CHAPTER 1
MEANING OF QUALITY

Quality has been with us since the dawn of civilization, however, since after Second World War it has been used more and more as a competitive weapon or competitive advantage. In order to understand this we have to only look at Japan which is a textbook case of how a nation used quality to become a world player in trade and industry. In the first few years after the Second World War as Japan was rebuilding from the war, many business executive went through training in quality, which was conducted by Drs. Deming and Juran. These executives took the quality message to heart and we can see the results today, which are too obvious to mention. Soon on the heels of Japan, some of the other countries such as South Korea, Taiwan, and Singapore in Asia/Pacific followed this model and became very successful in the world arena. This success resulted in rising standard of living for their citizens. These countries understood very well that in order to grow and prosper they had to tap the world market, and the only way they will be able to do that would be to offer quality products. Customers all over the world have become so demanding and expecting good quality that increasingly, quality is no longer a competitive advantage, but it is becoming a sheer necessity to survive in the marketplace. Therefore, quality has to be designed and built into products and not just “inspected” into products. What follows in the subsequent chapters will help you build quality into apparel. In order to design and manufacture quality into products, quality must be managed, and in order to effectively manage quality its meaning must be clearly understood, i.e., quality must be clearly defined.

“If we can show that a world without Quality functions abnormally, then we have shown that Quality exists, whether it is defined or not” so said Robert Pirsig [Pirsig, 2006] in a best seller book entitled “Zen and The Art of Motorcycle Maintenance.” While we can show quality exists, in order to manage quality, we must be able to define it.
Quality is unusually slippery and difficult to come to grips with and therefore, someone has said, “quality is something I know when I see it.” To some, quality defined is like ‘love,’ hard to define but you know it when you feel it and you know its absence, which can be felt. To some, quality means selling merchandise that does not come back but the customers do.

1-1 Dictionary Meaning of Quality

The simplest way to answer the question “what is quality?” is to look it up in a dictionary. According to Webster's II New Revised University Dictionary, quality is essential character: nature, an ingredient or distinguishing attribute: property, a character trait, superiority of kind, degree of grade or excellence.

The term “quality” is derived from the Latin (qualitas) and means attribute, characteristic, property, condition [Link 55, 2010].

1-2 What Quality Means to People?

If we asked several people, “What is quality?” We may get answers like:

- The best money can buy
- Meeting a specification or conformance to specifications
- Craftsmanship
- The degree of excellence that an item possesses
- No more than 1 % defective lot
- Anything Japanese or German

These responses, of course, depend on peoples’ perception of the value of a product or service under consideration and their expectation of performance, durability, reliability, etc. of that product or service. Therefore, quality means different things to different people.

1-3 Quality = Absence of Variation

Quality can also mean absence of variation in its broadest sense. For example, if you are manufacturing men’s trousers and your fabric specification calls for fabric weight of minimum of 356 grams/square meter (10.5 ounces per square yard) and you start receiving fabric that is anywhere from 285.5 to 322 grams per square meter (8.42 to 9.5 ounces per square yard), it is not quality fabric so far as you are concerned, because it varies considerably from what your requirements are.

If you are making men’s and/or women’s suits, then any discernable shade variation between the jackets and trousers fabric would be considered poor quality because such shade variation causes suits to be unacceptable.

Consider another example, the case of Ford vs. Mazda.....which unfolded years ago [Taguchi and Clausing, 1990]. Ford owns about 25% of Mazda and
asked the Japanese company to build transmissions for a car it was selling in the U.S. Both Ford and Mazda were supposed to build to identical specifications. Ford adopted zero defects as its standard. Yet, after the cars had been on the road for a while, it became clear that Ford’s transmissions were generating far higher warranty costs and customer complaints about the noise. To its credit, Ford disassembled and carefully measured samples of transmissions made by both companies. At first, Ford engineers thought their gauges were malfunctioning because while Ford parts showed some variation, in their measurements, they were all within the specifications, but the parts of Mazda gear boxes showed no variability at all from target specifications. That is why Mazda incurred lower production, scrap, rework, and warranty costs.

