1985).

Trustworthiness in naturalistic research is developed through several techniques. Adequate
observation of salient elements of the study (prolonged engagement) help to reinforce the credibility and dependability of the data. The use of several data sources and different data collection methods (triangulation) helps to ensure the objectivity, confirmability, and dependability of the data (Lincoln & Guba, 1985). Examples of data collection techniques which enhance trustworthiness include audio taped interviews of a wide range of informants, recorded field notes of observations, and analyses of documents and objects using photographs or photocopies.

Naturalistic methods consisting primarily of open-ended interviews and observation were selected as the most appropriate means for collecting data in this study. Triangulation was achieved through several types of data collection techniques and different sources of data. Opportunities for the collection of data presented themselves as the study unfolded, so all data sources were not anticipated in the study plan.

The design of this study included a combination of deductive and inductive technique. Research questions were deductively drawn from the literature. Premises within the research questions provided general conceptual categories as starting points for the primary phase of data analysis. Then, inductive analysis proceeded within and across the conceptual categories.

Sample

The firm selected for this study was identified when a colleague met representatives from the firm at an industry seminar. These representatives expressed an interest in a study of quality definition. After several telephone conversations and a formal letter which included a copy of the research proposal, the firm agreed to participate in the study. This firm is a tailored clothing producer with six domestic production plants and several off-shore operations. The product line is mostly men’s tailored suits in moderate price categories. It is a division of a larger apparel conglomerate located in the United States. According to the trade press, the tailored clothing division recently reached one hundred million dollars per year in sales.
Although this firm was selected partly out of convenience for its managers' willingness to participate, it was a highly appropriate selection for two reasons. Because the firm had several domestic plants which made different grades of the same product (men's tailored suit coats), potentially intervening variables of different garment types (such as children's wear or women's sportswear) were eliminated. Men's tailored suit coats were the garments of reference throughout the data, and some informants did make references to the grade of the garments if that distinction affected their concept of quality. The other reason this firm was selected was for its quality orientation. Quality ideology was a language that had been used in the plants over the past several years. This allowed for the exploration of behaviors that were already established in the firm and were related to quality goals. It was assumed in the selection criteria that a firm which had no quality orientation would not be able to provide quality definition data as rich and descriptive as a firm which had years of experience operating through a quality focus. The three domestic plants were selected as data sources by a senior manager according to geographical convenience. A fourth plant within this area was not selected because it performed most of the firm's cutting operations, and had no sewing facilities. The selected plants were located in three states, and were within a reasonable driving distance of each other.

The informant sample within the firm was stratified according to the following four formal constituencies: senior managers who had responsibilities which extended across plants, plant managers within each of three plants, supervisors within each of three plants, and operators within each of three plants. It was assumed that these groups would act as constituencies by sharing common goals and common frames of reference.

Within the plants, operator samples were selected from a computerized list of operators which had been generated according to length of service, with the most recently hired operators at the beginning of the list. With closed eyes and a pointed pencil, the first name was randomly selected, and with subsequent "nth" selection, at least one operator was chosen from all of the
length of service categories. Each plant had a different number of operators. The range of
plant employees was approximately 250 to 450. Even though this wasn't anticipated in the
proposal, the opportunity to have a range of responses from operators who had widely varied
lengths of service with the firm presented itself by the nature of the lists and perhaps served to
reduce bias in the sample. A larger than needed sample of operators was selected because
some operators who were sampled did not participate in the study due to absence, production
needs, or (in one case) personal preference.

Supervisors were randomly sampled from a much smaller list in one plant. In the other two
plants, all of the supervisors were included in the potential sample, and were eliminated if they
were unable to participate for reasons of absence or production or meeting priorities.

In all three plants, and in the main office, sampling of managers was purposive, according
to their responsibilities and availability for an interview. In each plant, the quality control
manager was selected, as was the engineer, and the plant manager. Several departmental
managers were also interviewed within the plants. Some senior managers who could have
contributed to the study were not available, but a representative sample of senior managers
from manufacturing, engineering, human resources, as well as the chief executive officer of the
firm were interviewed.

A total of 47 interviews were audio taped and used in data analysis. There were 22 operator
interviews, 9 supervisor interviews, 11 manager (plant) interviews, and 5 senior manager
interviews.

**Data Collection Instruments**

The data collection instruments consisted of four parts and were based on the research
questions. A semi-structured interview schedule was developed for the operators. It consisted
of 20 primary questions which reflected the operators' responsibilities within their jobs, their
knowledge about apparel quality, and their perceptions about quality goals and efforts within
the firm. A separate semi-structured interview schedule was developed for the supervisors and managers and consisted of approximately 14 primary questions. This schedule addressed the broader responsibilities of managers, and included questions about information sources, attitudes, and product variation. Several questions were the same on both schedules, and contained probes for identifying and stimulating further exploration of concepts. For example, all informants were asked about the mission of the firm, about their specific job responsibilities, the meaning of quality, and about what they thought the firm could do improve quality. Operators were asked about changes in their operations and how they were trained. Managers were asked about the firm's quality standards and allowances for variation.

The interview schedules were conceptually based on the literature and on themes identified in the research questions. The credibility of the interview schedules was confirmed by two experts in textiles and clothing and one expert in operations management. These interview guides were pre-tested at a smaller apparel production facility, and required only minor alterations.

Another data collection instrument was a brief questionnaire used prior to each interview of all the informants. This form contained the informant's identifying code number, the age and sex, the length of service, and the career history. The instrument was filled out by the researcher before the interview began and prior to turning on the tape recorders. It served as a tool to "warm up" the informants by allowing them to talk about themselves, as well as for collection of some demographic data about the sample.

The fourth data collection instrument was an observation sheet used for each location. It was categorized by process, product, quality documents, and other comments. It served to capture observations about the unique characteristics of each plant. The complete set of data collection instruments is included in Appendix A.

Prior to data collection, approval for the use of human subjects in research was obtained from the Iowa State University Human Subjects Review Committee.
Procedure

Data collection was conducted in all three of the plants as well as in the firm's main office. Several days before plant visits took place, the respective plant managers were notified by the researcher with a telephone call of introduction, as well as a facsimile which forwarded the introduction letter about the study (included in Appendix B). The managers had already been notified of their plant's participation in the study by a senior manager from the firm's main office.

Upon arrival at the plants, the researcher met with plant managers to discuss the details of the study and the sampling and data gathering techniques. Because of the advance notice, managers were prepared to set up appointments to accommodate interviews into their schedules. All interviews, meetings, and plant tours proceeded smoothly and orderly.

After the sample of operators was randomly chosen, the plant secretary was approached with the name of each potential interviewee. She called the operator's respective supervisor, who, in turn, notified the operator that he/she had been selected for an interview. The operator arrived at the front office, was greeted by the researcher and escorted to a private conference room. The study was explained both verbally and in writing. Each informant read a letter from the researcher which explained the goals of the study, the confidentiality, and the method of data collection (Appendix B). Informants were then invited to participate. A brief questionnaire was completed by the researcher prior to the interview concerning the age and sex of the informant, as well as the career history. Two small tape recorders were engaged prior to beginning the interview. In some cases, informants spoke after the tape recorders were turned off and the formal interview ended. Supervisors were notified by the same method, but sometimes had to set up appointment times for interviews because of production needs in their areas.

There was redundancy among operator responses for most questions. By the fifth day of interviewing, operator responses followed the same patterns and categories as previous
responses had in other plants. The final three operator interviews did not reveal much unique data.

In addition to interviews, data collection was enriched by the following activities: attendance at a quality audit meeting where randomly chosen garments are graded by a group of supervisors, managers, and operators; attendance at an informal plant manager meeting where quality issues were discussed; tours of the plants and distribution facility; observations of fabric inspection, cutting, sewing operations, and finishing; a visit to a nearby shopping mall with a sewing manager to view the firm's garments as well as competitors' garments in retail settings; informal conversations with a buyer, supplier, and other operators and managers; and an in-depth demonstration of the final inspection process with observation of many garments being inspected. Data collection in the plants took one full week of approximately ten hours per day. Senior managers visited the plants for interviews. A later visit to the firm's main office allowed for an interview of the fifth senior manager.

Interview lengths ranged from ten minutes to one and one half hours, with some informal managerial conversations and meetings exceeding two hours. For example, an audio taped interview of a plant sewing supervisor was about an hour in length. Later, that supervisor accompanied the researcher to a local shopping center to view garments in retail settings. Nearly all of the discussion during this activity over several hours was about the supervisor's perceptions of apparel product quality through references of garments being examined.

Data Analysis

During the data collection period, data was constantly being evaluated for appropriateness to the study's goals. Data accuracy was verified among and across constituencies. For example, several informants referred to criteria that the firm used in evaluating finished product quality. The form that the firm designed to use in this process became part of the study's database and provided verification of the reported data.
After the plant visits, data were transcribed into the Data Collector software (Turner & Handler, 1991). Interviews were printed, and five were randomly selected for concept analysis by two researchers. Statements of informants were broken down by discrete phenomena and separated into general conceptual categories. Conceptual categories were based on the a priori themes identified in the literature and developed in the research questions. Both researchers conceptualized the sampled data and compared outcomes. Minor differences were clarified and negotiated before proceeding to conceptualize the remainder of the data. For example, initially, one researcher conceptualized "consistency" only in terms of quality definition, while the other researcher also conceptualized "consistency" in terms of quality oriented behaviors in the firm. Negotiation then clarified how these different perspectives would be conceptualized throughout the data. From the conceptualized data, categories were isolated according to properties which were identified among and between the concepts. As patterns and dimensions of categories emerged, relationships were recognized. By returning to the data to verify these relationships within their contexts, further interpretation unfolded. For example, within the concept of quality meaning, categories emerged according to positive elements of quality in a garment and negative elements which prohibited quality. Further dimensions of those references involved elements which affected the garment's structure, elements which affected the garment's aesthetic properties, and elements which provided the garment with a powerful appeal. By studying across the concept category of responsibility, and comparing it to quality concept statements and categories, correlations between job responsibility and quality definition became apparent.

In order to better explore the variety and specificity of conceptual interpretation, further review of literature was conducted. For example, the concepts of variability and organizational culture emerged from the study. By returning to the literature in those areas, the conceptual linkages grounded in the data could be more thoroughly interpreted. Data analysis was also stimulated by discussions with research partners. Through these activities, further
conceptualization of the data emerged in addition to the a priori themes upon which the research questions were based. These activities reinforced the trustworthiness of the data, because other authors had addressed these concepts. This process enhanced the development of research implications and recommendations.
RESULTS

Analysis of A Priori Themes

Analysis of the data began with a separation of concepts. These concepts were based on themes identified in the literature, and provided the focus for the research questions. The following results exhibit the boundaries of the study. They include the concept of quality, consistency in the interpretation of quality, communications and quality, commitment to quality, and responsibility for quality. Constituencies within the firm were identified across all of the data.

Constituencies within the firm

The presence and functions of both formal and informal constituencies within the firm were identified in the study. It was assumed that these groups would behave as constituencies, and the study found that they did. Formal constituencies were those that were authorized by the firm's hierarchy, while informal constituencies were those that emerged out of working relationships. Formal constituencies included the executive group of senior managers. Senior managers were those who had responsibilities across plants, and who reported to vice-presidents or to the chief executive officer. Managers within plants, supervisors, and operators comprised the formal production constituency of the Kunz (1993) model. Plant managers were those whose responsibilities were within a plant. Supervisors were responsible for training and directing groups of operators. Operators had various functions, such as cutting, sewing, and finishing garments.

