

# Development of a Framework for More Effective Implementation of Total Quality Management Principles in Apparel Manufacturing

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doi: 10.19044/esj.2016.v12n28p472 [URL:http://dx.doi.org/10.19044/esj.2016.v12n28p472](http://dx.doi.org/10.19044/esj.2016.v12n28p472)

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## Abstract

The purpose of this paper is to develop a model or framework of total quality management (TQM) implementation in Textile and RMG industry. Textile and RMG Industry is an important sector for Bangladesh in terms of industrial expansion of the country, earning foreign currency and creating job opportunities. However, it faces subtle problems due to labor unrest, political instability and owner's ignorance. TQM is an approach that focuses on customer satisfaction. Therefore, implementation of TQM is a challenging task. Through a self-administrative survey from 50 Industries of textile and RMG industry in Bangladesh data have been collected. This paper identifies ten key factors of TQM implementation in the Textile and RMG Industry in Bangladesh. These are Leadership, Communication, Strategic Quality Planning, Training, Customer Satisfaction, Continuous Improvement, Employee Involvement & Satisfaction, Culture, Supplier Satisfaction and Teamwork.

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**Keywords:** TQM, Dimension of TQM, TQM framework

## Introduction

Bangladesh historically lags behind in industrialization (Sharker, MZH; Sobhan, Md A; and Sultana, S 2006). After liberation, the Government of Bangladesh has been endeavoring to improve its industrial growth (Karim,S 2009). From an economically conservative culture

Bangladesh is gradually processing towards the new era of open market policies and globalization. The RMG industry of Bangladesh started in the late 1970s and became a prominent player in the economy within a short period of time (Haider, 2007). In Bangladesh, in particular, these industries play a very significant role in the economic development in terms of employment generation especially for blue collar workers. It is also the biggest source of foreign exchange earnings. It employs a large number of people, mostly consisting of women workforce. In the 1980s the RMG industry of Bangladesh was concentrated mainly in manufacturing and exporting woven products. Since the early 1990s, the Knit section of the industry has started to expand <sup>[3]</sup>. The garment product base ranges from ordinary shirts, T-shirts, trousers, shorts, pajamas, ladies wears, under garments for men , women, children and sportswear to sophisticated high value items like quality suits, branded jeans items, cotton and leather jackets, sweaters, and caps etc.

Before phasing out, the Multi -Fiber Arrangement (MFA) in the North American market and preferential market access to European markets were dominant factors for the success of the Bangladeshi garment industry. Low labor cost was/is another factor of success. As explained by Warner International (1998), when the hourly apparel labor cost of Bangladesh is only \$0.30, it is \$ 10.12 in USA. Bangladesh is in a strong position in the global market. This is evident from the fact that the growth rate of garment exports in Bangladesh is significantly higher (81.3%) than that of several strong competitors such as Indonesia (31.2%), Mauritius (23.8%) and Dominican Republic (21.1%) ( Rashid, MA 2006).

Table 1: Comparative picture of Minimum Wages and Profit margin in the Garments Sector of different competing Countries (EPB).

<b>Countries</b>	<b>Minimum wage In USD per Month</b>	<b>Profit margin (%)</b>
India	113	11.8
Pakistan	118	N.A
Vietnam	120	6.5
China	204	3.2
Bangladesh	39	43.1

Companies actually compete on three major issues; Quality, Price and Delivery. If the choice is to compete in the market place on the basis of product or service price, then the level of competition is clearly defined; the low-cost provider wins. However, companies choosing the low cost approach may find themselves losing premium business to competitors while retaining the low-margin business in the long term (Karim,S 2009) <sup>[2]</sup>. In order for companies to survive and grow in the future, it is essential that they deliver high quality goods and services. The concept of quality management

and sophisticated production process is recent in Bangladesh and the country is in a partial awareness state (Mamun, MZ and Islam, N 2002). Many companies understand that TQM is necessary for them to remain competitive, retaining their market share and to be able to respond to changing competitive demand in today business world. Based on some studies, not all companies are able to implement TQM successfully (Ross, Ghobahdian, Ahire et al. Gulbro et al.,Yusof, 2000).

