

Empirical Study on the TQM implementation in the Apparel Industry of Bangladesh.

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Abstract: Organizations worldwide have been examining ways to improve business practices to gain competitive edge. An increasing number of organizations in developing countries are practicing Total Quality Management (TQM) in order to generate developments in performance and remain competitive. Total Quality Management (TQM) practices are primarily found in larger and multinational organizations, but little has been written on how TQM has been applied in small and medium textile industries of Bangladesh. This research reports the results of a full survey conducted among a sample of the local textile and apparel industries in Bangladesh. The survey is expected to reveal the level of TQM implementation in the industrial sector via a postal questionnaire. The survey covered 50 textile and apparel industries chosen from different industrial zone and produced a very remarkable response rate. The survey findings were analyzed using a statistical analysis package SPSS 20.0 version. Various remarkable variables of TQM implementation had been thoroughly studied and discussed. Attempts at finding significant differences between the industries having and not having Quality system implemented were successful. It also revealed areas lacking and challenges in implementation among textile and apparel industries in Bangladesh.

Keyword: TQM, TQM principles, Apparel Manufacturing Industry, RMG (Ready Made Garments).



1. Introduction

Total Quality Management (TQM) is a system focusing on customer satisfaction through a concept of "continuous improvement". This concept emerged after the 1980s with the purpose of developing and expanding quality management strategy by adding more aspects related to quality. TQM is considered by many researchers as an important approach in quality and business performance improvement, and therefore other industry is forcing the Apparel Manufacturing industry to adopt TQM. The implementation of TQM has been recognized by research as a successful management philosophy in the manufacturing and service industry, so can likewise be embraced in the Apparel Manufacturing industry to help raise the quality and productivity ^[1]. The United States and European industry are beginning to understand that poor quality costs industry a high amount in sales revenues nationally, and improving the quality of goods and services will help to improve productivity, lower costs and increase profitability. The United States and Europe have woken up a little late, after the competitiveness of Japanese manufacturing

in the early 80's. There is no doubt that most Japanese products are better quality, and lower cost than US and European products, which may be a result of Japanese manufactures understanding the TQM concepts earlier than others.

TQM system is an integrated system of methods, principles, and best practices that provide a framework for organizations to strive for excellence in the everyday processes. To become a world class competitor, industry needs a framework/model to integrate continuous improvement tools into a system that involves participative cross- functional implementation. The various models proposed by experts may support organizations in the TQM implementation process. A crucial element of TQM that has emerged is processes and efficiency. Without adequate attention to efficiency, there will be no product improvement and all TQM effort will be wasted. The TQM managers must keep an eye on cost and waste reduction, resource planning and utilization and above all safety to have a positive impact on society and the growth of the organization. The main issue is focusing on customer satisfaction and making operationally efficient.

2. Objectives

The main aim of the research is to check the feasibility of implementing a TQM framework and finding out its effects in the Apparel Manufacturing industry in Bangladesh. In order to achieve this broad aim following objectives emerged:

- Describe the literature review, tools & techniques of TQM.
- Analyze the current status of the Apparel Manufacturing industry in Bangladesh.
- To focus the Challenges faced in the TQM implementation.
- To find out the effects of implementing proposed TQM framework in Garments industries.
- To improve the quality of garment industry of Bangladesh by implementing TQM approach.

3. Methodology

3.1 Method

The research starts with a detailed literature review of TQM that requires a general understanding of TQM. Next, the objective and scope of research are defined to give a clearer picture of the research. All related quality issues in Bangladesh faced, especially by RMG sectors were being gathered to learn about the current trend of Bangladeshi Apparel manufacturing industries' quality activities. Further to that, all the TQM concepts will be compiled to suit the objective and scope of research as well as providing a guideline for future review ^[2]. SPSS-20 version software has been used to analyze the data, collected from the numerous clothing mills of Bangladesh using various data collection tools & techniques. To ensure the empirical study of the TQM framework implementation an intensive case study has been done and finally found the feasibility and effectiveness of TQM application in the apparel industry.