Both formal and informal constituencies related to production functions, or to production problems. Plants operated as formal production constituencies. Another example of a formal production constituency was a group of operators who comprised the plant finishing department and who were directed by a supervisor or finishing manager. A formal constituency was a group of managers, supervisors, and operators who came together with the common goal of evaluating the workmanship of a sample of coats in a visual quality audit. An
informal constituency was a group of plant managers and supervisors in one plant who met to solve quality related problems.

The data demonstrate that the production constituencies operated under constraints from the executive constituency, and under constraints imposed by the marketing, finance, and merchandising functions. Some constraints were self-imposed within the firm, and some were imposed by sources outside the firm, such as the government, and customers.

The concept of quality

In the review of literature, eight dimensions of product quality were identified. In this study only three of those dimensions emerged. According to the perceptions of members of the production constituency, the primary dimensions of apparel quality were aesthetic, perceived quality, and conformance to specifications. The other dimensions of quality previously identified received little or no mention in this study. The informants made references to all five approaches of product quality definitions-transcendent, product-based, user-based, value-based, and manufacturing-based.

Even though many of the informants defined quality through more than one of these approaches, most of the descriptions of the concept of quality in a tailored men's suit coat referred to aesthetic criteria within the transcendent approach of quality definition. This approach related quality to beauty. The majority of responses alluded to visual criteria with terms such as hanger appeal, nice overall appearance, hangs good, looks good, straight and neat. Other sensual criteria applied to ideas of softness, fit, comfort, crispness, symmetry, smoothness, and feeling right. Higher references of the transcendent approach involved terms such as rich, beautiful, and swept out. None of the informants referred to color or textured pattern within fabric as a dimension of quality.

Several references were made regarding the ability of a high quality coat to "jump out", to "stand head and shoulders above all others", to "grab you" and to "pop out at you" by managers who had developed expertise. These references imply motion, dimension,
animation, or a specific event that the coat was capable of engaging in. This potential motion suggests a form of allure, and could be regarded as the power of appeal. Interestingly, wool was reported as being the most tailorable, with wools from specific areas of the world being of highest quality. Well-constructed wool coats were perceived as being able to grab, stand, jump and pop. Wool fibers are known to be spring like, with an inherent resiliency. Polyester or cotton poplin coats were not capable of arousing these perceptions.

In describing quality, informants often referred to specific characteristics of garments that alluded to an absence of visual inconsistencies, or to purity. Cleanliness of the coat, absence of soil or flaws, clean seams, neatness, straightness, symmetry, balance, and consistency were terms used to relate this notion.

A common experience for most informants was an uneasiness in being asked to define quality. Because visual criteria relating to "looking good" was the most common definition of quality, expressions such as smiles and anxious laughter, as well as statements that referred to the difficulty or impossibility of this task paralleled the philosophical literature's claim on the implicit nature of beauty and the difficulty in defining it. This phenomenon relates to the transcendental nature of the concept of quality.

The perceptions of managers were overall different from those of operators. In relating the meaning of quality, managers primarily referred to holistic, aesthetic descriptions of quality. Managers could easily list many characteristics of a high quality coat. Managers saw hundreds of finished coats each day, and they reportedly studied competitors' garments in retail stores. Also, they adorned their own bodies with the coats, they participated in visual quality audits, and they sometimes taught visitors and employees about coat construction. Consequently, they defined quality in the coats through the perspectives of visual and tactile expertise. Managers responses displayed fluctuation between the objective and the subjective, between fact and opinion. References to elements of the coat that were measurable, such as straight pocket placement, were interspersed with judgments about appeal or goodness.
Operators had relatively more difficulty defining quality and listing quality characteristics. Most operators did not see finished coats on a daily basis. Reportedly, some operators had never seen a finished coat, or had seen them only in retail stores. The operators' perceptions about quality in finished garments reflected their limited experience with them. Operators were more likely to refer to quality in terms of doing their particular job right (e.g.; "... the bottom of the coat should be straight." or "...the plaids should match."). They did not have difficulty identifying characteristics of poor quality, however. Many of the operator responses associated quality with a manufacturing-based definition. This definition requires that quality is conformance to specifications. Numerous terms which referred to right or wrong made up the operators' ideas of good quality and bad quality. While manager responses reflected a reverence for the coat itself, operator responses reflected their constituency (subcultural) value of propriety of individual parts of coat construction.

**Quality as integrity and value** The informants provided many objective, descriptive elements to portray quality in a men's tailored coat. Most of these statements implicitly referred to elements of coats which were sympathetic to traditional tailoring and construction techniques. These ideas linked to the inference of structural integrity. The aesthetic of the men's tailored coat could also be explained as a composite representing every perspective of perceived quality which was reported. Aesthetic terms were not limited in the data to visual consistencies, but extended beyond the visual to comfort, fit (tactile sensations), and personal values based on cultural and sensual preferences. Thus, quality in apparel, according to this study, can be defined as the coexistence of structural integrity and aesthetic presence. Structural integrity and aesthetic presence converge within the coat to exhibit the power of appeal. This power endows the coat with value. Ultimately, in this case, quality represented value.

Table 2 demonstrates discrete portions of raw data in the form of statements from all constituencies. These statements represent diversity of perspectives rather than frequency of
Table 2. Concept of Quality Based on Statements from the Data

<table>
<thead>
<tr>
<th>Structural Integrity</th>
<th>Aesthetic Presence</th>
<th>Power of Appeal</th>
</tr>
</thead>
<tbody>
<tr>
<td>clean seams</td>
<td>feels right</td>
<td>it just grabs the eye</td>
</tr>
<tr>
<td>consistent gore seams</td>
<td>overall appearance</td>
<td>pops out at you</td>
</tr>
<tr>
<td>consistent collar notches</td>
<td>the look</td>
<td>collar expression</td>
</tr>
<tr>
<td>consistent lapel notches</td>
<td>cleanness of coat</td>
<td>shoulder expression</td>
</tr>
<tr>
<td>measurements have to be right</td>
<td>aesthetically comforting</td>
<td>coat jumps out at you</td>
</tr>
<tr>
<td>pocket bag inside should be flat</td>
<td>nice looking</td>
<td>the overall expression</td>
</tr>
<tr>
<td>everything matches good</td>
<td>whole look of the shoulder</td>
<td>it just looks rich</td>
</tr>
<tr>
<td>pockets are even</td>
<td>soft finished</td>
<td>it appeals to you</td>
</tr>
<tr>
<td>the peaks (lapel) are both pointed</td>
<td>in the eyes of the beholder</td>
<td>bunim</td>
</tr>
<tr>
<td>it has to be sewed right</td>
<td>it has to fit, feel good</td>
<td>it stands out</td>
</tr>
<tr>
<td>overall balance</td>
<td>beyond measuring &amp; fitting</td>
<td>finesse</td>
</tr>
<tr>
<td>the proper fullness</td>
<td>look good</td>
<td>hanger appeal</td>
</tr>
<tr>
<td>it has to be sewed natural</td>
<td>a different look</td>
<td>pizzazz</td>
</tr>
<tr>
<td>thing you build in a garment</td>
<td>symmetry</td>
<td></td>
</tr>
<tr>
<td>it has to be cut right</td>
<td>the drape</td>
<td></td>
</tr>
<tr>
<td>bottom of coat should be straight</td>
<td>smooth</td>
<td></td>
</tr>
<tr>
<td>good fit on the form</td>
<td>overall balance</td>
<td></td>
</tr>
<tr>
<td>a coat that matches the buttons</td>
<td>lining cleanliness</td>
<td></td>
</tr>
<tr>
<td>constructed properly and accurately</td>
<td>the proper look</td>
<td></td>
</tr>
<tr>
<td>sleeve hang is consistent</td>
<td>it is crisp</td>
<td></td>
</tr>
<tr>
<td>plaids have to match</td>
<td>coat has to be finished perfectly</td>
<td></td>
</tr>
</tbody>
</table>
reporting. The statements are categorized according to positive references in the concept of quality that refer to structural integrity, aesthetic presence, or the power of appeal.

Structural integrity is the manifestation of separate elements being coordinated and combined to provide an interrelated whole with harmony throughout. This harmony represents internal integrity. Consequently, the structural stability of the garment reinforces its symbolic meaning. Structural integrity is an honesty which may not be visually or perceptually apparent to everyone, but to the tailored clothing expert, aesthetic presence cannot exist without structural integrity. However, perfect structural integrity can exist in the absence of aesthetic presence. A well constructed coat can lack aesthetic presence, and therefore have no power of appeal to a potential buyer. Consequently, the coat has no perceived value to the buyer.

Both structural integrity and aesthetic presence reconcile the irregularities of the human body to the garment in terms of fit and comfort. The aesthetic satisfaction represents the garment's external integrity, which can be defined as the agreement between customer expectation and actual experience (Clark & Fujimoto, 1990). This definition encompasses all of the aspects of design, materials, and construction which were identified as necessary elements of quality. Although visual consistency was the most salient of the aesthetic references, the quality definition also accommodates cultural and personal interpretations of beauty which extend beyond vision. The concept of aesthetic presence accounts for quality perception in other senses, such as those of smell, tactile sensations, and sound. Most of the reported definitions indicate that the informants perceived the garment as being qualitatively different than the sum of its parts.

Poor quality Poor quality was perceived as a violation of the garment's structural integrity and/or aesthetic presence. Without structural integrity or aesthetic presence, the garment lacked the power of appeal, and hence its value. Without value, poor quality coats represent waste of the firm's resources.
Table 3. Negative Concept of Quality Based on the Data

<table>
<thead>
<tr>
<th>Structural Integrity</th>
<th>Aesthetic Presence</th>
</tr>
</thead>
<tbody>
<tr>
<td>fabric problems</td>
<td>doesn't fit</td>
</tr>
<tr>
<td>lining problems</td>
<td>lacks hanger appeal</td>
</tr>
<tr>
<td>sewing problems</td>
<td>looks like a board</td>
</tr>
<tr>
<td>puckering</td>
<td>fits like a rag</td>
</tr>
<tr>
<td>holes, dirt, oil</td>
<td>looks like adishrag</td>
</tr>
<tr>
<td>irregular</td>
<td>hangs like a dishrag</td>
</tr>
<tr>
<td>patterns don't go together</td>
<td>mismatch (plaids)</td>
</tr>
<tr>
<td>a lot of stuff wrong with it</td>
<td>pulled</td>
</tr>
<tr>
<td>wrinkled</td>
<td>floppy</td>
</tr>
<tr>
<td>crooked</td>
<td>bad appearance</td>
</tr>
<tr>
<td>slipped stitches</td>
<td>details are wrong</td>
</tr>
<tr>
<td>sleeves are twisted</td>
<td>wilted</td>
</tr>
<tr>
<td>hanging threads</td>
<td>no body</td>
</tr>
<tr>
<td>cut wrong</td>
<td>not symmetrical</td>
</tr>
<tr>
<td>material stretches</td>
<td>something wrong</td>
</tr>
<tr>
<td>button out of line</td>
<td>tight appearance</td>
</tr>
<tr>
<td>poorly made, wrinkled</td>
<td>poor fit</td>
</tr>
<tr>
<td>not hanging right</td>
<td>shaded</td>
</tr>
<tr>
<td>high/low pockets</td>
<td>looks like been worn</td>
</tr>
<tr>
<td>skips, nicks and cuts</td>
<td>stiff</td>
</tr>
<tr>
<td>crack in vent</td>
<td></td>
</tr>
<tr>
<td>pocket running downhill</td>
<td></td>
</tr>
<tr>
<td>bad pressing</td>
<td></td>
</tr>
<tr>
<td>gathers, revealed</td>
<td></td>
</tr>
<tr>
<td>uneven sleeve vents</td>
<td></td>
</tr>
<tr>
<td>strings, flaw</td>
<td></td>
</tr>
<tr>
<td>notch in lapel wider than the other</td>
<td></td>
</tr>
<tr>
<td>shaded buttons</td>
<td></td>
</tr>
</tbody>
</table>
Informants were easily able to list numerous characteristics of coats which they considered to be of poor quality. Responses were mostly negative and referred to an extreme and unacceptable condition. Descriptions such as poorly made, cut wrong, patterns don't go together, too much fullness in sleeves, lining too short or too long, shine from too much pressing, uneven lapels, etc. reveal the experiences of the respondents in learning about what was considered quality as opposed to what was not considered quality.

