QUALITY AS A COMPETITIVE TOOL FOR TAILOR STORE AB

The Thesis report submitted to the University of Boras,
Prof. Håkan Torstensson
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ABSTRACT

"Customer Satisfaction is a Continuous Process which does not begin or end with a purchase".

Slogans of “Quality” can be viewed all around the corners of factories, which has emerged as the managerial imperative from the past decade. But Quality failures, rejections & cancellations are still apparent. Therefore, we should investigate and prepare an action plan to experience the real achievement through producing quality products, to "Delight our Customers".

The Author of this study has recognized the extent of misunderstanding, miss management of production process and Quality Systems and did select specific research methods in order to satisfy the aim of the investigation. Moreover, Author has selected one of Swedish based retailer namely Tailor Store AB, company which is very successful in web base mass customization.

After analyzing the company Author has published a Quality handbook for the Tailor Store AB.
CHAPTER 1

1 Introduction

1.1 Background

Last couple of years the term mass customization has found in many articles revitalized on the subjects of innovation, technology management, product development, and supply chain management. It has changed the concept of retailing, especially in clothing. In present competitive marketplace, prediction of consumer’s wishes correctly and incorporation of these wishes effectively in business strategies with emerging technologies can bring success for the company. Nowadays companies are adopting this strategy in their businesses which hold a closer reaction to the customer’s needs and wishes. Mass customization can meet the customer’s hidden desires by providing individually Customized goods and services.

Companies and academics have mutually identified mass customization as a competitive business strategy because of its ability to incorporate the voice of the customer into company’s product. A mass customization environment is likely to present challenges to the production, product quality must be perfect and it must be continued.

Quality gets additional attention whenever talks about mass customization. When product is customized, a new set of quality characteristics will appear. An increased number of characteristics will raise the complexity of the production process.

To achieve continues quality improvement, firm’s existing quality and management process need to be evaluated. Next step would be collecting necessary data, measuring quality issues and calculating the cost of poor quality. Meantime firm should maintain specific procedure in order to maintain consistency of the product quality.
Let us discuss quality in general. What does it mean? It has many connotations. The meaning of quality differs from person to person. It can even be different from company to company and product to product.

The word “quality” need not be restricted to quality of product alone, but can be used for quality in general, including quality of Management.

I believe in that, quality is “way of life”. It means how we live, how we do our day to day work, how we speak, walk and dress are characteristics of my life and they are quantified to express the “quality” of my life. The quality of my life is very much influenced by the economic development of the country one’s living. People living in less developed countries find it difficult to understand the quality, demanded by the people in developed countries. The perception of quality of the two nations is different. Production facilitator must understand the nature of the particular end customer.

Quality is meeting customer requirement. It is also known as fitness for purpose and use. Requirements may include availability, style or design, reliability, delivery, manufacturability and value for money etc.

Reliability, why do we buy a Mercedes Benz? It is by far the safest and reliable vehicle on most roads. A part of the acceptability of a product or a service will depend on its ability to function satisfactorily over a period of time and it is this aspect of performance is known as reliability. It may be said that the ability of a company to continue to meet the Buyer’s requirements, for a long period may be regarded as a reliable company.

Customer Requirements, the ability to meet the customer requirement is vital, not only between two business partners but within the same organization. There are suppliers and customers within the organization and they exist in every department. Production Manager supplies quality products to his customer who is his General Manager.
1.2 Research problem

The case study at Tailor Store revealed that the company has serious internal product quality issues.

Considering a production line, which operating according to mass production concept. The production line manufactures large batches of shirts, says 5000 shirts per batch. When launching a new batch, the production operator mostly likely makes some mistake. This is due to each new batch will imply changes in the existing production line. But after producing a certain number of shirts the production line will adapt to the new production.

Now considering similar production using the mass customization concept, the form of mass customization adapted by Tailor store implies that every manufacturing product is customer unique and large variable when considering product attributes. As previously has been mentioned this requires a batch size of one product only. In Tailor store production base size is resulting in shifting work requirement of several operations. This will imply that the production line using mass customization will reasonably have a higher quality errors and damages. This suggests that when using a mass customization strategy, it becomes further important to monitor quality. If a firm wants to achieve a higher product quality it is required to fully understand the impact of the quality problems.

Further, Tailor Store did not use a general quality manual in the production line might also be an explanation to the high rejection level. The management, the quality controls and the employees did not mutually define good product quality in the same way.
1.3 Objectives of the study

- Investigation of quality requirements of Tailor Stores AB
- To identify the barriers that makes it difficult to maintain required quality in Tailor store’s production process
- To investigate the new ways of quality improvement in Tailor Store’s production process

1.4 Significant of the study

The quality is no more a luxury. It is a basic requirement. All products must confirm to quality standards. No matter how good it fits on you and looks nice, the product quality must be there, to sell the garments.

Therefore, the quality becomes of paramount importance when considering mass customization. We have to learn why quality keeps changing. The quality must not change, it must be consistent. If it is changing, we can lose the money. That is why this study will try to understand the reasons for change of quality and provide knowledge to keep quality at desired level.

The quality seems to have understood by many workers in the textile complex, yet, we have quality issues all the time. Perhaps, the understanding may be not compatible with the end user of the product.

The quality is involved between customer (end user) and supplier (producer). Both these parties must synchronize well in order to say the product is acceptable. Therefore, it is of paramount importance that these parties understand each other well. When this fails there is unacceptability of product.
1.5 Mass customization and product quality

In today’s saturated western fashion market, customer’s behaviour and desires are changing very fast. On the other hand continuous improvement in production process or in business techniques is a business legend. Many companies are trying to adopt new trend as well as new methods / techniques to attract the customers. Mass customization is a part of those techniques. With the industrial revolution and new technology, apparel industry moved from craft era to the mass production era. Today, new era has been started and it’s called Mass Customization. It’s quite similar to craft era where the product produced according to customer preference and their specification. Mass production era mainly focuses on high volume production where everyone could get same product affordable price, but it will not remain in future due to ever changing customer demand.