The value of this research is one of the primary steps towards reaching the needs of textile garment sector that are trying to implement TQM in their business. With a better understanding of this issues, it can be a groundwork for the development of an appropriate TQM framework for practical implementation by the garment sector.

### **Research Objectives:**

Main objectives of this study are as follows-

- ✓ To develop a model which can be used more effectively to implement Total Quality Management.
- ✓ To identify the barriers for implementing TQM
- ✓ To improve productivity and product quality
- ✓ To improve the quality of garments industry of Bangladesh by implementing TQM approaches

### **Methodology**

For conducting empirical research, there are two methods of data collection: Qualitative and quantitative. These two methods have their strengths and weaknesses. In order to avoid their respective disadvantages, one important way to strengthen a research design is to use both qualitative and quantitative methods. In this study we adopted following research strategies.

### **Literature review:**

Literature review has been conducted to identify the pillars required to implement TQM in practice. Articles that are related with TQM are reviewed to find out TQM framework.

### **Questionnaire Survey:**

A thorough study has been done to analyze the present condition of product quality. A questionnaire is developed to obtain maximum information and perceptions with regard to management's practices on TQM, the implementation of numerous quality initiatives, how the process of implementation was conducted, the benefits of TQM and problems company faced as well as the factors that contribute to the success of TQM. Data has

been collected through observation method, e-mail, interviews from 50 factories and analyzed. Besides interviews, Short visits at the plant are made. After analyzing this we made a Framework.

### **Case Study:**

In an attempt to understand the reality of TQM approaches in Textile Garments industries, a case study is conducted in Fakir Apparels Ltd. Although the case study approach has a number of drawbacks, it also has a number of unique advantages. Reason for the drawbacks is the lack of statistical evidence from research findings. The case study can provide practical assistance to Fakir Apparels in implementing this TQM model in practice, and can also provide a better understanding of the model.

### **What is TQM:**

Earlier definitions of a customer included one who was impacted by the product. TQM philosophy extends the Concept of impact to every individual or department within the organization. The external customer is only the final part in the customer chain. This makes everyone a customer of, and a supplier to, someone else in the chain. This new definition of customer asks for altogether different outlook to the question about responsibility of quality. Since quality inputs and outputs are demanded and expected at every point on the chain, no one is spared from performing the quality function. In fact quality becomes a routine duty of every individual. This is the new culture of TQM.

TQM is the integration of all functions and processes within an organization in order to achieve continuous improvement of the quality of goods and services. The goal is customer satisfaction.

Total Quality Management (TQ, QM or TQM) is sweeping “culture change” efforts to position a company for greater customer satisfaction, profitability and competitiveness.

### **Concept from Quality Gurus**

An extensive review of literature was carried out to identify the concept of TQM from quality gurus such as Deming (1986), Juran (Juran and Gryna, 1993), Crosby (1979), Feigenbaum (1991), and Ishikawa (1985). Their propositions are the foundation for understanding the concept of TQM. The following subsections present the main principles and practices of TQM proposed by these quality gurus.

Figure shows a summary of their theories and definitions made by these experts as compared to the current ISO 9000 key elements.

Table 2: Comparison of ISO and Quality Gurus Key Elements (Richardson, Terry 1997)

	Crosby	Deming	Feigen Baum	Ishikawa	Juran	ISO 9000
Quality definition	Three corners of quality: product, user, instructions for use	Conformance to requirements	What the customer says it is	Satisfactory to the customer	Fitness for use	Conformance to procedures and specifications
Philosophy	Defect Free	Constancy of purpose; Statistical analysis	Full customer satisfaction at economical cost	Company wide quality control	Project Approach; in order of importance	Documentation defines and reflects practice
Approach	Motivate the people	Statistical techniques	Systems approach to total quality control	Talk with data	Quality trilogy; planning, control and improvement	Self-audit with independent review
Mechanics	Fourteen steps	Fourteen obligations of management	The nine "M"s	Seven Statistical tools	Diagnostic and remedial journeys	Three ISO 9000 and two guidelines

**REASONS FOR POPULARITY OF TQM:**

Total quality management has become the synonym of the success for most of the organizations in the world and this is gaining popularity day by day. The reasons can be attributed to the beneficial consequences of TQM.