Evidence of poor quality can be categorized into two groups: characteristics which violated the definition and outcomes which violated the definition. Characteristics which violated the definition were found in terms such as slipped stitches, mismatched plaids, puckers, and crooked seams. Outcomes which were not consistent with structural integrity or aesthetic presence were perceived as being the result of violating characteristics and were exposed through the following types of statements which appear on Table 3. Table 3 categorizes statements according to negative references of structural integrity and aesthetic presence.

Conformance to specifications Characteristics which were inconsistent with the definition of quality could be viewed as failure to conform to specifications. However, only two informants defined quality as "conformance to specifications". This statement refers to a manufacturing-based approach of defining quality, and given the production based constituencies' experiences in manufacturing from specifications, it is no surprise that this idea is evident throughout the responses, regardless of the words chosen to express it. Perceptions of quality involved elements of an operation, an outcome of an operation, a series of operations, or a finished product as being either right or wrong. Rightness was reflected in positive terms such as right, should, correct, proper, supposed, perfect, consistent, best, make sure, and straight. Among these statements there seemed to be a firm or plant conscience which allowed varying degrees of infringement depending on any of the innumerable variables in the production process (fabrics, effects of other operations, equipment, customer requirements, etc.). Doing things "right" was associated with pleasure, pride, and profit.
Doing things "wrong" or "not right" was associated with guilt, fear of job loss, and looking bad. Operators felt responsible for quality, yet were not rewarded for it. Some examples:

Supervisor: "To me, if I look at the coat and I think it is a good one, I would be proud to wear it myself..."

Operator: "...when I do something wrong, when they bring it back to me, it makes me feel real bad that I would let something go like that."

Operator: "We try to help them do it right the first time so they don't have to do it over, because that can get real discouraging."

Operator: "I believe that quality is more important than quantity, because even if you put out a big quantity, if they are not right, they are not going to sell. I think it would be better to do less and do them right."

Few of the respondents reported an explicit connection between the firm’s definition of quality and its product specifications. The process of determining specifications in two of the plants was not well understood by either operators or some of the supervisors. Specifications for garments produced in these plants were developed in another state. However, in the plant that developed patterns and specifications on-site, the process was both well understood, and appreciated by the operators who had an opportunity to contribute. This was identified as a potential source of production quality variation, and will be explored in the discussion of the results.

Consistency in the interpretation of quality

The data demonstrate numerous inconsistencies in quality interpretation throughout the firm. The major inconsistencies were in quality definition among the formal constituencies, in the perception of the mission of the firm, and in the comprehension of the sources of product variation. Unless informants otherwise specified, when they used the term "customer" they were referring to retail firms represented by buyers, managers, or auditors. These representatives visited the production plants and interacted with the plant personnel.

Quality definition varied across constituencies. Despite general consensus within constituencies, quality definitions were personal, reflecting both the perceiver's levels of
experience and responsibilities within the firm. Personal definitions often reflected the informants' beliefs and not what they had learned about quality on the job. Those who had been employed in the industry the longest had more knowledge about quality than those with less seniority. Managers referred more to the transcendent and value-based definitions, while supervisors and operators referred more to manufacturing and product-based definitions throughout their verbal descriptions of the meaning of quality.

Other perceptual differences existed between constituencies. For example, all of the participants were asked about the mission of the company. Most informants related the mission to quality and product, while many also related the mission to customers, money, and value. Of the senior managers, 100% (n=5) related the mission to customers, while only 5% of the operators (n=22) related the mission to customers. Additionally, four of five (80%) of the senior managers related the mission to money, while only one out of twenty two (5%) of the operators did the same. Most supervisors related the mission to quality, and most plant managers related the mission to product. The data demonstrate some coherence within constituencies regarding their perceptions of the firm's mission. However, among constituencies, there were some striking inconsistencies in the perception of the firm's mission. Whether or not the firm had a written mission statement is not demonstrated in the data. No operator or supervisor mentioned how they had learned about the mission of the firm.

There was indication of inconsistency in comprehension of the sources of product variation. Operators frequently recognized variation in materials as a major source of quality problems. They also recognized variation in patterns and cutting. Supervisors frequently recognized process as a major source of variation, with issues of training, operator attitude, and communication as the foci. Managers reported variation in both materials and process, but most managers felt that the amount of variation that was tolerated depended on the demands of the customers. A common theme in managerial responses was that customers "controlled" the process, and it was this control which caused so much variation.
There was no consistent comprehension of quality as low variability in finished products among managers. Managers did offer many isolated suggestions for improvement of quality, and thus alluded to elements of variation. There was consistency within those suggestions. No single person in the firm related a holistic strategy for improving production quality. Managers consistently referred to the constraints under which they operated. Examples of constraints were high operator turnover, operator dissatisfaction with piece rates, quantitative production goals, overhead cost constraints, and problems with piece goods and linings.

**Communications and quality**

Members of all four constituencies reported that the firm is customer driven, which meant that the firm was "driven" by retail buyers, managers, and auditors. This concept is consistent with the behavioral theory of the apparel firm where high powered external coalitions compete for the firm's resources (Kunz, 1990). Senior managers believed that the firm's success was a result of accommodation to customer requests which differed in price points, production schedules, materials, styles, and types and numbers of operations. Customer information was important for understanding what customers wanted, so that prediction was minimized. It took the form of customer specification sheets, conversations with buyers and auditors, videotapes of customer feedback, customer visits to the production plants, and others. Because the information was collected in a number of formal and informal ways, it was not consistently available, nor was it always current. Verbal instructions modified written specifications throughout the process. Communication of customer requirements flowed vertically from managers to operators, with supervisors interpreting and regulating the flow of information to the operators. Information also flowed horizontally, especially among managers, and, to a lesser extent, among supervisors and among operators. Several respondents acknowledged the barriers to communication that existed in the firm. For example, a supervisor may have changed a product specification which had ramifications to the operators in a related supervisor's area, but the other supervisor wasn't notified that a change had been made. A
manager expressed dismay at the "walls" that were maintained between functional departments despite the interdepartmental cooperation which was required to fulfill the goals of the firm.

Verbal communication dominated the production process. It took the form of meetings, training, and informal conversations among and within constituencies. Other forms of communication, including actions and written documents were perceived as being important, but not as significant to actually getting things accomplished. Actions may have involved the demonstration of a finishing technique to an operator, as well as the development and presentation of a company-wide quality training program. Written documents related to quality included product specifications, strategic plans, production schedules, quality audit scores, logs of repair information, job descriptions, and others.

The firm had developed a method of communicating quality outcomes through a visual audit technique which was carried out weekly in each of its plants. The quality control manager selected five to ten coats from the finishing line and took them to a conference room. The data do not demonstrate what technique was used to select a sample, even though the managers reported selecting a "random" sample. A group of managers, supervisors, operators, and other employees met in the room to evaluate the coats. Scores were recorded on a pre-printed form using a 100 point scale evaluating ten specific areas of the coat, which included hanger appeal, lining, expression, finishing, shoulders, collar/lapel, fronts/pockets, back, sleeves, and hem/vents. Each coat was displayed on the hanger, on the form, and perhaps, on a man. The evaluators were expected to behave as amateur, end use customers, and judge the coats as if they themselves were intending to buy. Scores were revealed after the process, and those participants with outlying scores were sometimes asked to explain the reasons behind their scores in the ensuing discussion. Informants reported that the range of scores for each coat was usually narrow, indicating high interrater reliability. However, several managers remarked that the technique was flawed for several reasons. The main fault they perceived was that they were expected to look at the coats as amateur customers when in fact, they were
experts in evaluating subtle details. Another problem, was the fear some participants had of rating a coat too far from the known usual score, because they had to defend their scores, and may not have had the expertise or courage to do this. A quality control manager reported that some of the coats evaluated in the audits should have been rated very high, yet received only modest scores. In his opinion, some coats were outstanding, but the scores did not reflect their quality. Despite these shortcomings, the visual quality audit was thought of as an effective tool in communicating to the staff what was and what was not desirable in a finished coat.

Participants in these audits were expected to return to their respective areas of the plant and communicate what they learned.

This study included observation of a visual quality audit. Observation revealed that the quality control manager demonstrated a great deal of care in presentation of each coat by carefully placing it on the form or on himself, and smoothing, removing lint or threads, and arranging the lapels or collar. He did not participate in the scoring. Comments after the scoring process revealed that members of the group had different levels of expertise. A manager requested that a pocket placement be measured, because he detected that it may be "off". Indeed, it was off by an amount that exceeded tolerance. Coats which did not conform to perceived specifications were scored lower because they lacked elements of structural integrity and aesthetic presence. The participants were earnest in trying to learn from the exercise.

Written product specifications were intended to communicate the quality requirements of the customer to the plant managers, supervisors, and operators. Specifications were developed jointly by people in engineering, design, and quality control. Some operators reportedly had input into some of the specifications. Specifications formed the basis of the operator production standards and the piece rate compensation system. However, specifications were frequently altered by management. Managers admitted that specifications were maintained on basic operations, but not on feature (special or infrequent) operations because of a lack of
technical and clerical personnel to write and maintain specifications, and because of the variation in the materials and styles. Verbal communication from management appeared to take precedence over written specifications when it was perceived that changes had to be made. Written specifications did not appear to be the most active elements of production quality. Informants did not specify exactly what was written and what was verbal in the specifications.

Written specifications were intended to serve as communication of what was correct to the operators. Through communications, the operators learned "...what will go" for a particular customer and "...what won't go." Most operators were aware of specifications, but some admitted that their operations required making decisions to accommodate variations in materials and previous operations. If they were uncertain about handling a decisive situation, they called their supervisors for guidance. Supervisors and quality control managers (also described as "resident tailors") carried the burden of interpreting quality. In the words of one senior manager, "... we are relying on supervisors who have a tremendous amount of things to look after, to be responsible for all the quality." Because supervisors also trained operators for their respective areas, operators' dependency on supervisors appeared to be a major component of the plant culture.

Training as a form of communication was criticized by members of all four constituencies. When the operators were asked how they learned their jobs, most responses fell into one of the following categories: training by a supervisor, trained on the job, learned by self, or learned from another operator. Managers reported that local labor shortages were reflected in lesser skilled people applying for operator positions. High turnover in some plants was a concern, and its causes were not readily apparent to the managers. Many operators reported having been hired by this firm after having sewing experience in another apparel firm. Differences in operator attitudes about quality were attributed to several causes, including the educational and home situations people were raised in, as well as inadequate training.