Nowadays the apparel industry has been facing the particular challenge of quick response to ever changing customer needs as well as facing wide variations and increasing complexity of product design along with rapidly changing design and new technologies. The key to success in this highly competitive environment is company’s ability to produce products with specific design and with high quality within a short time frame and at low price.

To adopt a successful mass customization system requires the company obtaining certain abilities. The firm needs an elaborate system to thoroughly understand specific customer requirement. As well as system should be able to produce the particular product with high quality and less lead time. Therefore if the company wants to success in the market they should have proper production process with quality oriented. It is important to highlight high degree of customization and variety of product choice necessarily means that customer will be equally satisfied or will be willing to pay a higher price, if firm can maintain high quality at less lead time.
1.6 Methodology

The questionnaires will be distributed to the following group in order to collect quantitative data for the study.

1) Quality checkers at the end of the sewing lines.
2) Quality checkers in the cutting section (those who check the input panels before sending to the sewing lines)
3) Sewing machine operators.
4) Supervisors in the sewing lines.

The first part of the questionnaire is having five questions. This area will evaluate the type of garment defects, the frequency of occurrence, nature of the damage, the magnitude of the loss etc. the second part of the questionnaire will also have five questions and evaluates the root causes of the garment defects, production efficiency, cost per minute and information regarding prevention and controlling of defects. The available information in the organizations computer data bases, manual files, memos and records will also be included in the quantitative data collection.

Qualitative data will be collected using the following methods,

a) Focus groups
b) Managers interviews

Questionnaires will be distributed directly to the participants and the contents will be explained. Separate sessions will be held with the participant’s immediate supervisor to obtain qualitative data on end line garment defects. Name will be indicated in the questionnaire only to identify the participant by his/ her supervisor for the purpose of assessment. Before the collection of completed questionnaires name tags will be removed to assure complete anonymity.

The collection of data will be done in selected sewing lines. The collected data will be classified according to the priorities of the study. This will be done in a structured form, following a logical sequence, in order to derive meaningful conclusions.
1.7 Questioners

Below is the questionnaire that has distributed among participants

<table>
<thead>
<tr>
<th>Questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What is the most frequently found damage?</td>
</tr>
<tr>
<td>2. What is the action plan after identifying the damage?</td>
</tr>
<tr>
<td>3. Do you use specification regularly in your department?</td>
</tr>
<tr>
<td>4. How often do you check quality in your department?</td>
</tr>
<tr>
<td>5. Do you have guideline for your operation?</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Root Causes</th>
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<tbody>
<tr>
<td>1. In which part do you find most frequently damage?</td>
</tr>
<tr>
<td>2. Is it trim or fabric damage?</td>
</tr>
<tr>
<td>3. Is it operator mistake?</td>
</tr>
<tr>
<td>4. Is it machine damage?</td>
</tr>
<tr>
<td>5. What kind of actions you have taken so far related to quality?</td>
</tr>
</tbody>
</table>

**CHAPTER 2**

2 Literature review

2.1 Introduction

The purpose of this chapter is to review available literature related to the Mass customization and process quality. In this section author has given main priority to the available quality systems in order to understand concept of quality in manufacturing scenario with the hope of creating a Quality handbook for Tailor Store AB. It's incorporate Quality Philosophy, awareness of quality Control, Quality Assurance Tools and Techniques of Quality related activities.

2.2 Related literature

2.2.1 Mass customization

Pine (1993) defines mass customization as “the mass production of individually customized goods and services”. Given the changing characteristics of today’s consumer interests and industrial competition, mass production systems cannot satisfy both manufacturers and consumers; however, a mass customization system may achieve both manufacturer and consumer
satisfaction, providing a low-cost customized product. Pine stated that the prerequisite of implementing mass customization is the application of advanced technology, such as the flexible manufacturing system, computer integrated manufacturing; computer aided design, and advanced computer technology.

Pine explained that using these technologies in the practice of mass customization will shorten product-life and development cycles as well as allowing manufacturers to respond more quickly and flexibly to changing consumptive drives. Davis (1987) described Mass customization is where each product is unique for each customer. Pine (1993) described mass customization as a new business strategy where goods and services are customized within the context of a given product line to fulfil an individual's demands in a cost-effective way.

Alvin Toffler (1971) in “Future Shock” Mass customization is a new paradigm for industries to provide products and services that best serve customer needs while maintaining near mass production efficiency. Technology applications including computer-aided design, the Internet, and flexible manufacturing have enabled firms to identify and meet a customer’s individual needs and wants. Automobile, computer, and entertainment companies have embraced mass customization (Pine, 1993); a growing number of apparel companies have also begun to implement mass customization (Lee & Chen, 1999).

According to Gilmore and Pine (1997), mass customization can be achieved by not only altering the standard product but also the representation of the product to meet the needs of individual customers. They described four approaches to customization from the perspective of customized: cosmetic, transparent, adaptive and collaborative.

1) Cosmetic customization changes the representation of a product, such as its packaging, but not the nature of the product.
2) Transparent customization continues the standard representation of the product, but changes the nature of the product for individual customers.

3) Adaptive customization neither changes the product nor the representation of the product for an individual customer, but offers products that individual customers can independently manipulate to suit their own needs without any additional interaction with the company.

4) Collaborative customization involves changes in the design of the product itself as well as the representation of the product.

Duray, Ward, Milligan, and Berry (2000) also discussed four dimensions of mass customization: assemblers, modularizes, involvers, and fabricators. Assemblers provide customization by offering a large range of choices without direct involvement of individual customers in the design and fabrication stages. Use modularity in the assembly and use modularity for component commonality in the design and fabrication stages and involve Individual customers in specifying their unique requirements for the assembly and use stages.