3.2 Research Resources and Tools

Various research resources and tools were employed in this research to collect the required data and these resources are:

- Factory documents and statistics related to the research objectives.
- Literatures and researches related to the research questions
- Interviews with employees of Apparel Manufacturing industry in Bangladesh
- Questionnaire to collect data and information necessary for research study, statistical analysis, and get results.
- Internet search

4. Literature review

4.1 Definitions of Total Quality Management

Numerous definitions have been given on Total Quality Management (TQM) by quality gurus, practitioners and academician. Besterfield defined TQM as both a philosophy and a set of guiding principles that represents the foundation of a continuously improving organization. It integrates fundamental management techniques, existing improvement efforts and technical tools under a disciplined approach ^[3].

Using a three-word definition, Wilkinson and Wither defines TQM as below-

Total: every person is involved (its customers and suppliers)

Quality: customer requirements are met exactly

Management: senior executives are fully committed ^[4].

Feigenbaum defined TQM as an effective system for integrating the quality development, quality maintenance and quality improvement efforts of the various groups in an organization so as to enable production and service at the most economical levels which will allow for full customer satisfaction.

Much research has been conducted about TQM. However, it is evident from the literature that different researchers have adopted different definitions and frameworks based on the context of the application or the theme of the research.

TQM has been arguably the most significant approach to the management of organizations and their operations and its improvement and has provided many tools and techniques^{[5] [6] [7] [8]}.TQM helps in the management of operational activities and in business process improvement in two ways: Firstly, increasing effectiveness of the organization by improving the processes that result profit, and secondly, by reducing defects and eliminating extra costs to products and services thus decreasing overall costs and

creating extra capital for the development of organizational resources such as human capital.

4.2 Quality Tools & Techniques

Chan said ' You cannot manage what you cannot measure' ^[9]. Consequently, there is a need to establish a process for measurement of quality management system performance, aiming at monitoring data on current and end user customer satisfaction for all essential processes. Therefore the organization needs to establish a sufficient and workable process. TQM tools are technical means used to work in the quality programs, and often include diagrams, statistical graphs, also, used to improve processes or develop products in any organization by identifying, analyzing and evaluating data that is relevant to their business. Therefore, by using the tools and techniques, one can investigate problems, identify solutions and implement them in work practices, by measuring and analyzing the outcome.

The seven quality control tools described by Ishikawa are usually perceived as too simplistic and not appropriate ^[10]. In a study conducted by Scheuermann L. et al., the tools classified as Qualitative tools include flow charts, cause-and-effect diagrams, multi-voting, affinity diagram, process action teams, brainstorming, election grids, and task list), whereas Quantitative tools include Shewaryt cycle (PDCA), Pareto charts, control chart, histogram, run chart, and sampling ^[11]. TQM tools are practical methods, skills, means or mechanisms that can be applied to particular tasks.

A technique has a wider application, often resulting in the need for more thought, skill and training to be used effectively, such as SPC, benchmarking, quality function deployment ^[12]. The most popular sets of TQM tools are as below-

- Pareto Principle: Identifying the key problems
- Control Charts: Variation Control
- Cause and Effects, Fishbone, Ishikawa Diagram
- Histogram or Bar Graph
- Traffic Light System
- 5S
- Quality Function Deployment
- Failure Mode & Effect Analysis

4.3 Present status of TQM implementation in Bangladeshi clothing industry

It was extracted during the survey processes that there are some issues that concerned clients and Apparel Manufacturing industry as well, but from different points of view. These issues are the cost, quality of work, and the delay in the completion of projects. The literature review states that many management writers and thinkers have continually strived for better methods of achieving time, cost-effective and quality objectives ^[13]. The interviews conducted, employed a qualitative methodology to understand the situation among Apparel Manufacturing industry in Bangladesh.

The past view of quality is that “increased quality will increase project costs”, while today’s view is that “improved quality saves money and increases business” as mentioned earlier. The cost issue arises due to the fixed contractual amount during the duration of Apparel Manufacturing and to changes in the prices of materials. This issue does not exist in Bangladesh Apparel Manufacturing industry due to the availability of many suppliers for Apparel Manufacturing materials. Therefore, the Government of Bangladesh and other authoritative bodies like BGMEA, BKMEA, BJMC, and BTMC etc. should encourage building material suppliers to establish more shops by providing more facilities and remove any obstacle against the expansions of suppliers. It should also encourage foreign industry to come to Bangladesh and to focus their investments in the building material business.