Outside sources of information about quality other than customers include industry
seminars, a few trade publications, suppliers, and other manufacturers. Few managers reported any substantial reading in outside sources, with virtually no perceived access to, or knowledge of, research publications. Industry seminars were thought to be somewhat helpful, with informants discerning one or two concepts as being applicable to their jobs. Communication with managers from other companies was perceived as an important source, and decisions have been based partly on evidence of success from other companies. Most managers had access to industry trade publications, and admitted to reading these publications if they contained material which related to their business.

Communication emerged as a major theme in dealing with quality problems, in dealing with personal conflicts related to quality, and as an issue the informants thought the company should address in improvement of quality. There was concern among some managers that the intellectual property of the firm is not being collected and preserved for future communication. Intellectual property refers to the techniques and expertise which those who are experienced in production have developed over the years. There was a reported absence of an apprenticeship system in critical areas of production, such as finishing, even when the retirement of a key supervisor was imminent.

Overall, communication flow was inefficient, and restricted by hierarchy, geography and time. Communication patterns both defined the hierarchy and maintained it. There was a reliance on oral communication in the production process which lacked specificity and promoted variability. Networking or process oriented data sharing through computer technology in the plants was either absent or limited.

Commitment to quality

Informants from all constituencies reported that the firm was committed to its goal of continuously improving quality in its products. The company had reportedly developed quality consciousness within the last few years. Critical incidents, such as the threatened loss of a large customer, as well as the successful completion of a government contract with intricate
written specifications, had influenced the perceptions of the importance of quality within and among all constituencies. Respondents who were involved in production of the government contract garments admitted to a greater understanding of what was required for quality improvement. Becoming more quality conscious was perceived as a necessity in maintaining a customer-driven, growth oriented company.

Among the operators, quality commitment was associated with company profits and subsequent job security. Many operators admitted how important quality was to them in their specific operations. However, some complained about other operators who were not serious enough about quality. Among operators and supervisors, poor quality work on the part of operators was attributed to attitude, which in turn reflected making "production" (piece rate incentive) and knowing what "will go", or how much variance they could get by with. Operators who were willing to forego income by stopping their work to send a defective garment back, to help another operator, or to question a supervisor about a quality problem were perceived by others as being committed to quality. Those operators who did not exhibit such behavior, but instead kept up their pace, and intentionally or unintentionally "sew(ed) over bad work" were perceived as not being committed to quality. The altruistic operator who essentially donated time and effort to the company defended her behavior by citing personal ethics, beliefs in the value of teamwork, personal reputation, and concern for the perceptions of the end customer. Ironically, sewing operations were perceived by managers as manual rather than intellectual jobs.

Although operators identified many obstacles to quality which they faced in their daily work, they did not equate the presence of these obstacles with a lack of true commitment to quality on the part of management. Most of the operators believed that the management was committed to quality. Their beliefs had developed by the following evidence: rejections at final inspection, the presence of a quality control manager in each plant, a quality training program, plant visits by senior managers with feedback on their perceptions of quality in the plant's
output, customer feedback, and regular visual quality audits. The operators, supervisors, and managers accepted the obstacles to quality that existed (such as variation in materials and variation in operator training) as inevitable, and their struggles to accommodate variation was considered a principal element of commitment to quality.

Managers associated commitment to quality with competitive advantage in a global economy. They reported that all of the managers in the company were committed to the company's quality goals, but without offering specific reasons, they thought a few managers interpreted quality differently than did the majority. Supervisors and managers related techniques which they used to motivate others to strive for improvement in quality. Overall, there was a clear element of personal commitment to quality within most of the informants.

Responsibility for Quality

All operators, supervisors, and plant managers admitted when asked, that they were responsible for product quality. Many also thought that everyone in the company should be responsible for quality. Responsibilities in these constituencies were learned through experience on the job. Several supervisors reported that their responsibilities evolved as they were promoted from operator positions to supervisory positions. Managers noted that their responsibilities had changed as the company has changed. For example, the company was more production driven ten years ago. Operators were encouraged to earn as much as they could by viewing their operations as small personal profit centers, thereby keeping production high. With the recent quality orientation of the company, and the customer driven growth initiatives, managers now had different responsibilities that did not emphasize high production at the expense of quality.

More than half of the operators reported that their responsibilities changed regularly. These changes were related to work flow in the plant or style changes. New responsibilities were taught to these operators by supervisors or quality control managers. Responsibility for specification development or changes reportedly belonged to the plant quality control manager,
who then disseminated the information to the supervisors and operators involved. Operators recognized their responsibilities as allegiance to directives which came from above.

Three of the five senior managers were aloof about direct quality responsibility, and made references to delegation as their primary responsibility related to quality. All admitted at least ultimate responsibility for quality. It was within the executive constituency that the responsibility for a quality attitude and communication of that attitude was most dominant. Their perceptions of quality responsibility involved making sure that they had the right people in appropriate positions, and that those people had the necessary support and information. It was within the plant manager constituency that attitude alone was perceived as insufficient and sincere responsibility for quality was demonstrated by actions.

Individuals who worked in this company held the responsibility for verifying quality throughout the production process. Fabrics were inspected, roll by roll, with flaws tagged for pattern markings and cutters to work around. Some rolls were rejected if the number of flaws exceeded a certain limit. Reportedly, one or two mills verified the quality of their fabrics before the fabric was shipped. Despite this knowledge, all incoming fabric continued to be inspected. Responsibility for verifying quality was implicit in the operator duties. Operators were expected to send back a garment which appeared defective rather than continuing to process it. Finishing operation rates were developed to allow enough time for the presser to evaluate that the proper outcome had been achieved. Supervisors and the plant quality control managers were responsible for identifying quality problems in-line and taking actions to rectify those problems. Final inspectors verified quality through a visual process augmented with manual checking of seams and pockets. Inspectors were responsible for deciding if a garment was unacceptable and if it needed to be returned to respective departments for repair, or if it was rejected as irregular. This firm endured the costs associated with verifying supplier quality, as well as the costs of verifying quality in its products for its own customers.

Despite this level of inspection, at times, defective garments were shipped and the
customers discovered the defects. Most informants who addressed this issue thought that the
defective garments were almost always detected before shipping. Some informants expressed
dismay at the high number of repairs given the amount of effort the firm expends for quality
inspection. The final inspection rejection rate in one of the plants had reportedly been 27%.
Supervisors admitted that they were also repairing garments before they were finished, so the
actual rework rate was higher and was unknown. Repairs were considered by all
constituencies to be a normal part of the production process. Consequently, repairs were
expected, and the production process accommodated their acceptance.

Conflicts of quality

Throughout the data, there was evidence of numerous local conflicts. However, overall,
one of the most salient themes of this study was the recurring conflict of quality versus
productivity. It was perceived that the production process has a certain stable zone, and when
the rate of production is increased, quality deteriorated. Within this conflict were many
elements, such as the guilt an operator felt when she pushed to get the work out, while
worrying about the risk of sloppy work and the potential damage to her reputation. Plant
managers were concerned about the conflicts of quality activities on their plant's bottom line.
The plant that produced a higher volume of garments had more tension among and within
constituencies.

Operators reported many other related conflicts. They recognized that they were
interdependent on one another, yet some operators failed to contribute as team members. With
a recent plant layoff and subsequent permanent loss of some employees, there was concern
about job security among some operators and supervisors, causing conflict in commitment.
Managers, however, expressed confidence in the company's growth and pride in the
company's market position.

There was some perception that auditing and inspection activities in the plants by the
supervisors, quality control managers, or inspectors were policing functions, with data being
used to document who had failed. Operators were expected to perform at a high skill level, without creating conflict. Supervisors were expected to document perceived incompetence or rule violation by operators, as well as document the meetings which were held to resolve those conflicts.

Managers coped with a great deal of conflict, depending on their responsibilities. Plant engineers set the piece rates for sewing and finishing operations with the goal of balancing maximum use of direct labor dollars with the demands for operator compensation. Numerous conflicts about the fairness of rates versus the complexity of the tasks were reported. Occasionally, operators objected when their production standards were developed by the engineer, and the operation was then changed by the quality control manager. Operators insisted that if the operation was essentially altered, the production standard should reflect this alteration. The most significant conflict regarding the piece rate compensation system was that it provided a positive incentive for rapid production and a negative incentive for the conscientious protection of quality specifications. The piece rate system was also perceived as an inhibition to teamwork and a primary means for the operator constituency to compete with the management constituency for the financial resources of the firm.

Plant managers reported conflicts of high employee turnover with local labor being increasingly unskilled. Making operations more simple, so that less skilled people could be accommodated was one proposed solution. Managers had reportedly done no formal analyses of local labor statistics, nor had they done structured exit interviews of employees who were leaving.

Identified within the data were two or more behavioral levels. Some types of behavior were consistent with the goals of the individual, some with the goals of the constituency, and some with the goals of the firm. This behavior of varying individual priorities, constituency priorities, and firm priorities may be related to the reward system, and was rooted in many of the conflicts. An example of this refers back to the individual operator conflict with high
personal earnings for high productivity (reward) versus the firm quality imperatives which financially penalized the operator for helping inadequately trained operators.

Managers reported that their compensation would be affected if the firm failed to meet some of its quality goals. However, it was unclear what the quality goals of the firm were. Statements such as "continuously improving" and "better quality" were vague and lacked direction. There was no discussion of how the fulfillment of quality goals would be measured or determined. Individuals, constituencies, and the firm as a whole, behaved according to how they believed their actions were going to be measured and rewarded. Despite inefficient or unpredictable behavior of the individuals or of the constituencies, coherent patterns of goal fulfillment were realized in the firm. Goals appeared to be fulfilled within constituencies through a system of shared beliefs and values which constituted the cultural paradigm of the firm.

The cultural paradigm of the firm was further characterized by the use of results oriented data (such as financial statements) to recognize problems, reliance on unsystematic production floor experience for personnel development, denial or avoidance of other information sources, and intuition-based decision making. Within the firm, there was some evidence of the same implicit gender and social class role typing that exists in the society at large. Blame for variation in quality was directed heavily toward customers and plant floor operators. There was also an element of frustration in managers who espoused the principle of quality as the firm's priority, yet were not able to reduce variation.

Emergent Themes

While this study was based on the behavioral theory of the firm, another highly related behavioral paradigm emerged—the concept of organizational culture. Organizational culture has been defined by Schein (1984) as a pattern of basic assumptions that a group has developed in learning to cope with its problems related to external adaptation and internal integration. The
culture of a company develops over time from many influential sources. Underlying assumptions gain validity by producing behavior which leads to success. Therefore, the assumptions can be taught to new members as the correct way to think. A company's culture evolves from the company's reward structure, from industry practices, from outside constraints such as laws and the influences of organized labor groups, from social changes, from customer and stockholder demands, from the needs of people within the company, and from many other transient channels. A firm's culture exists within the context of an industry culture, within the cultures of suppliers and customers, and within the larger domestic and global cultures.

A pattern of basic assumptions form the taken for granted structure which allows the firm to work. These assumptions lie at the foundation of everything the firm does and everything it thinks it should do. An example of an assumption which underlies many American firms is that the firm exists to make a profit (Anderson, 1982). Understanding a culture requires a critical analysis of the organization's visible artifacts (e.g.; public documents, constructed environment, technology, etc.), as well as its espoused values. As values lead to behavior, and behavior solves problems, the values become transformed into assumptions which underlie the culture (Schein, 1984). Therefore, understanding what was happening in this firm required an analysis of the assumptions upon which the behavior in the firm was based.