Automobile battery is yet another example [Quality Alert Institute, 1991]. An automobile battery is charged with an alternator. The alternator has a regulator that controls the charge to the battery. The alternator voltage regulator assembly must let out a charge of 13.2 volts to keep the battery’s charge at 12 volts. If the alternator produces a charge of less than 13.2 volts, the electrolyte (acid) in the battery will gradually turn into water, resulting in failure of the battery. The lower the alternator output, the more quickly this will happen. If the alternator output is more than 13.2 volts, excessive heat will build up in battery. As the alternator output increases, this effect will occur more quickly. Therefore, the variation in alternator voltage will affect the battery life and battery life is considered to represent battery quality.

1-4 Quality = Meeting or Conforming to Specifications

This is the meaning of quality that people in manufacturing are quite familiar with because almost anything that is made is made according to some specifications. The question here is how good are the specifications? Do they reflect what customers want? There is an underlying assumption for those working with this meaning of quality that the specifications truly reflect customer requirements.

If you are a contract manufacturer then you are not much concerned with whether the specifications you have truly reflect customers’ requirements or not, because the customer, typically, a retailer or a buying house gave you those specifications and your objective is to make garments to those specifications. However, if you are not a contract manufacturer but you develop your own lines several times a year depending on the seasons, then, you really have to be concerned about how well your specifications for fabric, sizing, color, style, etc. reflect your customers’ requirements. Therefore, the challenge in meeting or conforming to specifications is to make sure that the specifications accurately reflect customers’ requirements.
1-5 Quality = Meeting or Exceeding Customer Expectations

The attributes a product has to display in order for customers to be satisfied depend on the individual customer's expectations. Therefore, there is no such thing as absolute quality, only customer specific quality [Link 55, 2010]. Therefore, quality means meeting customer's expectations. However, since we live in time of fierce competition, meeting customer expectations is not sufficient to grow business; we must strive to exceed customer expectations - all the time. The key here is to know accurately customer expectations on a continuing basis because unless you know customer expectations how can you meet or exceed them? The expectations of quality and the ability to distinguish various quality characteristics also vary from one group of customers to another. Generally, the more educated and sophisticated the customer, the more specific are expectations of quality and more precise the ability of the customers to explore those expectations. While there is a higher degree of tolerance for quality problems with “innovative” products, there is no tolerance for quality problems in commodity products [Watson, 2003].

John Rabbitt of The Foxboro Company [The Conference Board, 1994] defines quality as “the ability to exceed a customer’s expectations while maintaining a cost competitive market position.” This definition of quality emphasizes competitiveness. It implies that anyone can meet a customer's expectations if costs were no consideration, but the key is to be able to meet a customer's expectations within the cost constrains placed by the market place.

1-6 Eight Dimensions of Quality

According to Dr. Garvin [1988] of Harvard Business School quality can be defined in terms of eight dimensions. These eight dimensions are performance, features, reliability, conformance, durability, serviceability, aesthetics, and perceived quality.

“Performance refers to the primary operating characteristics of a product. For an automobile, they would be traits like acceleration, handling, cruising speed, and comfort; for a television set, they would include sound and picture clarity, color, and the ability to receive distant stations. In service businesses such as fast food and airlines, an important aspect of performance is often service speed or the absence of waiting time.” For clothing items, performance would mean shrinkage in laundering or dry cleaning, colorfastness, abrasion resistance, strength, etc.

“Features are the ‘bells and whistles’ of products, those secondary characteristics that supplement the product’s basic functioning. Examples include free drinks on a plane flight, permanent press as well as cotton
cycles on a washing machine, and automatic tuners on a color television set.” For clothing items, features will include some functional fabric finishes, such as, durable press, stain/soil release, odor resistance, etc.