The researcher has found that the quality issue discussed above basically referred to the shortage of workmanships skills which in turn led to poor quality and unclear quality standards, so that each consultant proposed his own specifications. In contrast, there is a quality standard in Bangladesh and all large Apparel Manufacturing industry follow this standard. Therefore, the attention to the import of skilled laborers and the existing master quality standards are important for overcoming these issues. Most of the projects in Bangladesh are only completed after the agreed time; this issue is global and not limited to Bangladesh.

The government in Bangladesh, as the authoritative body, classified Apparel Manufacturing factories according to certain criteria, aiming to improve and generate the spirit of competition among Apparel Manufacturing industry. Moreover, Apparel Manufacturing industry in Bangladesh believes in and agreed with the importance of improvement in order to gain a competitive advantage. It has been observed from the classification criteria, that the measurement or assessment of quality is based on the availability of quality management only in industry structure. Therefore, to exceed the value of quality and encourage Apparel Manufacturing industry in Bangladesh to increase their interest in the quality concept, the assessment for quality should be based on quality principles and upon measurement of the level and reality of the implementation of these principles.

4.4 Challenges Faced in the TQM implementation

While doing the case study, the researcher has faced some unavoidable difficulties and challenges. But the remarkable challenges have been illustrated below-

Quality definition: Most of the factory workers don’t have the clear idea about what is quality and what should they do to ensure the customers’ expectation. Commitment: commitment is one of the most important critical successful factors in the adoption of TQM framework. But the poor commitment of top management has been found as a challenge and a barrier against continuous improvement. At the same

time, the researcher believes that such commitment should not be limited to the top management only, but everyone in the organization, all of whom ought to be committed to the implementation of TQM principles.

Culture: The researcher has found that the ongoing traditional culture of the organization or factory is one of the most remarkable challenges faced while adopting TQM framework. Everyone is set to the existing culture and fears to any kinds of changes.

Communication: The proper communications between different levels of people are important factors that have an impact on quality. Since most of the workers in the Apparel Manufacturing industry in Bangladesh are local but the top management are foreigners, so language is the main obstacle to improving the communication between workers themselves from one side, and with their bosses on the other.

5. Case Study:

As a major part of the research methodology, a case study has been conducted at a very well-known textile factory named Knit Asia Ltd. The researcher has implemented a TQM framework there and the major aim of the case study was to provide a practical example of how to use the TQM implementation framework in practice. To achieve this goal, it is necessary to present the framework to a firm and investigate how the firm uses it in practice. TQM framework implementation was a time consuming task and had to change the overall company working environment. But considering some unavoidable limitations of time and company conditions, researcher has used every section in smaller portion not taking the whole department. For example, for production unit only one sewing line has been taken into the experiment, for HR department only 2 HR officer has been taken under experiment not the whole department as they had to have their regular office responsibilities. By this way the framework has been tried to implement there.

6. Effects of implementing the TQM framework:

By implementing the TQM framework, it has been possible to check for the no. of defects or alters occur during making a garment. Here a comparative statistic has been illustrated to disclose the effects of implementing the TQM framework in Knit Asia Ltd. (RMG unit-2).

Alters or reworks statistics [without implementing the proposed TQM framework (conventional line)]

Table 1: Statistics showing alters or reworks% (without TQM implementation)