2.2.2 Quality process in production

Management literature of recent decades (Drucker, 1974; Porte, 1986; McNamee, 1989), refer to the great uncertainty that surrounds modern business, while futurists (Toffler, 1970 & 1980; Naisbitt, 1994 & 1995) attempt to forecast the momentous changes that are in store for mankind. These developments offer opportunities as well as challenges to organizations. The changes that are taking place with respect to (A) consumer preferences, (B) requirements of intermediaries, C) competition and (D) technology. Hemsley (2000) said that just as companies think they are edging ahead in the race for customer loyalty, many are discovering they are being overtaken by changes in consumer attitudes and expectations. Hemsley, S. (2000), “Keeping Customer in the Journal of Marketing Week” March 16, pp 39.
Managers must meet customer needs by offering quality products and services that outperform the products and services of worldwide competition. This is the force behind Total Quality Management.\textsuperscript{4}

Stattle (1995) further stresses that firms consistently producing affordable high quality products and services will be international business survivors and growth engines of the 1990s.\textsuperscript{5} In a competitive world wide, open market customers have low quality products will go bankrupt, since the best defence is good offense, maintaining customer loyalty through high quality products is a way to prevent international competitiveness. According to a recent international quality study, the American Quality Foundation made the following bold statement concerning the importance of Quality as a business strategy in the global market place.

This illustrates well in the Japanese economy, Alkhafajts (1996) said, according to the US department of commerce, the US trade deficit with Japan grew from US$ 10 billion in 1980 to US $ 52 million in 1983, but 1950s and 1960s the label “made in Japan” suggested “poor quality” while “made in the USA” means just opposite. But today, Japan has rapidly become an impressive competitor. Japan in the 1990s projects the image of a producer of quality goods.\textsuperscript{6}

Marcello (1999) suggested when a manufacturer brand succeeds in establishing a quality image; it can build customer loyalty and secure repeat sales.

\textbf{2.2.3 Who are the customers?}

Stone & Young (1992) described that “A customer is anyone or any group of people who interact with an organization and whose well-being is important to it”.\textsuperscript{7} According to Jarvis (2000) “Good reputation is easier to lose than regain people’ trust and become accustomed to favourite goods”.\textsuperscript{8}

\textsuperscript{5} - Do -
They remember the bad and crap about it to others. A company that fails to focus on quality loses market share and declined in reputation. Kasten said, “Customers gave us high marks for Quality” (1997). Tait (1998) stresses the most important strategy to achieving business goals is “Improving Product Quality”.

Kuruppu (2006) said product quality must satisfy the customer requirement and not necessarily the quality of raw material, quality of craftsmanship and quality of product parse. He emphasized that quality depends on customer satisfaction and quality which is good for one may not be good for another.

Kaplan and Norton (1992) said, “Quality measures the defect level of incoming products as perceived and measured by the customer” Smith (1995) explained this under the customer perspective. The heart of customer satisfaction is meeting or exceeding customer expectations: at its highest level it is achieving “customer delight” as BMW puts it. To become the world class supplier of apparel, a country should be able to deliver quality of service, delivery, communication and the finish & the workmanship of the products. Deming (1998) said to Japanese on his speech, “If you pursue Quality first approach, Japan would dominate the world market and every one.”

He stresses that the Americans thought Quality is trade off between Productivity and Quality and between Price and Quality, but Japanese had not seen it as two different things. They have accepted not to treat Quality and Price, or Productivity and Quality as tradeoffs. Deming further expresses that once you have achieved Quality, then you can have productivity.

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According to Waters (1999), organizations now pay a lot of attention to the quality of their products, Ford uses the slogan “Quality is job I” IBM say, and “we will deliver defect free competitive products and services on time to our customers”. Thousands of companies advertise that they are “ISO 9000 REGISTERED”. Main objective of many of them is to make “Products of the highest Quality”

2.2.4 What is quality?

According to Jarvis (2000), Pascal says, “Quality can be a compelling value in its own right. It is robust enough to pertain to products; Innovations, services, standards; and calibre of people, everyone at every level can do something about it and feel the satisfaction of having made a difference, making products that work, or providing first class service in something we can identify with for our own experience. It has been showed that the Champions have contributed to definitions relating to what quality is”.  

Deming (1950) said, “A product or service nature or features that reflects capacity to satisfy express or implied statement of need.” Juran (1964) said that Quality is “Fitness for purpose or use”. Juran (1964) said that Quality is “Fitness for purpose or use”. Juran (1964) said that Quality is “Fitness for purpose or use”. Juran (1964) said that Quality is “Fitness for purpose or use”. Juran (1964) said that Quality is “Fitness for purpose or use”. Juran (1964) said that Quality is “Fitness for purpose or use”. Juran (1964) said that Quality is “Fitness for purpose or use”. Juran (1964) said that Quality is “Fitness for purpose or use”. Juran (1964) said that Quality is “Fitness for purpose or use”. Juran (1964) said that Quality is “Fitness for purpose or use”. Juran (1964) said that Quality is “Fitness for purpose or use”. Juran (1964) said that Quality is “Fitness for purpose or use”. Juran (1964) said that Quality is “Fitness for purpose or use”. 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Kuruppu (2006) said that one must understand that “meeting the requirement” is not used in restrictive manner. For example, products for children are more associated with satisfaction in ownership than some functional property. Similarly, in retail fashion shop the need may be for a garment with colour, style and impact

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http://sol.brunel.ac.uk/garvis/bola/quality
which the customer will quickly buy. The customer will not bother whether or not the garment lasts two washes. Further, he will not care even if it falls to pieces in short period because something else may be fashionable by then. For him Design is more important than the functional properties. But still he gets a quality garment. But in another store there can have garments where manufacturing quality is very high. They want their customers to come back again, not for fashion but for reliability. If you are a fire fighter you probably won’t worry too much about the style of your garment but you will be annoyed if your fireproof fabric catches fire.¹⁹

If quality is meeting customer requirements, then this has wide implications. The requirements may include availability, delivery, reliability, maintainability and cost effectiveness etc. The first items on the list of things to do are to find out what the requirements are. If my customer places a requirement on me to run a mile in five minutes, then I know I am unable to meet this demand; unless something is done to improve my running performance. In my experience very few executives really bother to find out what their customer requirements are. To achieve quality throughout an organization, each person in the quality chain must interrogate every interface as follows:

Garvin (1988) has summarized five principle approaches to define Quality. Those are Transcendence, Product base, User base, Manufacturing and Value base.²⁰

The international standards organization has defined Quality as “The totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs” (ISO 8402).