“Reliability reflects the probability of a product's malfunctioning or failing within a specified period of time. Reliability normally becomes important to consumers as downtime and maintenance become more expensive.” For clothing items reliability would mean how well an item would withstand effects of daily wear and refurbishing.

“Conformance is the degree to which a product's design and operating characteristics meet pre established standards.” For clothing items, conformance can mean how well an item meets design specifications such as sizing and construction features.

“Durability can be defined as the amount of use one gets from a product before it physically deteriorates. A light bulb provides the perfect example. After so many hours of use, the filament in a light bulb burns up and the bulb must be replaced. Repair is impossible.” For clothing items durability would mean how long a clothing item lasts before it must be discarded.

“A sixth dimension of quality is serviceability, or the speed, courtesy, competence, and ease of repair. Consumers are concerned not only about a product's breaking down but also about the elapsed time before service is restored, the timeliness with which service appointments are kept, the nature of their dealings with service personnel, and the frequency with which service calls or repairs fail to correct outstanding problems.” Serviceability has a slightly different meaning for clothing items. Serviceability of a clothing item generally means how well a clothing item will perform in daily wear and refurbishing.

“Aesthetics – how a product looks, feels, sounds, tastes, or smells – is clearly a matter of personal judgment and a reflection of individual preferences.” For clothing items, aesthetics means how well a clothing item looks or how attractive it appears, which would be influenced by drape, size of the garment or how well it fits the wearer.

“Perceived quality – Consumers do not always possess complete information about a product's or a service's attributes. Frequently, indirect measures are the only basis for comparing brands. Recently, market research has found that a product's country of manufacture is viewed by many consumers as an indication of its quality. Reputation is in fact one of the primary contributors to perceived quality.” When it comes to clothing, generally speaking, clothing made in Italy, Germany, or Japan is perceived to be higher or better quality clothing than that made in some of the Asian countries.
Dr. Garvin suggested that by influencing or varying any one or more of these eight dimensions of quality, a company can position itself in the market place, so quality is then a strategic variable. However, it is important to pursue only those dimensions of quality that are unimportant to consumers.

1-7 Meaning of Quality Based on Product, User, Manufacturing, or Value

Dr. Garvin further proposed that a definition of quality can be product based, user based, manufacturing based or value based.

A product based definition of quality views quality as a precise and measurable variable. Differences in quality reflect differences in the quantity of some ingredient or attribute possessed by a product. For example, we tend to associate finer rugs with a higher number of knots per square inch - therefore higher, better quality.

A user based definition of quality simply means that quality is whatever the customer says or wants - which goes back to meeting or exceeding customers’ requirements and expectations.

A manufacturing based definition of quality means meeting specifications, conformance to requirements, etc. Any deviation from meeting specifications means poor quality.

A value based definition of quality takes into consideration cost or price of a product or service. The question from a customer’s view point is what is the value of this product or service to him/her? Or how valuable is a given product or service?

Dr. Garvin goes on to say that companies may want to take a multiple approach to defining quality, that is, start out with a product based approach which identifies quality characteristics or characteristics/properties through market research that connote quality. Then use a user based approach to translate those characteristics into manufacturing based approach as products are being manufactured and finally use a value based approach to offer the customer better value than your competitors. When defining quality this way, everyone in the company has a role in “quality.”

1-8 ISO Meaning of Quality

ISO [ANSI/ISO/ASQ Q 9000-2005] defines quality as ‘degree to which a set of inherent characteristics fulfils requirements.” “Characteristic” in turn, is defined as distinguishing feature. A characteristic can be inherent or assigned. A characteristic can be qualitative or quantitative. There are various classes of characteristic, such as the following:
Physical, e.g., mechanical, electrical, chemical, or biological
Sensory, e.g., related to smell, touch, taste, sight, hearing
Behavioral, e.g., courtesy, honesty, veracity
Temporal, e.g., punctuality, reliability, availability
Ergonomic, e.g., physiological characteristic, or related to human safety
Functional, e.g., maximum speed of an aircraft

“Requirement” in turn, is defined as need or expectation that is stated, generally implied or obligatory.