| Alters (without implementing the proposed TQM framework) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-----------|---------|----------|---------------|----------------|--------------------|-------------|----------------|----------------|----------------|-----------|------|-----------|---------------------|-----------------------|-------------|---------------|-----------------|---------------|----------|-------|------------|-------------------|----------------|--------|-----------|---------|---------------|--------|
| | | | | Sewing | | | | | | | | | | | | | | | | | | | | | | | | | |
| Date | Check QTY | Color | Order no | Broken stitch | Stitch Up-down | Drop / Skip Stitch | Join Stitch | Un-even Stitch | Run Off Stitch | Over Stitching | Open Seam | Wavy | Puckering | Placket Box Slanted | Armhole Point Up-Down | Bad Tension | SPI Irregular | Incorrect Label | Label Slanted | Oil Mark | Pleat | Dirty Spot | HTS/Print Problem | Button Problem | Others | TTL Alter | Alter% | Finishing Alt | Alter% |
| | | | | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | Sewing | Sewing | Sewing% | | |
| Day-1 | 2285 | White | 949 | | 4 | | 2 | 6 | | 6 | 2 | 4 | | | 2 | | | | 5 | 2 | 2 | 0 | | | | 35 | 1.53% | 19 | 0.83% |
| Day-2 | 2306 | White | 951 | 1 | 3 | | 4 | 4 | | 5 | 2 | 5 | | | 1 | | | | 5 | 3 | 2 | 0 | | | 3 | 38 | 1.65% | 22 | 0.95% |
| Day-3 | 2306 | White | 950 | 2 | 4 | 1 | 3 | 4 | | 7 | 3 | 4 | | | 3 | | | | 4 | 4 | 2 | 0 | | | 4 | 45 | 1.95% | 19 | 0.82% |
| Day-4 | 2200 | White | 951 | | 1 | | 4 | 4 | | 5 | 2 | 4 | 2 | | 3 | 1 | | | 5 | 3 | 2 | 0 | | | 4 | 40 | 1.82% | 20 | 0.91% |
| Day-5 | 2260 | White | 638 | | 2 | | 3 | 4 | | 5 | 2 | 3 | 2 | | 2 | 1 | | | 5 | 2 | 2 | 0 | | | 3 | 36 | 1.59% | 21 | 0.93% |
| Day-6 | 2260 | M.blue | 638 | | 2 | | 4 | 5 | | 5 | 2 | 3 | | | 3 | | | | 4 | | 2 | 0 | | | 3 | 33 | 1.46% | 18 | 0.80% |
| Day-7 | 1756 | H.grey | 166 | | 3 | | 1 | 2 | | 6 | | 4 | 1 | | 3 | 2 | | | 1 | 2 | 2 | 0 | | | 3 | 30 | 1.71% | 20 | 1.14% |
| Day-8 | 2261 | H.Grey | | | 3 | | 4 | 5 | | 5 | 2 | 4 | 1 | | 2 | 2 | | | 4 | | 1 | | | | 3 | 36 | 1.59% | 21 | 0.93% |
| Day-9 | 1600 | H.Grey | | 1 | 2 | | 4 | 4 | | 5 | 2 | 2 | 2 | | 3 | | | | 3 | | 2 | | | | | 30 | 1.88% | 19 | 1.19% |