Four major cultural assumptions were identified in the study. These assumptions were conceptually grounded in the data and were based on the beliefs, perceptions, and behaviors within the firm. It was believed by most managers that these assumptions permeated the American apparel industry and were not unique to this firm. 1) Apparel manufacturing should be a customer driven system. 2) The apparel production process is linear. 3) Variation in the production process cannot be controlled. 4) Success of an apparel manufacturing firm is dependent on the speed of production. Other subsequent assumptions which were derived from these, exposed a cascade of complexity within the firm.
Apparel manufacturing should be a customer driven system

One of the most salient themes of this study was the informants' belief that customers should be allowed to force the firm to accommodate their needs. Customers, defined as retail buyers, managers, or auditors were perceived to have exerted control over the production process. Because the customers needed and demanded quality in the products, a subsequent assumption under which the firm operated was that it was the customer who ultimately defined quality. Therefore, it was understood that the only legitimate definition of product quality was that which each customer specified. An important source of conflict arose when retail "customers" acted as buying agents of end customers, and had to anticipate what end customers would want to purchase during a given season at a certain price point. The definitions of quality that existed in the specifications were meant to represent the needs of end customers, based on their past buying habits and other information upon which such decisions were made.

Under the assumption that customers have driven the production process, the customers' demands acted as constraints which then exerted control over the firm's resources. The management had retained little perceived control. Capitulation to customer demands was a major managerial conflict because of the levels of expertise managers had about product quality versus the inadequacy of product quality knowledge among the customers.

Dichotomy of quality perceptions and production consequences  Given the average range of scores on the visual quality audits, and the informants' opinions about the quality of coats being produced at the three plants, there existed a dichotomy between what the informants thought was quality and what was being produced. Because it was reported that some plants had failed retail customer quality audits, apparently retail customers, too, were not always satisfied with the production quality. When asked how much variation in quality was allowed, one manager replied:

"...so you start off with a picture in your mind of what is perfect, and you start finding
things that are problems. Somewhere between the first slightly crooked seam that you see, and the tremendous problem of a puckered lapel, is a breaking point that something is not accepted. And that is awfully, awfully difficult to determine where that point, where they cross that line..."

It is not known if customer or managerial expectations were realistic. Customers may have expected more aesthetic presence than the limits of this type of manufacturing process could have provided. Also, customers may have been seeking structural integrity as that which existed when all specifications were within tolerance. Tolerance, then became critical to the customers' definitions of quality.

Managers, too, may have developed attitudes about quality in those coats after seeing and wearing better coats from other sources, while not realizing their own firm's limitations in consistent production of those levels of quality. Customers reportedly sourced coats with identical specifications from several different manufacturers. Any ambiguity or significant quality failure could have been readily apparent to an auditor when comparisons between vendors were made.

Clearly there was inconsistency in quality definition between constituencies within the firm, and between the firm and its customers. Consequently, everyone was not speaking the same language and did not have the same understanding and expectations. In one manager's words:

"It is not the attitude so much, as it is what is quality...and it is different from one person to the next. The manufacturing person, to him, it is how the garment drapes, the collar locks in around the neck, and how the sleeve hangs. And to the sales and merchandising people, he is not attuned to that at all. To him, it is more obvious things, maybe the buttons or the pressing, the shine, the real obvious...more the consumer look. And it is very different than just an understanding and a level of expertise."

Visual quality audits were meant to bring various constituencies in the firm together to learn about quality in the products through the language of the ten audit criteria. However, those who were grading coats according to what they thought the group would accept were not
allowing the process of scoring to reveal itself as a failure in true objective evaluation. For those who attended their first audit, and who did not understand what shoulder expression was, the score they offered was not helpful information. Because the sampling procedure was not truly random, and other forms of bias could have been introduced into the scoring process, the scores were probably not meaningful. However, for all participants, the process of showing coats and discussion about coats was very helpful in the participants' understanding of the managers' quality ideals. Whether the gain of the audit process justified its cost was not known. Operators and supervisors who left the visual quality audits enlightened by what they had learned could not translate the product quality knowledge into improvement of the production quality in the plants because they did not have the knowledge or power to do so.

**The apparel production process is linear**

The production process was assumed to be a simple, linear system, characterized by many, complex problems. The linear system perceptions were demonstrated by job descriptions, top-down directives, and the apparent flow of garment pieces from cutting to finishing. Design and pattern making functions were located at a remote facility. Job descriptions were written, and reportedly defined the discrete tasks and responsibilities which were expected of all employees. Personal job responsibilities were described briefly in interviews as though the richness of workplace context did not exist. Formal reporting responsibilities were vertical. Numerous references were made about the production "line". The plants operated on the assumption that work should begin when all the employees arrived at 7 AM and continued until employees left in the afternoon, leaving work-in-process inventory sitting in bundles at all times. Complexity was seen as an inevitable set of difficulties that interfered with linearity, and that had few apparent, acceptable solutions.

Linear thinking was further characterized by the assumptions that there were simple causes for complex effects, consequently, most behavior in the firm could be explained by the informants as having one or two main reasons. For example, it was assumed that control over
operator behavior in its many forms would result in control over the plant's costs as well as control over the product. When a plant's costs or its production quality failure was too high, it was assumed by management that more control had to be exerted over the operators. This assumption neglected the needs and motivations (i.e., the complexity) of the human beings in the production system. The goal of "quality control" reflected the perceived linear relationship of control rather than the complexity of achieving consistent quality. This is reflected in the following managerial statement:

"An operator who is coming in here is going to make $10.00 per hundred coats could care less about your drape and your whatever, but if you tell her, 'sew from here to here, match this outfit', then you know it is going to be fine when you are done."

Examination of the process of production through the data reveals that the process was, instead, a complex, non-linear system, characterized by fundamental problems of variability. The production system demonstrated itself as being non-linear in many ways. Clues to the culture of the organization emerged throughout the data, and it was the culture of the firm that created and supported the complexity of the production process. Although a simple business model of firm conduct may have prevailed in the job descriptions and in the minds of some managers, the data indicate that there was a strong social model in the production process. Successful operators, supervisors, and managers had developed skills in communication, troubleshooting, teaching, decision making, and information gathering (i.e., "...on the job training."). These skills were developed in the context of the workplace, and in response to the complexity of the process. For example, the skilled operators appeared to be the ones who had learned the strategies necessary for managing ambiguity in the specifications and variability in the materials and the previous production processes. Also, the successful operators had learned the subtleties of the incentives and disincentives in the compensation system, and could exert some influence in the plant to accommodate their own interests. Operators in one plan:
reported that they were frequently asked for their ideas about how to improve the production process. They were motivated by the opportunity to contribute.

All three plants appeared to have high work in process inventory. This study did not address issues of work flow directly. However, informants reported that communications between production departments was a constant source of problems. Several operators expressed their dismay at the inspection process taking place after the finishing process. Defective coats were finished, only to be discovered in final inspection, sent back for repair, and then refinished. These operators felt that inspection should take place earlier in the system, before the firm has added so much value to defective coats.

Centralized decision making. A subsequent assumption of linearity was that of centralized decision making. Decisions were made from the top down, or from those who knew what should be done to those who did not know what should be done (i.e.; from senior manager to plant manager to supervisor to operator). This system was maintained as long as those on the bottom cooperated. Those who knew what should be done were those who had contact with the customers. Consequently, centralized decision making was assumed to result in more satisfied customers. Despite professed obedience and respect for higher levels of management, supervisors and operators were not always pleased with decisions that were made or the directions given. Customers needs, and the directions they provided to the production people were not clear. From the production perspectives, problems in production quality were not easily solved by sweeping directives from above. In the words of one operator:

"Some customers buy this material that we got to make their coats out of, and it is worse than a dishrag, but we have to go ahead and put out a coat that I wouldn't have, but you know, that is what they want, so that is what you have to give them..."

Variations in managerial beliefs and practices converged into the other four areas of variation. The managerial paradigm mirrors that of the US apparel industry. It was characterized by a Theory X (McGregor, 1960) bureaucracy, paternalism, some gender role
typing, reliance on industry sources which may be inaccurate and biased, and traditional
industry accounting and promotion practices. Social and cultural barriers existed between
managers and operators. Managers were developed on the job, although many had some type
of engineering and/or management background. Promotions were based on job experience and
demonstrated competence. Decisions were made based on past experiences, intuition, group
consensus, or other forms of limited search behavior. Consequently, managers options were
limited. The firm culture valued job experience above formal education. Gut feelings of
managers were acceptable in final decisions if data was not available. There was a continuous
managerial focus on short run problem solving rather than long term process improvement.
This attitude may be consistent with the financial results oriented data by which the firm's
managers are forced to respond. The managers assumed that the firm's rapid growth was a
positive development, and was the firm's reward for its customer orientation. They supported
further growth initiatives.

The production process was characterized by uncertainty avoidance as well as risk
acceptance. Uncertainty avoidance may have evolved from the conservative culture in the
industry, as well as from the cash flow constraints of the firm. Uncertainty avoidance affected
buying practices, merchandising and marketing decisions, hiring and compensation practices,
capital equipment purchases, and many other decisions which managers had to make. The
constraint of expense control could be seen and felt in every plant. A dominant theme among
managers was the avoidance of spending money, rather than the endearment of making money.
Risk acceptance affected all of the same decisions. Taking risks was perceived as making
decisions based on limited information.

Every manager had identified and explored the problems of production quality failure and
had struggled with potential solutions. Simple search behavior, such as meetings with
operators and supervisors, was evident in the data. Some managers had participated in distant
searches, including seminar attendance and visits of apparel firms in other regions of the world
in attempts to find the clues necessary to solve the complex quality problems. Others had
resigned themselves to the belief that the answers to the problems existed within the plants,
especially on the production floors. They thought that over time, solutions would unfold in the
form of technology, deskill operations, more basic designs, or improved operator training.
Generally, the problems were rationally constructed as if they could all be solved or had to be
solved on the production floor.

There was not any solid constituency-based consensus on who was considered as being
most responsible for the problems. Some respondents believed that quality production
problems originated with those doing the cutting, some believed that the sewing operators were
at fault, others thought that there weren't enough inspectors, and several operators complained
about patterns being inaccurate. A few supervisors and managers admitted confidently that the
problems ultimately originated with the behavior of senior management.

Although operators may have enjoyed competence in their work, they did not feel that they
possessed a genuine freedom of inquiry or expression regarding the production levels or the
process. The culture of the plant had not dignified the operators with participation in or
recognition of anything relating to power. A manager revealed his awareness that the operators
were not telling management everything they knew. Some operators demonstrated managerial
capabilities in the interviews through confidence in their knowledge, analytical skills, and
verbal communication skills. Also, some female operators perceived that they did not have the
opportunity to be promoted beyond the line supervisory level because of the (implicit) gender
role attitudes in the culture of the firm. Female supervisors also expressed the apparent
difficulty of personal development and promotion to management positions.

Production quality failure Production quality failure was perceived as a major problem in
the firm because of its cost. It was defined quantitatively by the percentage of finished
garments which required repair or were classified as irregular. The repair percentage figure
fluctuated over time, and the plant employees were made aware of it through signs posted in
the plants or through verbal communication from management. Senior managers were acutely aware of the production quality failure rates, and their trends, in each plant. Plant managers had contended with trying to reduce these rates in order to keep their manufacturing costs as low as possible, while concomitantly keeping their productivity as high as possible. By in large, this was attempted through direct control strategies of close supervision, and frequent intervention when potential failure outcomes were recognized. Managers believed that the current performances of their plants were capable of realizing improvement, and they expressed dedication to fostering that improvement.