According to Waters (1999) “Higher Quality will satisfy customer demand. Any organization that ignores the trend towards Higher Quality will lose out to competitors. Those are better at meeting customer expectation and higher quality will guarantee best sales or success of a product. But, low quality will certainly


guarantee its failure”. He further expresses “Producing Higher Quality Products is staying in Business”.21 Business activity must contribute to overall profits, and mostly Quality Controlling is exception. According to the Industry Veterans, Senior Managers expect and consider Quality as primarily business problem, a matter of marketability and economics. A company can save money by producing higher quality. And also some of heavy costs can be actually reduced when Quality is increased.

2.2.4.1 Quality cost

Meat (1992) suggested any activity in a business must contribute to overall profits. Bell (1994) “Quality costs are those incurred by an organization in ensuring that the product or service it provides conforms to customer requirements”.22

Therefore, Quality costs are the sum of that spent in ensuring customer requirements are met plus that wasted through failing to achieve the desired level of quality. He further, stress Quality costing is one of several techniques available to assist companies with the attainment of Quality. Primarily, in manufacturing industry, it is estimated that 5-25% of sales turnover is as cost of Quality. Quality Cost can be analyzed and identified as “Four Costs of Quality”. They are Prevention Cost, Appraisal Cost, Internal Failure Cost and External Failure Costs.

2.2.4.1.1 Prevention cost

The cost of preventing occurrence of defects, any product quality is set at the designing stage. So, best way a guarantee Quality is not by inspection, but by designing a good product in the first place. Prevention costs include all aspects of Quality that are designed into a product.

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Such as material, trims, performance, time needed to make the product as the direct cost and as indirect cost, method of ease of production, type of process, amount of automation, procurement needed, workforce skill level required and the training needed.

### 2.2.4.1.2 Appraisal cost

The cost of confirming the design quality is achieved by the Production Process, Factory quality controlling system of inspecting

- Receiving Inspection
- In-Process Inspection
- Final Inspection
- Product Audit

What will happen after these defective components or garments rectified by the quality controlling system of the factory, then correction must be done.

Wild (1995) suggested “correction costs are incurred because the costs outlined above generally fail totally to ensure that nothing goes wrong. Correction involves doing things again (to get them right) replacing things which when found to be wrong cannot be rectified, the repetitions of operations, the recycling of items or customers etc, as well as costs of wastage, loss, scrap, and so on. These are often referred to as the “Internal Failure Costs.”

### 2.2.4.1.3 Internal failure costs

Some of the Internal Failure Costs found in the factory environment are

- Scrap
- Rework
- Inspection due to rework
- Overtime work for rework
- Failure cause Analysis
- Reject or waste material, trims when rework

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More cost or wastage may occur if the defects would not found in the initial phase. Water (1999) suggested “the further product goes though the process, the more money is spent on it and the more expensive it is to scrap or rework. Ideally, then defects should be uncovered as early as possible in the process”.

2.2.4.1.5 External failure costs

According to Water (1999) “External Failure Costs often represent the highest of Quality Management, and should certainly be avoided”. And there are costs or loses to the reputation of the factory which, does not accountable or reclaim easily which include loss of sales and loss of goodwill to the Buyer.

Vonderembse, (1998) suggested “for firms to remain competitive in today's global markets, they must produce high quality products. To remain cost competitive, Organizations must find ways to improve product quality without increasing costs”. And he further stresses “improvement in quality can be achieved with high costs are held constant or reduced. It is true that high quality can be achieved with high costs and that there will always a market for exclusive products”. But mass market appeal requires the right blend of improved quality and lower costs. He confirms that the Organization that can be achieved this ideal low costs, high quality base will have a distinct advantage of winning the competition.

2.2.4.2 The Concept of Control

According to Union off Japanese Scientists and Engineers Councillors and Japanese Quality Control School Norriaki kano, “control” means all necessary activities for achieving objectives in the long – term, efficiently and economically. Therefore, control is reliable means of maintaining and measuring what is achieved from the process.

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According to interviews with the factory management and staff majority don’t understand the theoretical meaning of Quality Control. Most of them understand is as inspecting the output to compare the standards and if not, returned to the Machinist for repairs. It is illustrated by Bell (1994) as “Quality Control (QC) concerns the techniques and activities which sustain Quality to specified requirements. This system has for many decades been the traditional understanding of the term Quality”26.

2.2.4.2.1 Quality Control Process

According to ISO (International Organization for Standards) definition “Quality Control is the operational techniques and activities that are used to fulfil the requirements for Quality. It is expressed as System of techniques for economically producing goods and services that meet the customer’s requirements”.

According to Bell (1994), the typical activities in a QC environment are,
- Determination of Inspection Points
- Inspection Method Development
- Data Collection and Analysis
- Prevention of Chronic Problems

Further analysis for Quality Controlling, Hoyle (1997) suggested that, “Quality Control is a process for maintaining standards and not for creating them. In simple terms, this prevents undesirable changes being present in the Quality of the product Quality Controlling is that it creates an awareness of the situation happening on the process or in the manufacturing process and this could be after the effect has taken place”. In innovative manufacturing system uses quality as a measure of how well the manufacturing process meets customer quality requirements, and also provides feedback and control to correct quality problems as they occur. Factories are using reports to enter the defects which, they have found and the Quality Controller or the Supervisor can attend to the problem easily by referring to the report.