| Day-10 | 905 | N.black | | 2 | 2 | 1 | | 3 | 3 | 3 | 1 | | 2 | 1 | | | 2 | | 2 | | | | | | | 22 | 2.43% | 21 | 2.32% |
| Day-11 | 1800 | Black | | 2 | 3 | | 4 | 5 | | 6 | 2 | 3 | 1 | | 3 | 2 | | | 5 | | 3 | | | | | 39 | 2.17% | 17 | 0.94% |
| Day-12 | 1576 | N.black | 489 | | 2 | 2 | 3 | 3 | 1 | 4 | 2 | 2 | | | 3 | 1 | | | 3 | | 2 | | | | | 28 | 1.78% | 21 | 1.33% |
| Day-13 | 1605 | M.blue | 838 | 1 | 1 | | 3 | 3 | | 4 | 2 | 1 | | | | 2 | | | 3 | | 1 | | | | | 21 | 1.31% | 21 | 1.31% |
| Day-14 | 1964 | M.blue | 615 | | 2 | | 2 | 3 | | 4 | 2 | 2 | | 1 | 1 | | | | 4 | | 2 | | | | | 23 | 1.17% | 24 | 1.22% |
| Day-15 | 1514 | M.blue | 638 | 1 | 2 | | 2 | 2 | 1 | 3 | 1 | 2 | | | 1 | 1 | | | 3 | | 2 | | | | | 21 | 1.39% | 25 | 1.65% |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------|------|--------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|--|----|-------|----|-------|
| Day-16 | 2100 | M.blue | 638 | 1 | 2 | | 4 | 2 | | 5 | | 3 | 2 | | 3 | | | 4 | | 2 | | | | | 28 | 1.33% | 20 | 0.95% |
| Day-17 | 2211 | M.blue | 307 | 2 | | 5 | 3 | | 4 | 6 | 1 | 2 | | 1 | 1 | | | 3 | | 2 | | | | | 30 | 1.36% | 20 | 0.90% |
| Day-18 | 2190 | M.blue | 307 | 1 | | 4 | 3 | 1 | 1 | 3 | 1 | | | | 1 | | | 2 | | 3 | | | | | 20 | 0.91% | 22 | 1.00% |
| Day-19 | 1902 | M.blue | 638 | 2 | 3 | 1 | 4 | 4 | 1 | 5 | 2 | 2 | | | 1 | | | 6 | 2 | 2 | | | | | 35 | 1.84% | 20 | 1.05% |
| Day-20 | 1606 | White | 173 | 2 | 3 | | 4 | 3 | | 4 | 1 | 2 | | | 2 | 2 | | 4 | 3 | 3 | | | | | 33 | 2.05% | 21 | 1.31% |
| Day-21 | 1800 | White | 175 | 1 | 1 | | 3 | 2 | 1 | 3 | 3 | | | | 2 | 3 | | 2 | 2 | 5 | | | | | 28 | 1.56% | 19 | 1.06% |
| Day-22 | 1300 | White | 171 | 1 | | | 4 | 1 | 1 | 3 | 4 | | | 1 | | 1 | | | 1 | 4 | | | | | 21 | 1.62% | 19 | 1.46% |
| Day-23 | 1938 | White | 175 | 1 | 1 | | 3 | 3 | 1 | 3 | 4 | | | | 3 | 2 | | 3 | | 3 | | | | | 27 | 1.39% | 20 | 1.03% |
| Day-24 | 1808 | White | 952 | 2 | | 5 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | | 3 | 1 | 2 | | 2 | 4 | 2 | | | | 38 | 2.10% | 20 | 1.11% |
| Day-25 | 1900 | White | 170 | 1 | | 3 | 4 | 2 | | 3 | 3 | 2 | 2 | | 3 | 1 | | 4 | | 3 | | | | | 31 | 1.63% | 22 | 1.16% |
| Day-26 | 2100 | White | | 1 | 2 | 3 | 6 | 3 | 1 | 4 | 3 | 1 | 2 | | 1 | 2 | | 4 | | 5 | 3 | | | | 41 | 1.95% | 22 | 1.05% |