**Guaranteed Customer Satisfaction and Increased Market Share:**

In TQM culture, the customer is the most important part of process line and if process quality is attained, customer satisfaction is guaranteed. Quality product and services ensure not only the customer's future return but also fewer complaints and lower warranty costs. Higher profits improve reputation and hence increased market share.

**Cost Reduction:** Decrease in cost under warranty is not the only target of cost reduction to be achieved. The higher the quality, the lower the number of inferior products. The reasons for reduction in cost due to high quality are:

- ✓ less consumption of energy and saving of working hours,
- ✓ less replacement of materials, and
- ✓ less stoppage of machines for inspection of final output.

The effect of cost reduction leads to prompt deliveries and higher productivity levels, and simultaneously lower cost for repair and reworking.

**Conducive environment:** TQM provides an environment where fear is eliminated. When fear is absent, it leads to the consequences where:

- ✓ employees take pride in their work because they can admit to their mistakes and provide opinion,
- ✓ employees feel respected and accepted because they feel as part of the team, and

- ✓ employees strive not only for their own interest but also for interest of organization.

**AXIOMS OF TQM:**

The essential elements of TQM as a process-oriented approach can be represented by only three main principles.

- ✓ Commitment (to never ending quality improvement & innovation).
- ✓ Scientific knowledge (of the proper tools and techniques for the 'technical change').
- ✓ Involvement (all in one team for the social change).

**Comparison of Different Quality Models**

Table 3: Comparison of Different Quality Models (Al-Musleh, 2010)

Models	Criteria	Focuses	Important elements
TQMEF (TQM-Efficiency) Model	Process & Efficiency, Customer focused Performance, People Management, Team Building & Business partner Development	Process & Efficiency	Processes, Customer, people management
Oakland Model	(3C) Culture, Communication, Commitment + (4P) Planning, Performance, Processes + People	Commitment	Commitment, Culture, people, processes
MBNQA (Malcolm Baldrige National Quality Award)	Leadership, Strategic Planning, Customer & Market, Information and analysis, Human Resource Focus, Process management, Business Results	Leadership	Leadership, Human Resources, processes
EFQM (European Foundation Quality Management)	Leadership, People, Policy & Strategy + Partnership & Resources + Processes + People Satisfaction+ Customer Satisfaction + Impact on Society + Key Performance	Leadership	Leadership, People, Customers, Processes, Society

**Reliability**

Reliability refers to whether you get the same answer by using an instrument to measure something more than once (Bernard, H.R. 2000). Reliability concerns the extent to which an experiment, test, or any measuring procedure yields the same results in repeated trials (Carmines, E. G. and Zeller, R. A. 1979) ; it is a statistical measure of how reproducible the survey instrument’s data are (Litwin, M. S.1995). Coefficient alpha measures internal consistency reliability among a group of items combined to form a single scale. It is a statistic that reflects the homogeneity of the scale. Generally, reliability coefficients of 0.70 or more are considered good (Nunnally, J.1967).

Table 4: Internal Consistency Analysis

Scales	No. of Items	Cronbach's Alpha
1. Leadership	6	0.297
2. Communication	5	0.601
3. Strategic Quality Planning	5	0.291
4. Training	5	0.254
5. Customer Satisfaction	5	0.680
6. Continuous Improvement	5	0.633
7. Employee Involvement and Satisfaction	5	0.666
8. Culture	5	0.541
9. Supplier Satisfaction	5	0.006
10. Teamwork	5	0.455

### Factor Analysis

Factor analysis addresses the issue of analyzing the interrelationships among a large number of items and then explaining these items in terms of their common underlying dimensions (factors). In fact, the general purpose of factor analysis is to find a way of condensing or summarizing the information into a smaller set of new composite dimensions (factors) with a minimum loss of information. Four scales contain about more than 60% variance which is good for this study and Scree Plot (Below) shows that all the values of the scales are reliable and First Four scales have greater than 1 eigenvalue.