According to Mr. Kuruppu (2006), QC means a process which has defectives and will be controlled to a desired level as per customer requirement. He pointed out that QC system exists because there are defects in the process that is why you need to control the quality. Also the systems in the factory will highlight the defective operations or operators using charts and visual diagrams which are known as “Statistical Quality Control or Statistical Process Control”. What it means by the process, Starker (1995) explains that the processes are the three “P” s of Quality in business such as people, Product, Processes. “Where Products are, what is done, and Processes are about how it is done.

According to Juran (1988) “A process is a systematic series of actions directed towards the achievement of a goal”. To control the manufacturing process is basically giving the management a feed back of what is happening. Following techniques were utilized to statistically control the processes.

2.2.4.2.1 Statistical quality control

Ross (1993) suggested SQC involve several process control methods. It involves the use of statistical techniques such as control charts to analyze a work process or its output. This method can spot the causes of variations of incoming materials, Machine defects etc., and he further stressed “SQC” is a systematic way of problem solving”. The basic steps involved in SQC are as follows,

1. Awareness of the problem.
2. Determine the specific problem to be solved.
3. Diagnose the causes of the problem.
4. Determine and implement remedies to solve the problem.
5. Implement control the hole the gains achieved by solving the problem.

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According to Ross (1993) data collection is summarized or collects data on presses in order to determine whether any unusual or unwanted elements present. When collecting data a proper sample must be provided represent the population.

**Control chart:** Reflect the ongoing control of a process signals and alarm when the process exceeds the limits.

**Bar chart:** Column graph summarized and present data in an easily understood manner.

**Scatter diagram:** Depicts the relationship forms a pattern.

**Histogram:** Its Vertical graph showing the distribution of data in terms of the frequency of occurrences for specific values of data.

**Pareto diagram:** It’s the most widely used statistical tool on problem analysis. It’s the graphic way of summarizing data in order to focus attention on the main reason.

### 2.2.4.2.1.2 Quality assurance

According to International Organization for Standards (ISO) definition states that Quality Assurance is all those planned and systematic actions necessary to provide adequate confidence that an entity will fulfil requirements for quality. According to Bell *et al.*, (1994), Fundamentals of Quality Assurance are,

1. Anticipated by the supplier and manufacture in advance.
2. State by the purchaser in the form of a specification for the goods.
3. Stated by the purchaser required, in this Instance, the provider manufacturer will draw up the specification for the goods as well as providing the manufacture the products

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QA activities
1. How an organization develops policy in respect of Quality.
2. The allocation of responsibility within the organization structures.
3. Procedures used to carry out the need of the business.
4. The standards to be attained in the work place.
5. The documentation required to demonstrate both the operation and maintenance of the system and the attainment of Quality.

2.2.4.2.1.3 Total quality management (TQM)

Oakland (1995) defined TQM as “Approach to improving the competitiveness, effectiveness and flexibility of a whole organization. A way of planning, organizing and understanding each activity and it depends on each individual at each level. TQM is a way of bringing everyone into the processes of improvements”. 31

Major components of TQM are readily identifiable.
1. Focus on the customer.
2. Everyone is responsible for Quality.
3. Team problem solving.
4. Employee training.
5. Fact – based management.
6. A philosophy of continuous improvement.

TQM approach promotes “Quality” as a important business strategy and it was proved in Japanese management that the organizational level quality improvements makes market potential, cultural change in work place and more innovative improvements can be made.

2.2.4.3 What is an acceptable quality level?

According to Mr. Kuruppu (2006) basically, this is the level determined by management to provide the best economic return for the effort of invested in achieving the required quality level. In other words quality cost and demand (adequate for required volume at specified price must be balanced well). The

product at the acceptable quality level must be able to satisfy the customer and it may be produced in time to meet delivery requirements. The above all it may be made at minimum cost. If the product can meet these three requirements it can then called acceptable product.\(^\text{32}\) The original appearance of the garment plays a vital part in customer satisfaction. This owes a great deal to the flair of the designer but will depend, to some extent on the detail and work content, together with the handle and appearance of fabric trimmings. Suitability for purpose and retention of original appearance play a more important role, long term, and will influence the choice of an another garment with the same label, as will consistency of quality – How reliable are you as a manufacturer.

CHAPTER 3

3 Analysis of Tailor Store

3.1 Introduction

This chapter serves as a presentation of the company, mainly focusing on Production based on collected data by doing interviews. Details of the manufacturing plant included with step by step analysis, followed by current quality routines.

3.1.1 Tailor Store Sweden (TSS)

Tailor store Sweden AB is medium sized e-commerce clothing company located in Halsingborg, Sweden. The company was founded in 2003 and the main business concept is to market and sell custom made garments through their own web site. The majority of TSS customers are located in Scandinavia; however, within a short future TSS aims to capture lager market shares particularly in UK, France and Germany. TSS was acknowledged with the SIME award the best E commerce company in Scandinavia.

\(^{32}\) Kuruppu R.U, 2006, “Facets of clothing industry of Sri Lanka”, first edition, the modern book company, Nugegoda, Sri Lanka,
3.1.2 Tailor Store International (TSI)

Tailor Store International (Pvt) is the manufacturer of apparel clothing and firm specialized in the customized dress shirts. The company acquired its first large scale production plant in 2007, in Sri Lanka. TSI is medium size growing company which is having 375 employees.