Alters or reworks statistics [with implementing the proposed TQM framework (experimented line)]

Table 2: Statistics showing alter or reworks% (with TQM implementation)

| Alters (with implementing the proposed TQM framework) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-----------|---------|----------|---------------|----------------|--------------------|------------|---------------|---------------|----------------|-----------|------|-----------|---------------------|-----------------------|-------------|---------------|-----------------|---------------|----------|-------|------------|-------------------|----------------|--------|-----------|---------|---------------|--------|
| Date | Check QTY | Color | Order no | Broken stitch | Stitch Up-down | Drop / Skip Stitch | Join Stich | Un-even Stich | Run Off Stich | Over Stitching | Open Seam | Wavy | Puckering | Pracket Box Slanted | Armhole Point Up-Down | Bad Tension | SPI Irregular | Incorrect Label | Label Slanted | Oil Mark | Pleat | Dirty Spot | HTS/Print Problem | Button Problem | Others | TTL Alter | Alter% | Finishing Alt | Alter% |
| | | | | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | Sewing | Sewing | Sewing% | | |
| Day-1 | 2356 | N.black | 959 | | 3 | | | 4 | | 3 | 2 | 2 | 2 | | 3 | 4 | | | | 2 | 3 | 0 | | | | 28 | 1.19% | 20 | 0.85% |
| Day-2 | 2311 | N.black | 959 | 1 | 3 | 2 | 2 | | | | | | 1 | | 3 | | | | 2 | 2 | 2 | 0 | | | 3 | 21 | 0.91% | 23 | 1.00% |
| Day-3 | 2360 | N.black | 959 | | 3 | | 3 | | | | | | | | 3 | | 1 | | 3 | | | 2 | | | 3 | 18 | 0.76% | 21 | 0.89% |
| Day-4 | 3085 | N.black | 29 | 2 | | | | | | | | | | | 3 | | | | 3 | | 2 | 3 | | | 3 | 16 | 0.52% | 23 | 0.75% |
| Day-5 | 2266 | N.black | 32 | 3 | | | | | | | | | | | | | 2 | | 3 | | 3 | 4 | | | | 15 | 0.66% | 20 | 0.88% |
| Day-6 | 2508 | N.black | 31 | 1 | | | | | | | | | | | 3 | | 3 | | 3 | 2 | 3 | 4 | | | | 19 | 0.76% | 20 | 0.80% |
| Day-7 | 709 | White | 952 | 1 | | | | | | | | | | | 4 | 2 | | | 3 | 1 | 2 | 2 | | | | 15 | 2.12% | 24 | 3.39% |
| Day-8 | 2208 | White | | 1 | | | | | | | | | | | 5 | 1 | | | 2 | 1 | 2 | | | | 5 | 17 | 0.77% | 19 | 0.86% |
| Day-9 | 3107 | White | | | 2 | | 2 | 2 | 1 | 3 | 2 | | 3 | | 3 | | | | 2 | | 3 | 4 | | | 4 | 31 | 1.00% | 23 | 0.74% |
| Day-10 | 2809 | N.black | | 2 | 1 | 2 | 2 | | 3 | | | 1 | | 6 | 3 | | | 3 | | | | 1 | | | 2 | 26 | 0.93% | 19 | 0.68% |
| Day-11 | 2808 | Black | | 2 | 3 | | 3 | 3 | | 3 | 2 | | 2 | | 3 | 2 | | | | | | 2 | | | 5 | 30 | 1.07% | 26 | 0.93% |
| Day-12 | 2809 | N.black | 396 | 1 | | | | | | | 2 | | 1 | | 4 | 3 | 1 | | 2 | | 2 | 2 | | | 3 | 21 | 0.75% | 24 | 0.85% |
| Day-13 | 2808 | Blue | 648 | 1 | | | | | | | | 2 | 3 | | 4 | 1 | | | | | 3 | 2 | | 1 | 4 | 21 | 0.75% | 22 | 0.78% |
| Day-14 | 2878 | White | 797 | 1 | | | | | 2 | 3 | | 2 | 2 | | 5 | 1 | | | | | 3 | 2 | | | 4 | 25 | 0.87% | 21 | 0.73% |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------|------|---------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|---|---|---|---|---|---|---|----|-------|----|-------|
| Day-15 | 2880 | N.black | 396 | | | | | | 3 | 4 | | | 2 | | 6 | | | | 3 | | 2 | 3 | | | 4 | 27 | 0.94% | 23 | 0.80% |
| Day-16 | 2879 | N.black | 461 | 1 | 3 | | 2 | 3 | | | 2 | 2 | 2 | | 6 | | | | 3 | | 5 | 3 | | | 5 | 37 | 1.29% | 21 | 0.73% |
| Day-17 | 2221 | White | | | 1 | | 2 | 3 | | 3 | 1 | 1 | 3 | | 3 | | | | 4 | | 3 | 2 | | | 6 | 32 | 1.44% | 25 | 1.13% |
| Day-18 | 2909 | M.blue | 648 | 1 | 1 | | | | | | | 1 | 3 | | 5 | | | | 5 | | | | | | 4 | 20 | 0.69% | 24 | 0.83% |
| Day-19 | 2913 | M.blue | | 3 | 3 | | | | | | | 2 | | 5 | 2 | | | | 3 | 1 | 4 | 1 | | | 3 | 27 | 0.93% | 24 | 0.82% |
| Day-20 | 2406 | M.blue | 650 | | 2 | | 1 | 2 | 1 | | 3 | | | | | | | | 5 | | 4 | 1 | | | | 19 | 0.79% | 21 | 0.87% |
| Day-21 | 2028 | Pink | 57 | 2 | 1 | 8 | 2 | | 2 | | 2 | | | | | | | | 6 | | 2 | 1 | | | | 26 | 1.28% | 24 | 1.18% |
| Day-22 | 2580 | Pink | 57 | 2 | 2 | | | | | | | | | | 2 | | | | 5 | 2 | | 1 | | | | 14 | 0.54% | 21 | 0.81% |
| Day-23 | 2861 | White | 741 | | 3 | | | | | | | | | | 2 | | | | 3 | | 5 | | | | | 13 | 0.45% | 25 | 0.87% |
| Day-24 | 2861 | White | 741 | | 3 | 2 | 3 | 4 | | | 2 | 3 | 3 | | 5 | 1 | | | 5 | | 3 | 1 | | | | 35 | 1.22% | 21 | 0.73% |
| Day-25 | 2911 | M.blue | 196 | 1 | 4 | 2 | | | | | 2 | 3 | 2 | | 2 | 2 | | | 2 | | | 3 | | | | 23 | 0.79% | 20 | 0.69% |
| Day-26 | 2862 | M.blue | 198 | 1 | 3 | 2 | | | | | 3 | 2 | 2 | | 5 | 2 | | | | 3 | | | 3 | 1 | | 27 | 0.94% | 19 | 0.66% |