**Variation in the production process cannot be controlled**

Throughout the firm it was perceived that variation in the production process could not be controlled primarily because of unpredictable customer demands and inadequate production operators. A subsequent assumption was that production operators, with the guidance of supervisors and quality control managers, should be able to compensate for preexisting variation.

The firm had neither quantified nor qualified the variation in its production processes. Little process oriented data was collected or used for process improvement. Therefore, it was not known how much or what kinds of variation were occurring according to plant, cut, customer, etc. Local managers and supervisors used essentially intuitive criteria from the history of the production process to create solutions for individual cases of variation. The data demonstrated that variations in the process and outcomes were frequent, that written specifications were not clearly defined nor widely accepted, and that adequate methods were not made available to measure outcomes. Given the reported weakness in operator training and quality failure of materials, it was possible that consistent conformance to specifications for some products was an unreasonable goal. However, process control is possible, and should be the first step (Evans & Lindsay, 1989). When products did not pass customer quality audits, there must have been a substantial and customer-important difference between operation specifications and
actual practices. There may have been a problem in the process of developing production specifications from either designer specifications or customer specifications. Managers also reported that some customer quality auditors did not have expertise in the products and did not have reasonable criteria for evaluating quality, but the managers felt compelled to conform.

When asked how specifications were developed, this supervisor replied:

"I presume now that they are done by the management at plants, and the big boss men. They are the ones that work these up. And they work with all the quality people and then they see what the customer is looking for, and what kind of quality they are looking for, and that is what we have got to look for...so they write it up and pass it down to us."

The data reveal that there were five core problems of production quality failure in the firm. The problems were those of variation in materials, labor, process, technology, and management. Each problem was characterized by a system of knowledge and behaviors which existed as obstacles to production quality.

Variation in materials was recognized as the most important and common constraint in both product quality and production quality. Piece goods varied from three dollar a yard polyester to expensive, imported silks and wools. Fabrics were sourced from many worldwide locations, some of the sources had little or no internal quality control. For example, hand woven silks arrived in burlap bags from India. Managers viewed this sourcing as a competitive advantage because it offered their customers higher valued fabrics and greater product differentiation, which they thought domestic sourcing could not offer. No informant reported that data was being collected on materials variations, nor were there suggestions that the firm could obtain verified quality materials from its vendors.

Fabrics were reportedly flawed, incorrectly sized, color shaded, improperly finished, or defective in other ways. Systems did not apparently deal with these problems before value was added to the product. The poor quality of lining fabrics was a major concern at one of the plants. Defective fabrics achieved legitimacy in the production process by being marked for
cutters to work around. Because they were so many complaints from operators and supervisors about defective fabrics throughout the process, the solution of allowing defects to enter the process under the surveillance of the cutters was obviously not working.

Other materials variations occurred in findings such as buttons, thread, fusibles, and shoulder pads. Buttons were reportedly shaded, uneven in widths, missing holes, or were the wrong kind for the coat. A button operator had reported questioning the supervisor about the quality of a batch of buttons which did not match in color. The operator felt that it was in violation of a quality standard to have used those buttons. The supervisor contacted the vendor, and then told the operator to use the buttons anyway. In this example, production speed took priority over a quality standard. Reports of other materials problems reinforce the conclusion that vendors to this firm were not verifying quality, yet continued to make sales to the firm. One manager lamented about the false economy of trying to save a few cents per yard on piece goods, then having to spend so much more time in production because of the poor quality of the goods. This is further evidence of the pervasiveness of a managerial cost cutting objective.

The firm assumed that incoming materials would have variation, and that production personnel would have to confront the consequences of the variation, as well as prevent the variation from reaching the firm's retail customers in the form of finished product. Variation in materials attracted problems throughout the firm. The operators thought that their jobs would be so much easier if only they had good materials to work with. They complained about the fabrics which some of the customers provided, and the absurdity of trying to placate the customers' quality demands with such poor quality materials. The speed of production necessary to meet the customers' deadlines further complicated the situation. The immediate efforts by supervisors to control the effects of materials variance concealed the amount of total variance from the entire firm. Furthermore, these efforts helped to support the assumption that buying materials and sewing garments is a precarious and indeterminate business.
Variation in labor is also assumed to be dependent on circumstances beyond the firm's control. The labor force training is done by supervisors and operators on the job through unstructured and undocumented methods. In two of the plants, a constant trickle of female job applicants came through the doors. Hiring was being conducted in each of those plants by a single woman. New operators were reportedly trained in their respective departments. In the words of one operator:

"I didn't know what was right and what was wrong. You just sit down and you do the best you can. I think they (operators) should have more time spent with them, as far as training...as far as people checking their work more..."

Variability in operators' knowledge was evident throughout the data, and depended in part on what information the supervisors or managers had shared with the operators. The operators had little or no knowledge about their job security, or the financial performance of the plants and firm. They had variable knowledge about the product design and development process, the company mission, customer requirements, and inspection criteria. Obstacles to quality which operators recognized included a lack of control over the perceived incompetence of other operators or supervisors. Also, operators thought they lacked control over changes related to designs, materials, equipment, patterns, cutting, etc.

Process variability was also evident on a larger scale. For example, running different quality standards in the same plant according to differing customer requirements was something that one manager thought the company could no longer tolerate. Continuous changes in specifications, customer requirements, inventory flow, products (styles, fabrics, trims), and time schedules required the production plants to continuously accommodate variation within the self-imposed linear constraints of the progressive bundle system and the piece rate compensation system.

Variation in technology emerged as an issue, but was not well-explored in this study. A certain number of quality problems occurred because of machine problems. Skipped stitches in
hundreds of coats, and variable outcomes on different fabrics in finishing equipment settings were examples of technology related quality problems. Issues of preventative maintenance on machines, or data collection on breakdowns were not explored. Technology which was inappropriate for fabric, design, or production requirements was mentioned. Quality problems related to machinery focused on cleanliness, age, and malfunction. New technology was being explored by the management in an effort to achieve better product consistency and lower costs. Some solutions for quality failure were thought to be adoption of new technology and deskillling.

There was evidence of variability throughout the production process. Ambiguity in specifications was a major source of variation. Because changes in specifications during production were often reported, the necessity for changes may have been a reflection of an inadequate product development process, which may have, in turn, reflected severe time constraints. Proficient operators were cultivated by the process of fractionated operations, making it difficult for them to conceptualize the holistic quality of the garment. Additionally, skill fractionation may have made it more difficult for them to adapt to product changes and control the consequences of their work.

**Sensitive dependence on primary circumstances** Just as the subtle details in a coat determined the coat’s quality, the subtle details in the production process determined production quality. Tiny flaws in some fabric appeared to pose relatively small cost or variation consequences to the firm when the fabric was received. But after production and inspection costs, the tiny flaw that ended up on the lapel of an otherwise perfect coat (which could not be repaired) had magnified into significant costs to the firm. A machine that skipped, a specification that was changed and not communicated, an operation that was done in error, or any other seemingly insignificant combination of variation sources interrupted the order of the process and resulted in impressive production quality failure. Even with perfect materials, variation had begun with dull cutting blades and absent notches. Imprecision in patterns and
inaccuracy in specifications could have enormous consequences in the production plants. The production process was acutely sensitive to all conditions through which disorder developed. Production quality was extremely sensitive to small variations within the process. Interventions with the system either restored order or created more disorder in some other place. Supervisors who were pulling coats out of bundles to repair them could have been adding more variation or creating a condition which would cause variation farther downstream. Conditions which caused variation were perceived by many of the informants. The concept of dependence on primary circumstances was clearly demonstrated in descriptions of product quality. Relatively insignificant time contributions to an entire coat, such as press shine, could render a coat with structural integrity into one that lacked aesthetic appeal and was not considered a quality garment. The informants were extremely sensitive to other subtle details which violated their internal criteria of quality, and influenced their perceptions of poor quality. Each coat was acutely sensitive to aberrations within the materials and within the system which produced it. Trivial details led to remarkable changes in a coat which forced it to cross an imaginary line dividing the good from the bad. It could then be implied that nearly perfect coats are created from nearly perfect materials in a production system which does not encourage disorder.

In summary, variation in production was either created in the process or brought in from other sources. Materials, labor, technology, process, and managerial practices were the sources of variation. Variation manifested itself in the finished products as production quality failure.

Success of an apparel manufacturing firm is dependent on the speed of production

Time was perceived as a critical element of production. Managerial goals and responsibilities were sometimes stated in terms of how many good coats had to go out the door each day. Success of each plant and that of the entire firm was believed to be dependent on the speed of production. Operators were thought to be motivated by incremental increases in
wages. It was assumed that paying operators by the piece would result in the desired operator behavior of high speed production. Because speed was critical, a subsequent assumption was that oral communication could adequately support the production process. Under this assumption, verbal changes could be made in specifications or to clarify other elements of production in order to accommodate variability. Although none of the informants specifically mentioned the time value of money, managers and operators were aware of the cost of time in terms of direct labor. Some managers were also aware of the costs associated with high work in process, finished inventory, and coping with materials variation.

An underlying assumption of labor variability was that the operator who was fast and accurate was more valuable to the process than one who was slower and accurate. An operator who was slow and inaccurate could not be tolerated and had to be removed from the system, if necessary. However, managers and supervisors expressed the importance of patience in teaching and showing operators what should be done. With the piece rate compensation system, the fastest operators earned more money and enjoyed higher prestige than did the slower operators. Operators expressed pride when leaving the plant if they "made production" that day. The goal of this firm's management was to train and promote operators to maximize productivity in their operations. Managers believed that if all the operators were fast and accurate, the plant's overall productivity would improve. However, this goal may not have been realistic, considering the high operator turnover. In certain areas of any manufacturing plant, fast and highly paid operators create expensive buildups of inventory in front of slower departments or slower operations. Operators were sometimes moved to other areas to help out if they were out of work in their departments. Idle time for any operator was taboo. Referring back to an operations management text (Vonderembse & White, 1991), the production capacity of a plant is equal to the slowest unit, department or operation. For example, highly paid operators who were able to rapidly sew products which then sat for hours or days in front of the finishing department, have not contributed, through their increased speed, to the overall
throughput rate of the plant. In this viewpoint, throughput of the system as a whole is more important to productivity than are individual fast operations which are not strategically located in the process.

**Conclusion**

In the final stage of data analysis, three broad concepts were apparent. These related to what people knew about quality, how their knowledge affected the way they thought, and how their thinking affected the way they behaved. The first was that knowledge was intellectual property, and was a dominant factor of apparel production. The second was that of linear thinking and its relationship to the firm's inability to completely control the complexity of the process. Coupling complex knowledge and uncertainty with linear thinking encouraged the intuition-based decision making paradigm of the firm.

**Intellectual property as a dominant factor of production**

The common theme among all five sources of variation was that of knowledge. Knowledge of the techniques which had evolved to produce the apparel products included the knowledge of sourcing and managing materials, human capital, and capital assets. The knowledge was both generated internally and acquired from outside sources. It allowed the firm to make and market its products. This knowledge was owned by the firm, and it was that which helped distinguish the firm from others in the industry. As proprietary knowledge, it was here considered to be intellectual property. Thus, intellectual property of the firm could be defined as its shared universe of information and meaning (Harrison, 1992).