3.1.3 Interaction between TSS and TSI

The end customer purchases product through TSS`s web site, which provide the customer with possibility to customize and design the shirt at different preferred customized levels. Possible customer inputs are measurements, selection of fabric, and different styles of shirts. When the customer make an order through the web site system will generate the specification for that particular shirt, this specification include all the requirement of the particular customer and directly accessible for TSI. Tailor Stores international company will make the shirt according to the specification. Finally complete garment will send to the TSS where distribution center located.

Tailor Store AB has introduced online business concept which embraces product designing, making and retailing. They accumulate the customer's needs and demand. Customer can make design and order their dress through online. Tailor store send this design and measurements to off shore production plant through online and within few days customer can get their desired product by post. Tailor's retailing concepts with online shopping options where modern computer equipment gives the customer an interactive and positive shopping experience along with lots of colours and accessories. It is interesting and time saving, energy saving because in online shopping the products will be displayed in consumer's home computer not necessary to visit shopping centre. Consumers can choose their desired product without going to the store physically. But it has also some limitation especially in clothing. It is one future way for the fashion and apparel industry but garment size and colour election has been some of the restrictions. (Fralix 2003)
3.2 Tailor Stores fundamental process chart

- **ONLINE CUSTOMER**
  - **HEAD OFFICE HELSINGBORG, SWEDEN**
  - **STORES**
  - **FABRIC SUPPLIERS INDIA SRILANKA**
  - **TRIM SUPPLIERS**
  - **PRODUCTION PLANT ALAWWA, SRI LANKA**
  - **THIRD PARTY LOGISTIC**

**Head Office Tasks**
- Web Development
- Getting Customized order through online
- Order Inquiry Management
- Product Development
- Final PDM to Production plant
- Relies Po’s to Suppliers
- Process Management

**Production Plant Tasks**
- Store
- Cut and Saw
- Quality control
- Finishing
- Introduce and Improve production system for mass customization
- Product Development/Sample making
- Purchasing Raw Materials
- Deal with Logistic
3.3 Tailor Store’s website

Tailor Store website is interactive, easy to navigate and supported by software for shirt customization. Tailor store is all the users around the World and language support is available according to selected regions. Other than product specifications, customer service and shipping are the main parts of the website. The right of cancellation of the order and table of delivery times according to regions made Tailor store transparent in their services. Full help is provided to the customer during customization of the product.

3.4 Made to measure shirt

Tailor store is behaved like an ordinary tailor shop where shirts are made as per the 100% body specifications and measures to fulfill the customer needs. It’s like the same way to choosing different fabrics and classical colours according to the choice and needs of the customer. Also expansion of collection is attractive for
customer to buy not only matching garments and accessories but also to increase the company’s sales.

The Tailor Store mass customization business model allows the customers to select a design of his/her desire clothing with perfect fit. Consumers find an ideal solution to fit their dress with body. In conventional shopping many consumers feel some difficulties to get right size of garment. Sometimes they don’t get their desired design but in this business concept customer can customize his/ her requirements and needs by designing and getting a unique dress which is made only for him/her, which produce interactive and individuality for customer. They can get enjoyment in this shopping system because it very easy and handy.

3.5 E-Marketing

E-marketing is one of the unique benefits of internet and it has revolutionized the way of marketing in recent years with the increasing number of people using internet. It not only reduces the costs of the company but also target the internet users to get instant response of their wishes. As being an online shop, E-marketing is equally important for Tailor Store to promote their business. The main target group of Tailor Store AB is internet users who spend more time on internet and like to buy shirts online. The model is typically defined by the goal. The key object of Tailor Store is to increase the visits of people on its website and change these visits to convince them to buy a product.

3.6 Tailor Store production process

Before focus on Tailor Store Quality challenges, the reader will be given brief introduction to the production setup. During Tailor Store’s expansions, the production setup has been altered several times. The firm has moved from employing traditional tailors who single-hand stitch a complete shirt, to a line system divided into several production steps. The line system is composed of 25 production operations which are subsets to the eight production sections.
A brief description of eight main production sections follows; the data was collected through observations and a set of interviews with Shaymali, production and communication manager in Tailor store. It is important to notice that all of these production steps are sequentially dependent.

Illustration of Tailor Stores production process

3.6.1 The cutting section prepares shirt pieces for the following production steps. The cutters get the selected fabric according to specification (print out) delivered to their cutting table by a production helpers. The cutting of a shirt is therefore performed manually with a pair of scissors. A great deal of the cutting is based on the individual knowledge and skill of the employee, and the cutting section holds the most experienced employees in the Tailor Store production line.

3.6.2 The fabric quality control section guarantees the quality of the fabric by reviewing every single piece of an unmanufactured shirt. If damage fabric is discovered the concerned piece will be cut all over again by the cutting section.

3.6.3 The fusion section contains fusing machines which is processing specific parts of a shirt. The employees working in the section are preparing selected parts of a shirt, e.g. the collar and the cuffs, with fusion material to ensure that the fabric becomes stiffer.

3.6.4 The stitching teams work as five small lines within the main line systems. Each of the five teams contains fifteen machine operators who are stitching the different part of the shirt. The stitching of a shirt is divided into ten specific and dependent operations. All teams have a team leader who is responsible of managing and supervising the team.
3.6.5 The button section employs totally of thirteen workers. The main task is to mark and produce the button hole and attach button to the shirt. The button holes and the attachment of button are performed by machine run by an operator. Manual operations such as clearing and extra button attachment are also conducted at this section.

3.6.6 The final quality control section has the objective to ensure that the processed shirts have a satisfying, high quality level, including good stitching, cleanliness and correct measurement as per the specification. There are thirteen employees working as quality controllers. Shirt that are rejected are sent back to the responsible section in the line to be corrected.

3.6.7 The packing section task is ironing the shirt and wrapping it into plastic cover. The section has eight employees.

3.6.8 The scan and send section is responsible of scanning the specification into the local IT – system and ensure that each customer order containing several product is packed together.