The term quality can be used with adjectives such as poor, good or excellent. “Inherent”, as opposed to “assigned”, means existing in something, especially as a permanent characteristic. For example, moisture absorbency is inherent characteristic of cotton fiber, however if a 100% cotton fabric is treated for “durable press” or “wrinkle resistance” characteristic, then durable press or wrinkle resistance is “assigned” characteristic.

## 1-9 Quality = Fitness for Use

Why do we buy a product? We buy a product primarily because we want to use that product.

Now, if the product we bought has some deficiency what happens? We can’t use it, so, in that case, can we say that the product we could not use is defective? Sure, we can, isn’t it? Therefore, quality can be defined in terms of “fitness for use.” Dr. Joseph M. Juran [Juran and Godfrey, 1999] came up with this concept sometime in the late 50’s. Companies should judge fitness for use of a product from customers’ viewpoint and not from manufacturers’ or sellers’ viewpoint. Fitness for use takes into consideration product design, features, as well as workmanship. Anything that enhances fitness for use from customers’ point of view is quality.

The first aspect of quality indicates that an item with those features that customers prefer is a quality item. An example is a durable press shirt. This is a feature which means that a customer does not necessarily have to press his/her shirt after laundering it to be able to wear it. But this added feature will increase shirt’s cost.

Similarly, fit is another feature of a garment that customers consider when buying. For example better fitting ladies jeans in the U.S. command prices upwards of $150 per pair! Obviously, it costs more to produce better fitting jeans because you not only have to have better patterns but also better fabric. In order to have better patterns, you have to have better body measurements of the customer segments you are trying to sell.

The second aspect of quality means that an item must be free from defects such as stains, material (fabric) defects, open seams, loose hanging
(untrimmed) threads, misaligned buttons and buttonholes, defective zippers, etc. and must perform satisfactorily in normal use, meaning that a garment must be able to withstand normal laundering/dry-cleaning/pressing cycles without color loss or shrinkage, seams must not come apart, fabric must not tear, etc. Regardless of the great features, if an item is not free of deficiencies, it is not a quality item.

Product safety is also considered an aspect influencing fitness for use of an item. If an item is unsafe, it is not fit for use. Therefore, that item is of poor quality.

Therefore, for an item to be fit for use, it must have desired features, it must be free from defects, and it must be safe to use.

According to Dr. Juran [Stephens, 2004] quality as seen by the user (fitness for use) may be superior, competitive, or adequate. When the fitness for use is superior, a company derives profit through a combination of high share of market (if priced competitively), premium prices (if marketed selectively), and greater ease in bidding and in negotiating contract terms. When the fitness for use is competitive, a company’s profit is decided not by the minor quality difference but by competitive pricing, attractive packaging, imaginative promotion, personable selling, etc. When the fitness for use is only adequate, the prices are commonly low, and we rely on these low prices to give us a high share of market. Thus, the level of “fitness for use” has direct impact on a company’s profits.

1-10 Taguchi Loss Function

Dr. Taguchi, a Japanese engineer has said that quality can be defined in terms of losses a product imparts to society from the time it is shipped. The loss to the customer increases as the performance characteristics deviate more from the target value. For example, if you go out and buy a “durable press” shirt because you do not want to iron a shirt but if this shirt’s durable press quality turns out to be such that you end up ironing that shirt any way, it incurred you an economic loss in terms of first the extra price you paid for the durable press characteristics, and then in terms of your time, effort, and electricity you used in ironing that shirt. According to Dr. Taguchi, such economic losses can be measured, quantified, and quality can be defined in terms of economical loss imparted to the customer and/or to the society. This method of defining quality is known as “Taguchi Loss Function.”

This method of defining quality is not used in the apparel industry. It is mostly used in projects involving highly complex engineering systems.