Culture is the knowledge which people use to generate behavior-it is not the behavior itself. (Spradley & McCurdy, 1987). Through the perspective of quality issues, this study revealed that the behavior in the firm was constructed from the firm's intellectual property. Therefore, intellectual property was a dominant factor of production, and could be recognized as the most powerful asset the firm owned. Organizational learning was a constant progression. The
study revealed that an unknown, but significant amount of intellectual property existed only in
the minds of the people in the firm. Effective managerial styles, results from materials testing,
successful training methods, knowledge of customer preferences or vendor capabilities, and
secret techniques of operators in sewing and finishing were all examples of intellectual property
which the firm used to fulfill its goals.

There was concern among some of the managers that this knowledge was not explicitly
valued by the firm because the firm had not "captured" it in the form of documentation, training
programs, plant process databases, formal apprenticeship programs, or other means. The firm
collected results-oriented data in the form of financial statements, productivity reports, sales
data, etc. Financial data is inadequate for identifying sources of problems or means of
improvement. The collection of process-oriented data, which was part of the firm's
continuously evolving intellectual property, was lacking.

Deception of linear thinking

The study indicated that the production process was an interactive matrix of processes, and
was not linear. Consequently, simple cause and effect relationships did not exist, and
managerial efforts to correlate behavior with outcomes had not been successful. Separation of
the concurrent and sequential events in the production process from the management process
was necessary to comprehend how managerial decision making formed the complex interactive
matrix (Kunz, 1993). The firm's reward systems supported the assumption of linearity, yet
were not consistent with the firm's quality goals. Quality control was not achieved by any one
action, such as training. Simple search behavior of managers who tried to solve the problems
of production quality failure was inadequate for the same reason. The cost cutting posture of
the management may have been encouraging variation. Managers were encouraged to think in
terms of cause and effect/problem and solution. Controlling complexity by the erroneous
perception that there was a simple, linear relationship among production variables was
unsuccessful. Managerial thinking about the production process as a mere set of individualized
simple operations without any interactive potential among them was interpreted in this study as a critical element of production quality failure.

**Intuition-based decision making**

Despite the implicit respect for the power within the hierarchy, decision making related to the finished product in this firm was inherently decentralized. Many decisions which had potentially major implications for the firm as a whole, were being made by supervisors in the plants who struggled out of fear to accommodate uncontrolled variation. Because the firm had not created a process oriented database for making decisions, problems had to be resolved at all levels of the firm with results oriented data and with consequential uncertainty. Without data, quality decisions were based on intuition which developed from the experience and knowledge that the firm valued.
SUMMARY

Apparel manufacturers have been concerned about the quality of their products and the costs of production quality failure. Rising import penetration with upgraded value by foreign producers has motivated American apparel manufacturers to develop quality related goals and programs. Apparel product specifications may constitute the firm's definition of quality for each product, as well as provide a basis in evaluation for acceptability as first quality. Technical literature within the apparel industry, as well as apparel production textbooks, offer many different meanings of quality. However, research studies have not defined quality through the perspectives of apparel production personnel.

A review of quality related literature revealed many definitions of the quality concept throughout a diversity of disciplines. The perspectives of economists, engineers, industrial managers, product designers, and consumers offered five product definition categories which proved to be a useful frame of reference for interpreting the meanings of apparel quality which emerged in this study. The literature also revealed a lack of descriptive research studies of apparel production behaviors related to the achievement of quality goals. No research studies of apparel quality definition within the apparel industry were found, despite the presence of numerous studies of apparel quality perceptions among consumers. There were, however, studies of quality related issues in other types of manufacturing industries which were relevant to this study, and which helped in the development of a priori themes and in the interpretation of the data.

Apparel industry trade publications indicate that quality has been an important source of competitive advantage for producers. However, these publications have not focused on the potential significance of a specific apparel quality definition and its influence on the apparel production process. Implicit in apparel technical literature is the operational definition of quality as conformance to specifications. Throughout the literature of the identified disciplines, quality is a complex concept which has been constitutively defined by other concepts.
Overall, the literature review was valuable to this study in that it identified where quality related research has been focused, and what types of definitions of product quality have been proposed. The literature also provided a basis for the development of research questions upon which the a priori themes of concept, consistency, commitment, communication, responsibility, and conflict were founded. Review of theories of the business firm suggested an appropriate conceptual framework for the study which was the behavioral theory of the firm (Cyert & March, 1963; Kunz, 1993).

The objectives of the study were to 1) Identify, describe, and define the meaning of apparel quality through the perceptions, knowledge, and beliefs of senior managers, plant managers, supervisors, and operators in an apparel manufacturing firm, 2) Compare and contrast perceptions of apparel quality issues among and between senior managers, plant managers, supervisors, and operators in the firm, and 3) Contribute to the development of a behavioral theory of the apparel firm.

Because the purpose of this study was to develop a perceptual definition of quality among people who work in apparel production plants, naturalistic methods best facilitated the gathering and inquiry into a wide range of responses, with a behavioral theory of the firm as a theoretical basis. The study was conducted in a large tailored clothing firm whose management professed a commitment to improving quality. Within the firm, sampling was stratified by constituency. At the managerial levels, sampling was purposive, with line supervisors and operators randomly sampled within each of three plants. Semi-structured, open-ended interviews (n=47) were audio taped and transcribed. Other data collection techniques included visual inspection of garments, attendance at a visual quality audit, and informal conversations and observations of production and inspection activities. Emergent themes were inductively identified through content analysis and triangulation of interviews, field notes, and observations.

Most of the verbal elements used to describe the quality concept were made in reference to
a men's tailored suit coat, which was the primary product of the three apparel plants. A
definition of quality was composed from the data. Ultimately, quality in a garment represented
value. A garment earned value by acquiring three essential properties during its production.
Structural integrity emerged from proper construction techniques and appropriate materials.
Aesthetic presence emerged from structural integrity and provided sensual accordance
through visual consistency and elements of tactile comfort. The power of appeal endowed
the garment with value, and represented the convergence of structural integrity and aesthetic
presence. This holistic definition was not explicitly established in the firm by the management,
nor was it perceived or articulated by its constituencies.

The data demonstrate numerous inconsistencies in quality definition throughout the firm.
Despite general definitional consensus within constituencies, quality definitions were personal,
and reflected each informant's level of experience and responsibilities. Managers referred to
transcendent and value-based definitions, while supervisors and operators referred to
manufacturing-based and product-based definitions.

Verbal communication was found to dominate the production process and emerged as a
major theme in solving quality problems, in dealing with personal conflicts related to quality,
and in improving production quality. Informants from all constituencies reported that the firm
was committed to a goal of continuous quality improvement, and all informants reported
responsibility for quality. Most conflict emerged from the piece rate compensation system and
other constraints under which the production system operated.

Four major cultural assumptions were identified in the study. These assumptions were
conceptually grounded in the data and were based on the beliefs, perceptions, and behaviors
within the firm. It was believed by most managers that these assumptions permeated the
American apparel industry and were not unique to this firm. The assumptions were: 1) Apparel
manufacturing should be a customer driven system. 2) The apparel production process is
linear. 3) Variation in the production process cannot be controlled. 4) Success of an apparel
manufacturing firm is dependent on the speed of production. Other subsequent assumptions which were derived from these, exposed a cascade of complexity within the firm.

Production quality failure was related to variation in materials, technology, labor, process, and managerial behaviors. The presence of variation within and between garments was identified as a violation of quality. It was also found that the culture of the firm created and supported variation in product quality and production quality. The study revealed that there were numerous constraints imposed on the production constituencies. These constraints were either externally imposed or internally imposed, and they prevented the production constituencies from fulfilling their goals of creating apparel products which were consistent with the management's implicit definitions of quality.

This study was designed to capture in-depth knowledge about garment quality from production personnel. If quality was the priority of this firm, the definition of quality composed from the study could provide a conceptual framework for the firm's operations. By making the definition explicit to all personnel, vendors, and customers, the firm could establish its ideology, provide a consistency of purpose, and a supportive environment for specific production quality goals.

The study could also make a contribution to curriculum development in academic apparel programs. Students in the areas of design, merchandising, and production could use this definition of apparel quality as a frame of reference for their quality related learning activities. Results of the study may offer students an introduction to industry practices and the realities of apparel production.

The final objective of the study was to contribute to the development of a behavioral theory of the apparel firm which was proposed by Kunz (1993). The Kunz model portrays the apparel firm's production process as a complex, interactive matrix of activities, within a larger matrix of specialized constituencies. The other constituencies of merchandising, marketing, operations and finance, and executive management impose constraints on the production
constituency. The results of this study offer evidence that the apparel production constituency behaves according to goals and constraints that are imposed on it.

Recommendations

Several years ago, the management of this firm recognized that product quality and production quality were strategically important. Based on information within the industry and trade literature, they instituted a learning program for all employees. This program taught operators and supervisors about the firm's quality goals. It also helped to develop an awareness of quality, as well as quality problem solving skills. The study shows that this program was effective in creating and sustaining an awareness of personal responsibility for quality and firm commitment to quality. However, it was not clear that product quality and production quality took precedence over quantitative production goals.

If quality is a priority of the firm, the definition of quality composed from the study could provide a conceptual framework for the firm to use in making decisions. Making this definition explicit to all personnel, vendors, and customers would be of primary importance, because it would firmly establish the firm's ideology. Integration of the definition into the mission of the firm could provide a consistency of purpose and a supportive environment for definitive production quality goals. Consequently, the definition of quality could be adopted by the firm as a conceptual (or strategic) basis upon which the firm operates. The effect may unify the firm to support more definitive quality.

In the wide range of executive constituency determinations, namely, from capital budgets to personnel policies, making decisions from the factual basis of what will enhance or preserve structural integrity in the products and reduce variability in the process, would allow decision makers to focus on the choices that are relevant to quality. If operators were trained to know that their primary responsibility as members of the firm was to develop the structural integrity of the product and to enhance its aesthetic presence, they could make their decisions from that
basis instead of from the group norms which have evolved within their constituencies. People within the firm need to be given the knowledge and power to stop the process when quality conditions are violated.

Managers and supervisors could develop a consistent training program and provide technical leadership according to the quality definition. In materials procurement, buyers could stand behind the firm's definition when insisting on verified quality from vendors. The firm should then reward the development of structural integrity through the reduction of variability. In doing so, the firm would give its members permission to support the quality definition and the mission of the firm. Rewards do not have to be monetary, and could consist of recognition for reducing variability, assurance of job security, achievement of group generated goals, or the privilege of perceiving some control over one's own job responsibilities.

The firm needs to develop its priorities through the explicit mission of the firm. Processes and procedures can then be developed and communicated to support the mission. Design and marketing efforts could also arise from the same definitional focus, providing a congruent language for quality expectations of the firm and its customers. Furthermore, the firm could differentiate itself to potential customers because its quality focus would be defined and, consequently, would be more unique. Customers could then recognize that the firm's quality commitment was explicit and pervasive. Within the past ten years, many apparel firms have adopted a quality orientation, but they have probably not explicitly defined what quality is to all of their stakeholders. On all behavioral levels, the firm's decisions and activities could originate from the knowledge of what apparel quality is.

It is the process-oriented data which can reveal the specific sources of variation. Coupling process-oriented data with the knowledge and adaptive skills of all personnel could result in a significantly stronger production process with much less variation. The definition of quality as structural integrity, aesthetic presence, and the power of appeal could become the firm's quality standard by which it measures production quality success. However, for practical purposes,
parts of the definition could be applicable only in certain areas of the production process. The firm needs to determine which product standards support the definition. For example, inspectors could be trained to evaluate all of the elements in coats which constitute or violate structural integrity. Inspection could then take place before finishing, with inspectors focusing on the verification of structural integrity. Coats that violate the criteria of structural integrity could be sent back for repair before they are finished. The finishing personnel could then assume that they are receiving coats which have had their structural integrity verified. It is they who could be trained to assure the element of aesthetic presence is fully developed in the finishing process and maximize the potential that each coat has the power of appeal. The role of inspection could also be reduced by providing operators with intense training on quality standards and rewarding them for supporting the standards.