3.7 Quality at Tailor Store

The present quality assurance policy enhanced by tailor store does not employ a quality system or quality guidelines for production. Most of the knowledge about product quality is embedded in employee knowledge. The organization is struggling to clearly define the meaning of good product quality. Management faces challenges when incorporating new employees in the company. When new employees start working for Tailor store, the problems with product quality tend to become a growing issue. (Shyamali, 2009)

The most important quality characteristics at Tailor Store are considered to be the measurements and the overall appearance of a shirt. Since tailor store business model is based on production of individual customized shirts, the measurements are specified for each customer. Hence, the most crucial product quality characteristic for tailor store is correct measurement, which if correct will ensure
that the customized shirt will have a good fit for the customer. The second most important factor is the overall appearance of the shirt, including characteristics like high quality fabric and well performed stitching.

3.7.1 Shirt Damages

There are numerous damages which will imply that the shirt has to be remade. Some of the most common errors are machine damages, poor stitching, and overall damages affecting the total appearance. Example, Incorrect placement of a pocket or an erroneous shaped collar, the fact that sometime employee does not follow the specification correctly can result in various product errors such as poor measurements, selection of incorrect fabric or wrong type of shirt cuff. (Syamamalie 2009)

3.7.2 Quality control

Tailor store has two quality checking sections in their process, fabric control and final quality control.

3.7.2.1 Fabric control

The fabric control section is located after the cutting section in the production line. The workers manually check each piece of garment cut by cutting section to ensure that no fabric damage exists on the garment pieces. A potential damage of the fabric which is discovered later on in the production line implies the great time waste, since the shirt most likely will have to be unstitched and remade. The existing suppliers guarantee high quality fabric but Tailor store has still chosen to perform a re-check due to earlier problems with fabric quality.

3.7.2.2 Final Quality control

The last quality control checkpoint in the Tailor store production process is final quality control, which is located after the button section and prior to the packing section. The final quality controllers are personally responsible for not letting any damaged shirt pass.
Every shirt thoroughly evaluated by a final quality checker before entering the packing section, which means that tailor store does not use random sampling in the quality control. Every batch is examined and since the production line only has batch sizes of one every single shirt requires supervision.

4 Conclusion

The firm must not be satisfied with utilizing the total quality control process only once. The company must continue to scan the production for quality failures and rejection in regular intervals. Necessary action plan should be followed with the identified issues in a quick way. It is important to understand that the quality system continually repeated and fine tuned over and over.

The Author also recommended to Tailor Store to maintain a quality handbook as an initial step for the own quality manual. Idea of this book is to give overall picture of total processes which are currently taking place at Tailor Store International. This handbook can be used during the introduction period of new comers.

Suggested Quality handbook can be referred after the reference pages.
5 References


Appendix:

QUALITY HANDBOOK

TAILOR STORE®
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1 Overall process chart of Tailor Store AB

**Head Office**
- HELSINGBORG, SWEDEN

**Online Customer**

**Head Office Tasks**
- Web Development
- Getting Customized order through online
- Order Inquiry Management
- Product Development
- Final PDM to Production plant
- Relies Po’s to Suppliers
- Process Management

**Online Stores**

**Production Plant**
- ALAWWA, SRI LANKA

**Production Plant Tasks**
- Store
- Cut and Saw
- Quality control
- Finishing
- Introduce and Improve production system for mass customization
- Product Development/Sample making
- Purchasing Raw Materials
- Deal with Logistic

**Fabric Suppliers**
- INDIA
- SRILANKA

**Trim Suppliers**

**Production Plant**

**Third Party Logistic**

**Fabric Suppliers**
- INDIA
- SRILANKA

**Trim Suppliers**

**Production Plant**
- ALAWWA, SRI LANKA

**Third Party Logistic**
2. Introduction

This quality handbook will outline, the department wise processes, systems, the role of departments (mainly production related), how they function and how they are co-ordinate with one another.

This book mainly focuses on systems to achieve quality. Fabric quality, trim quality, standardizes work quality, overall outlook of the garment etc. if all above mentioned aspects are met the final garment will be surely prefect. This is what Tailor Store AB truly believed and wishes to achieve in every single garment which produce at Tailor Store International. This book is mainly for production related departments.

3. Store

It is meant as Fabric, accessories store. This department is backbone in the production process. Main duties of this department will be receiving in coming goods from the suppliers. If it’s bulk order 10% inspection has to be done, in case of sample order 100% inspection is required. It is very important to maintain storage area according to style number. Store is responsible for all raw materials quality; they should not dispatch raw materials to other departments without cross checking with the customer specification.

The store performs following tasks,

- Storage of fabrics and trims
- Issuing materials for production
- Arranging timely delivery from suppliers, to avoid production delays
- Returning rejected materials

3.1 Procedures followed by store

- If any department required materials from the store they must send a requisition form which is included required amount, style no and reference with signature of HOD.
Have to check PO with the actual incoming goods, if there is any shortage should inform immediately to relevant Merchandiser

4. Merchandising / Sampling

The head office Merchandising team directly deal with customer therefore they play important role when considering getting correct details from the customer; this team represent the customer side to the production department.

Specification is created from the head office, they received regular updates and changes from the customer the head office Merchandising team should be ensured this information is passed efficiently and effectively to the production department. It is the responsibility of merchandising team to make sure the details passed on further are up to date as per customer latest instructions. Factory sampling team is responsible for developing exact garment according to customer specification, sampling team and the Merchandising team should be work closely.

4.1 Procedures followed by Merchandising / Sampling

- Arranging specification according to customer requirement, providing swatches, samples, costing and new developments

- Developing raw materials with the suppliers, making Pos

- Follow the order status, accomplish required raw material for the particular style

- Make photo / proto / fit / size set samples

- Sending one sealed sample to production department

- Maintain a data base with step by step developments (Time and Action plan) Fabric approval dates, lab dips , trim approval, fits, sealed sample
➢ For daily samples sampling team has to raise a requisition form to store with exact description

➢ Merchandising team should prepare style file for all styles, which is included total pack of specification. (Measurement sheet, sketch, trim card)

➢ Production department has to follow the style file most of the time, to identify the exact raw material, stitch type, SPI etc.