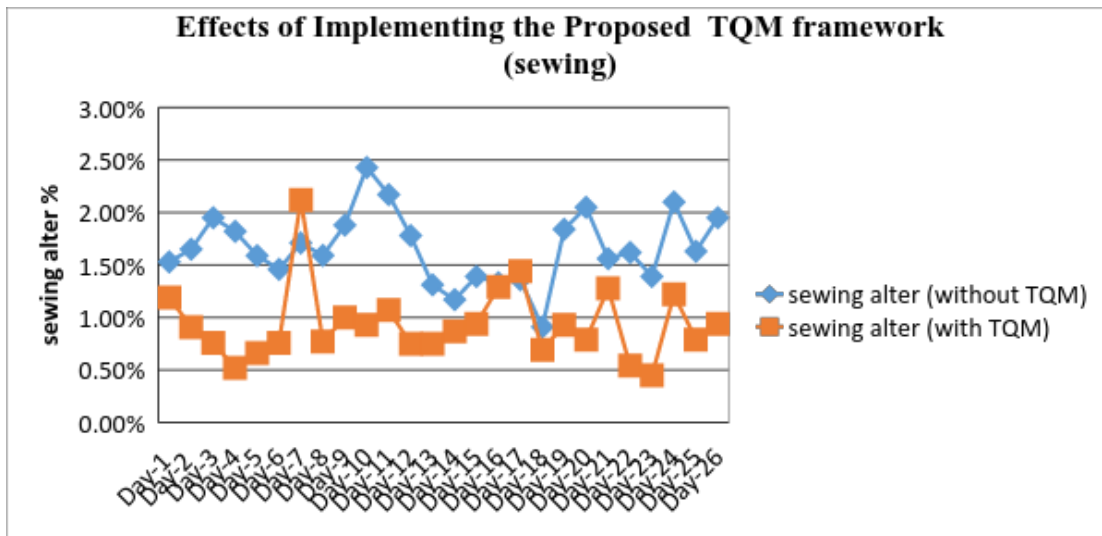


Figure 1: Comparison of sewing Alter & reject% with & without implementing TQM

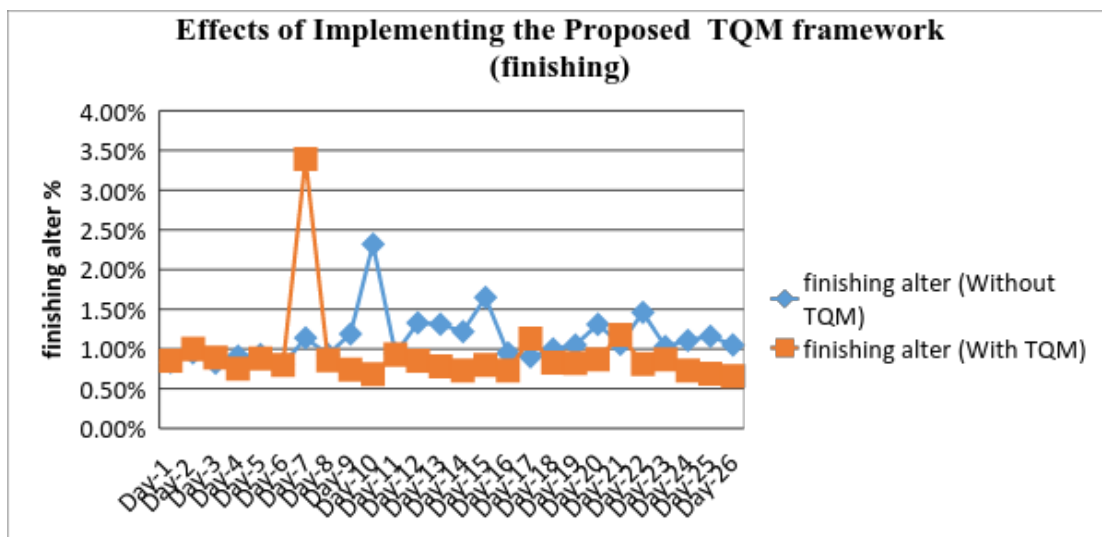


Figure 2: Comparison of finishing Alter & reject% with & without implementing TQM

Table 3: Comparative statistics of before and after TQM implementation.

| Category | Without TQM | With TQM |
|---------------|-------------|----------|
| Production | 49453 | 67333 |
| Working day | 26 | 26 |
| Total alters | 809 | 603 |
| Total rejects | 168 | 148 |
| Alter % | 1.64 | 0.90 |

| | | |
|---------|------|------|
| Reject% | 0.34 | 0.22 |
|---------|------|------|

In apparel manufacturing processes, especially in sewing there are so many faults or alters may occur. Some are repairable alters and some are not (non-repairable) which are unavoidable, but may be reduced in quantity but cannot be removed. To find out the benefits or advantages of implementing the proposed TQM framework, the two experiments have been carried out simultaneously considering so many limitations. Here two sewing floors have been taken into considerations for the experiments. One has been considered “before implementing the proposed TQM framework” that is their ongoing floor and another followed the TQM principles has been considered as “after implementing the proposed TQM framework”. Then both the floors have been observed regularly for about a month: how is the production, how much faults are occurring and what about the status of alters or reworks, etc. From the data mentioned above, it’s been found that production has been improved as total alters and rejections have been considerably reduced after implementing the proposed TQM framework.

7. Limitations of the Research:

Of course, this research has some limitations and these limitations of the research are presented in this part as follows:

- The research focuses on the Apparel Manufacturing factories only, other types of factories within the Textile industry will not be discussed in detail.