In this way, the definition becomes a philosophy from which the production personnel could gain some support for decisions, could resolve conflicts, and could strengthen their production process. The definition can help the firm to move forward in its quest for quality as a basis of implementing policies to support a quality focus. A stronger production process would be one that is efficient in time and money, flexible, continuously improving, and best able to meet the customers' needs.

Through the study's emergent themes, some of the firm's underlying cultural assumptions were identified. It may be of value for the firm to examine these assumptions. The cultural environment is maintaining constraints which are interfering with production quality.

**Limitations of Research**

The results of this work are based on the study of a single firm. Because the cultural assumptions under which this firm operated were thought to be prevalent throughout the industry, some of these findings can probably be generalized to other apparel firms. Furthermore, the definition of apparel quality which emerged was based on men's tailored
clothing and may not be applicable to all other types of apparel. A relatively small number of operators were interviewed, 22 out of a population of over 500. Despite redundancy in the operator interviews, this sample percentage is very small (less than 4%), and may not have provided a full range of possible responses.

**Recommendations for Further Research**

The five areas of variability which emerged through examination of the research questions—materials, technology, process, labor, and management—deserve further, in-depth study. Each area of variability could be a study in itself. With the nature of the apparel industry's products and the velocity of their modifications, controlling variability is essential to the survival of all firms. Further descriptive studies of a firm's behavior regarding these areas of variability may lead to progressive methods of variation control.

Another pertinent area for research which emerged in this study was the product development process and the subsequent transfer of this information into product specifications through a quality definition perspective. The product development process was not well understood by the informants in this study, even though it was critical for them to understand how quality was built into the product, and may have affected their behaviors in production.

By examining the assumptions of linearity, and their relationships to the apparel manufacturing process, researchers may be able to document process dependencies and interrelationships, thereby advancing the development of an interactive process model. Modular manufacturing is a current method addressing linearity.

Further study of this quality model could be conducted in other firms with different apparel products. A statistical (positivistic) study could be based on this study, also.

Because corporate culture emerged as an important theme, further research on the role of culture in apparel production quality would be valuable. Many types of studies could be done with the behavioral theory of the firm as a conceptual basis and could further describe the
inherent complexity in apparel production. The relationship of the behavioral theory of the firm and the kinds of effective cultures that can exist within it may reveal the range of behaviors that can create and maintain a successful apparel firm.
REFERENCES


ACKNOWLEDGMENTS

It is with profound appreciation that I thank the management and the informants of the referent firm for supporting this study, and for sharing the firm's knowledge of apparel quality with the academic community.

This work depended on the support and expertise of Grace Kunz, as well as the cultural perspectives of Mary Littrell and the quality operations influence of Barbara Flynn.

Emotional guidance for my persistent involvement with the thesis progression was provided with eloquent fluency by William Bender.
APPENDIX A: DATA COLLECTION INSTRUMENTS
Production Operators Interview Guide

1. What is the mission of this company?

2. What is the importance of product quality in this company?

3. What are your responsibilities as an operator?

4. How did you learn your job?

5. Do your responsibilities change regularly?

6. Do you have to do new operations? If so, how often?

7. How do you learn new operations?

8. Are you responsible for quality?
   **Probe:** If not, then who is?
   If yes, in what way?

9. How do you know what quality should be?

10. Where do you get information about quality?
    **Probe:** Written or verbal specifications for operations or products
        Instructions from supervisor
        Learned in training
        Inspector
        Other operator
        Industry seminars
        Trade publications

11. Do you provide information to others in the company about quality?
    **Probe:** Supervisors
        Trainers
        Operators
        Managers

12. Can you tell me what quality means to you?

13. How would you describe one of your products that is of high quality?

14. How would you describe one of your products that is of low quality?

15. Do you have problems with quality?

16. Does your company ship poor quality products?
    **Probe:** If yes, how do you feel about it?

17. How are quality problems dealt with?
18. Are your ideas about quality the same as those of your supervisors?

**Probe:**
- If yes, how do those attitudes develop?
- If no, how is conflict dealt with?

19. Are your ideas about quality the same as those of other operators?

**Probe:**
- If yes, how do those attitudes develop?
- If no, how is conflict dealt with?

20. What do you think the firm can do to decrease the repair rate and improve quality?
Senior Management/ Plant Management/Line Management
Interview Guide

1. What is the mission of this company?

2. What is the importance of product quality in this company?

3. What are your responsibilities in this company?

4. Are you responsible for quality in the products?
   Probes: If yes, how? How did you learn these responsibilities?
   If not, who is? How do they learn their responsibilities?

5. Can you tell me what quality means to you?

6. Does your company have standards for quality?

7. Does your company have specifications for its products?
   Probes: If yes, how are they developed, and by whom?

8. How much variation in quality is allowed?

9. Where do you get information about quality?
   Probes: >Management?
   If yes, in what form?
   >Industry seminars?
   If yes, sponsored by whom?
   >Others in the company?
   If yes, what are their titles and lines of communication?
   >Trade publications?
   If yes, can you name an example?
   >Research publications?
   If yes, can you name an example?
   >Standards/specifications?
   If yes, how are they developed?

10. Is there consistency among the managers in their attitudes toward quality?
   Probes: If yes, how did those attitudes develop?
   What is the source?
   If no, how is conflict dealt with?

11. Is there consistency among the operators in their attitudes toward quality?
   Probes: If yes, how did those attitudes develop?
   What is the source?
   If no, how is conflict dealt with?

12. How would you describe one of your products that is of high quality?
13. How would you describe one of your products that is of low quality?

14. What do you think the company can do to decrease the repair rate and improve quality?
Preliminary Questionnaire: The Meaning of Apparel Quality

The interviewer will ask you the following questions and record the answers on this form at the beginning of the interview. Neither you nor your employer(s) will be identified by name in the publications that might result from this research.

To assure confidentiality, your responses are identified only by number, not by name.

1. #___ Male Female Age ___

2. Present position/Title: ________________________________

3. Employer: _______________ Location: ____________________

4. How long have you been in this position? ____________________

5. Briefly summarize your career history: ____________________

_________________________________________________________

_________________________________________________________

_________________________________________________________
Plant Observations

Plant Code: ______

Processes:

Products:

Documents related to quality:

Comments:
APPENDIX B: INTRODUCTORY LETTER
Introduction of Research Project for Personal Interviews:

The Meaning of Apparel Quality Through the Perceptions of Managers and Production Workers in Apparel Manufacturing Firms.

Dear Participant:

I am a graduate student from the Textiles and Clothing department of Iowa State University in Ames, Iowa. This summer, I am conducting a research project to learn about quality from the perspectives of managers and operators who work in an apparel manufacturing firm. I have selected you for an interview because of your experience and expertise. Therefore, I would like to talk with you in some depth about your perceptions of quality in apparel manufacturing. Your participation will help to fulfill my research goals, which are:

1. To describe the meaning of apparel quality through the perceptions of operators and managers in apparel manufacturing companies.

2. To understand how apparel companies put quality into their products.

I have prepared a guide to the topics which I want to discuss with you, so I may be taking some notes when I visit you at your company for approximately one hour. All records of the information you share with me will be identified by number only. No names will appear on any information from you. Any publications from this research will be written without identification of names, companies, cities, or people.

I will be writing a master's thesis from this research, as well as an article or two which may appear in a publication. Because accuracy is of critical importance, I would like to tape record this interview. The information you give me is more valuable in your own words. No one but me and my faculty supervisor will hear this tape. (Any references to people or companies within the tape will be made anonymous when the data is published).

Your participation in this study is voluntary. I would like you to participate, but if you cannot, I will understand. You may withdraw at any time.

If you wish, I would be pleased to send you a copy of the summary and recommendations of this research.

Heidi P. Scheller

(Address & telephone)
Information for Review of Research Involving Human Subjects
Iowa State University
(Please type and use the attached instructions for completing this form)

1. Title of Project: The Meaning of Apparel Quality through the Perceptions of Managers and Production Workers in Apparel Manufacturing Firms

2. I agree to provide the proper surveillance of this project to insure that the rights and welfare of the human subjects are protected. I will report any adverse reactions to the committee. Additions to or changes in research procedures after the project has been approved will be submitted to the committee for review. I agree to request renewal of approval for any project continuing more than one year.

Heidi P. Scheller
Typed Name of Principal Investigator

Textiles and Clothing
Department

140 LeBaron Hall
Campus Address

294-2626
Campus Telephone

6/17/92
Signature of Principal Investigator

3. Signatures of other investigators

Signature redacted for privacy

Date

Relationship to Principal Investigator

Signature redacted for privacy

4. Principal Investigator(s) (check all that apply)

☐ Faculty  ☑ Staff  ☑ Graduate Student  ☐ Undergraduate Student

5. Project (check all that apply)

☐ Research  ☑ Thesis or dissertation  ☐ Class project  ☐ Independent Study (490, 590, Honors project)

6. Number of subjects (complete all that apply)

# Adults, non-students  # ISU student  # minors under 14  # minors 14 - 17

(approximate)

7. Brief description of proposed research involving human subjects: (See instructions, Item 7. Use an additional page if needed.)

Interviews will be conducted with managers and operators in five midwestern apparel manufacturing firms about their concepts of apparel quality, their responsibilities for quality, and the firm's conflicts about quality.

(Please do not send research, thesis, or dissertation proposals.)

8. Informed Consent:

☐ Signed informed consent will be obtained. (Attach a copy of your form.)

☑ Modified informed consent will be obtained. (See instructions, item 8.)

☐ Not applicable to this project.
Checklist for Attachments and Time Schedule

The following are attached (please check):

12. ☑ Letter or written statement to subjects indicating clearly:
   a) purpose of the research
   b) the use of any identifier codes (names, #’s), how they will be used, and when they will be removed (see Item 17)
   c) an estimate of time needed for participation in the research and the place
   d) if applicable, location of the research activity
   e) how you will ensure confidentiality
   f) in a longitudinal study, note when and how you will contact subjects later
   g) participation is voluntary; nonparticipation will not affect evaluations of the subject

13. ☐ Consent form (if applicable)

14. ☐ Letter of approval for research from cooperating organizations or institutions (if applicable)

15. ☑ Data-gathering instruments (Tentative instrument-revisions may be made after pretesting)

16. Anticipated dates for contact with subjects:

   **First Contact**
   - June 25, 1992
   - Month/Day/Year

   **Last Contact**
   - August 4, 1992
   - Month/Day/Year

17. If applicable: anticipated date that identifiers will be removed from completed survey instruments and/or audio or visual tapes will be erased:

   - May 30, 1993
   - Month/Day/Year

18. Signature of Departmental Executive Officer

   Signature redacted for privacy

   Date: 6/19/92

   Department or Administrative Unit

   Signature redacted for privacy

19. Decision of the University Human Subjects Review Committee:

   ☑ Project Approved
   ☐ Project Not Approved
   ☐ No Action Required

   Patricia M. Keith
   Name of Committee Chairperson

   Date: 6/25/92

   Signature redacted for privacy

   Signature of Committee Chairperson

GC:1/90