➢ Merchandising team must send a packing approved sample before proceeding actual PO

5. Production

It’s a team, the leader of this team is production Manager. It included entire process cutting to packing of the complete garment. All these process have to be done according to the customer specification and standards of quality.

The main goal of the production is satisfy the final customer with high stranded product. For that internal system must be well planed and guided from the top management. Each and every member of the factory should have one aim towards higher productivity and quality. The Top management is responsible for maintaining quality driven system.
Communication in between Merchandising team, Production team and Store is very critical. Paper work is essential when dealing with each other, should not work with verbal commands.

Should maintain following reports,

- Daily cutting report
- Production report
- Finishing report
- Inline and end line quality audit report

Finishing and packing is the final stage before the delivery, the garment should thoroughly check before packing. All the packing trim should be placed according to packing approved sample and folding of garment as per the approved garment.

There should be exact quantity per carton that quantity should not exceed

**5.1 Procedures followed by production**

- After receiving style file from the Merchandising team, production supervisor must explained all the critical points before the production, it’s important to have a meeting prior to the production, which can be called pre production meeting. There should be following parties, fit and constructor, cutting in charge, production supervisor, finishing in charge, and store in charge and work study person if any.

- In this meeting all the critical operations have to be communicated in details, there should be specific structure for the pre production meeting. Approved samples should dispatch to relevant person in order to make available in production line and finishing department.

- Have to handover trim cards to all departments with actual trim, which should be signed by merchandising team. Daily production report have to maintain which included cut, production in, production out and finishing in and out.
Every morning there should be a meeting which call "Morning meeting". It’s mainly to discuss production related issue which has occurred previous day. There should be a stature for this meeting it should be limited for 30 minutes.

6. Quality assurance

This department works on quality and monitoring the system in order to maintain accepted quality level. This department is responsible for raw material quality and operation wise quality. They must carry our pilot run prior to the production to ensure the correct pattern, spec, sizes, stitch type and machinery setting.

- Machines should be checked regularly and maintaining a machine history card is important

- In line check points, garments should pick randomly in order to check measurements, construction, trims and label attachment against the style file.

- Garment should check 100% before the packing

- Quality department is responsible for safety issues; machine should include needle guard to protect the operator from needle injuries

- Should follow Needle replacement policy, broken needles must handover with all parts in order to issue a new needle

7. General manufacturing specification

7.1 General finish

- Garment must be free from stains, soiling and flaws
- Loose thread must be removed from the garment
- There should not be any needle damage
✓ There should not be any puckering on the seams
✓ Garment must be free from pressure marks
✓ Button and other accessories must be in working order
✓ Garment must not show any kind of twisting
✓ Hems must be flat and even in depth and show no sign of twisting
✓ Garment must not have any strong or unpleasant smell

7.2 Fabric
✓ Fabric suppliers are required to carry out visual inspection monitoring length, width, skewing and blowing, shading shrinkage and lab dip. All the report should be received with the fabric delivery
✓ Store and inspection team is responsible to cross check all details given by supplier
✓ Approved lab dip is required before proceeding cutting
✓ Shading will not be accepted within a garment and good colour continuity is required in a same delivery

7.3 Seam construction
✓ Seam must not crack when extended
✓ Seam must be free from puckering
✓ Stitched must be correctly tensioned so as to avoid seam grinning
✓ Stitch density must be appropriate to fabric thickness and seam type (average 10/12 SPI)
✓ Width of seam allowance must be adequate and be even throughout

7.4 Hems
✓ Raw edges on hems must be over locked or double folded
✓ Hem type should be agreed at pre production meeting

7.5 Thread
✓ Thread must be appropriate to the fabric and the end use of the garment
✓ All visible stitch throughout the garment must be the same colour and should match the fabric, unless to be used as a contrast
✓ All thread must be colourfast to the same performance standards as per the garment end use

7.6 Button
✓ Must be correctly position
✓ Must be securely fastened
✓ When mounted there should not be any visible thread ends

7.7 Buttonholes
✓ Must be adjusted to the button
✓ Must be sewn with sufficient density
✓ Must be sewn with the interlining

7.8 Interlining
✓ Interlining and face fabric must be correspond each other
✓ Interlining and the face must appear smooth and wrinkle free
✓ Interlining must not show any sign of staining after laundering
✓ Fusible interlining must not show visible points or bubbles on fabric

7.9 Pockets
✓ Pairs of pockets must be symmetrically positioned
✓ Pocket seam allowances must not be visible
8. Garment Quality Flow Chart

8.1 Product development
- Ensure manufacturing specifications are as per customer requirements
- In case of any amendments made by customer relevant adjustments are made in the manufacturing specification
- Prepare sample garments for shade, measurement verification

8.2 Sample verification
- Commercial samples are counter verified against
  - Customer manufacturing specs
  - Measurement
  - Shade standards

8.3 Trims verification
- Threads
- Packing materials
- Accessories
  Verified against customer provided standards prior to induction in production line.
8.4 Pre production
- Trial garment
  Before execution of orders trial garments are prepared in order to verify shrinkages, measurements, and shades.
  Adjustments are made by product development for shrinkages and pattern etc.

8.5 Cutting
- Spreading – cut off identified fabric defects
- All cut panels are checked on paper pattern individually
- Verification of pattern for size and style as per customer requirement

8.6 Sewing
- Each operation checked for quality parameters and customer spec.
  Measurement
  Thread type
  SPI
  Stitch type
  Final audit, each operation of the complete garment is checked for quality parameters and customer spec.