- Since the TQM as a topic is almost new in developing countries, and never been fully implemented in the Apparel Manufacturing industry in Bangladesh, the literature review is based on work done in the developed countries such as Japan, UK and USA.
- Newly proposed TQM framework has been applied in only one Apparel Manufacturing industry as its very vast concept and needs to change the whole factory set-up.
- The proposed TQM framework has been applied in two separate but almost same type sewing lines having the same style running through it.
- It was not possible to do the experiment in the same sewing line with same garment styles as this garment orders has very short lead time for sewing. That’s why two parallel sewing lines have been taken; one with TQM and another without TQM.

8. Conclusion:

This research has discussed and analyzed the implementation of TQM within the Bangladesh Apparel Manufacturing industry. The research also identified a number of issues and employed a number of methods which ultimately led to the development of frameworks of TQM. TQM is not a specific destination rather its journey and it has no end. Organization is always trying to improve as well as different techniques and tools are invented parallel to enhanced customer expectation. So definition of quality is always evolving. In Bangladesh RMG is booming sector its growth is remarkable. To sustain the development and keep the growth rate high necessity of TQM is decisive.

List of Abbreviations:

TQM: Total Quality Management

RMG: Ready Made Garments

SPSS: Statistical Package for the Social Sciences

BTMC: Bangladesh Textile Mills Corporation

BGMEA: Bangladesh Garment Manufacturers and Exporters Association

BKMEA: Bangladesh Knitwear Manufacturers and Exporters Association

BJMC: Bangladesh Jute Mills Corporation

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