1-11 Economic Meaning of Quality

Economists define quality in terms of unit value. In other words, those items having higher unit value are considered having higher/better quality.
Every now and then you might read in some trade or business publications that the unit value of garments exported from a given country is higher than the unit value of garments exported from another country. Unit value of an item can be increased by:

1. Increasing durability, reliability, compatibility, flexibility, etc.
2. Using superior materials or higher skills in manufacturing
3. Making a product more specific to demand
4. Refining or further processing a product
5. Adding new function, service or maintenance contract
6. Better design, advertising

1-12 Quality is Relative to….

According to Lamprect [2000] quality, whatever its definition, is relative to experience, culture, and habits. For example, Americans are the only people in the world who think their coffee tastes good. The rest of the world considers “American coffee” as slightly inferior in taste to cod liver oil. Why? Relativity.

Culture and expectations also affect what one considers quality or poor quality. When China was opening up in mid 1980s, the company where this author worked started importing clothing items from China. Once a large shipment of ladies’ tops was rejected at a factory because of dirt stains, otherwise, the workmanship and fabric quality were good. The General Manager of that factory could not understand why we rejected a perfectly alright shipment of clothing. In his opinion, those stains would come out the first time those items are washed by the customers. We had to explain to that gentleman that we can not display such dirty merchandise in our stores because the customers would not buy dirty items. American consumers would want to be able to wear an item right off the shelf or rack, so to speak. Besides that, clothing items with stains create an impression in consumers’ mind that of poor quality garments, never mind that the stains may come out in the first wash. The Chinese gentleman was not aware of such cultural expectations because according to him, in China, consumers would not mind buying such clothing items. Once he understood preference of American consumers, he made sure that next time he did not present dirty merchandise to us for inspection.

1-13 Quality is Whatever the Customer Thinks is Quality

Quality is also a reflection of customers’ opinion on the value they see in your product compared to that of your competitor’s. In other words, quality is whatever the customer says it is or the customer is the final judge of quality.
Quality, simply put, then means a product does what a customer wants it to do at a price the customer is willing to pay.

According to Dr. Deming [Shewhart, 1980] quality, however, to the consumer, is not a set of specifications. The quality of any product is interaction between the product, the user, his expectations, and the service that he can get in case the product fails or requires maintenance.

1-14 Two Aspects of Quality: Objective and Subjective

The objective aspects of garment quality are related to various physical properties and performance of the garments, such as fabric construction, fabric weight, fabric strength, abrasion resistance, shrinkage, colorfastness, durable press, durability of any finishes, etc. These are things that can be measured and quantified. Subjective aspect of quality is about what we think, feel, or sense as a result of objective aspect of quality. The way a garment fits, the way it drapes, etc. are also objective aspects of garment quality.

The subjective aspects of garment quality are those that appeal to our emotions. Things such as a garment’s appeal, how a person feels when wearing a certain garment, what kind of responses or comments he/she receives from other people based on the garment he/she is wearing, how well the garment meets the customers’ expectations while wearing a certain garment because when people wear garments for certain occasions like business meetings/presentations, social events, etc. they have certain expectations from those particular garments, etc. are considered subjective aspects of garment quality.

Although it is the objective aspects of quality that we try to measure and control, it is the subjective aspects of quality that influence purchasing decisions on consumers’ part and therefore, it is of commercial interest. Subjective aspects of garments depend on objective aspects of garments. For example if an item is not made right, it will not be appealing and chances are consumers will not buy that item.

Subjective aspects of quality are always shifting with shifting expectations of consumers.

Quality is what the customer perceives when he/she feels that a product meets his/her needs and lives up to his/her expectations. It is important to emphasize that customer perception is reality. If your customers believe there is a problem or flaw in your product, then that is the reality, whether or not the product conforms to internal specifications. The root cause of this problem may be that the specifications do not reflect the reality of the consumer’s desire.