Table 5: Factor Extraction (Evaluation)

Component	Total Variance Explained				
	Initial Eigenvalues			Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %	Total	% of Variance
1	2.108	21.080	21.080	2.108	21.080
2	1.975	19.751	40.830	1.975	19.751
3	1.563	15.627	56.457	1.563	15.627
4	1.067	10.672	67.129	1.067	10.672
5	.993	9.925	77.055		
6	.727	7.267	84.322		
7	.555	5.552	89.874		
8	.461	4.614	94.487		
9	.300	3.004	97.491		
10	.251	2.509	100.000		

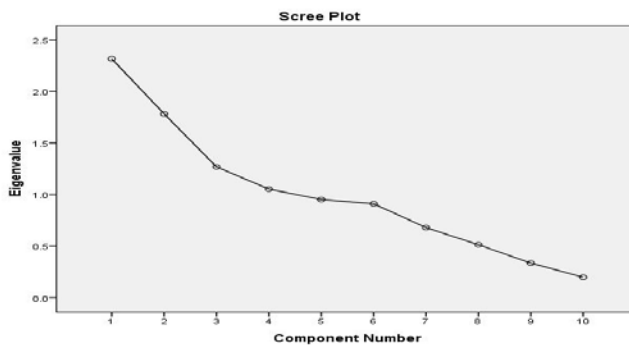


Figure: Scree Plot

### A Framework of TQM

The framework of TQM consists of the 10 elements of TQM where four elements are main targets in this study. Of the 10 TQM elements Leadership, Strategic Quality Planning, Training and Continuous Improvement are the most important.

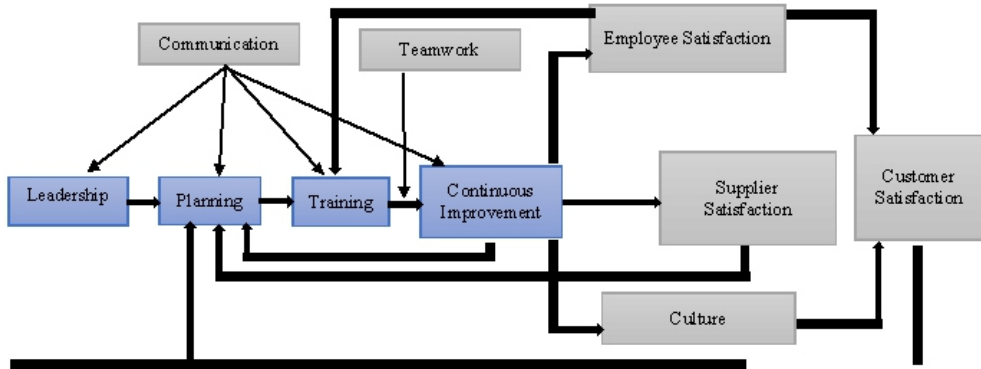


Figure: A Framework of TQM

To implement the proposed framework at first we have to implement these four phases which will be ensured total implementation process.

Leadership	Planning	Training	Continuous Improvement
Top management commitment Management participation Top management learning Empowerment Top management encouragement Role model Pursuit of long-term business success	Vision statement Quality policy Overall business performance plan Product quality goal Quality improvement plan Formulation of vision and plan	Education and training plan Team work learning Quality awareness education Training for quality management knowledge Job training Formal education promotion	Supplier quality audit Supplier communication Inventory management Inspection Use of quality tools Customer satisfaction survey Quality Warranty Improving employee commitment

### Results and findings

The results of the case study conducted in Fakir Apparels Ltd.

Area	Before Implementation	After Implementation
Defect %	9	10
Rework %	6	<5
Reject %	3	<3
Quality %	65	85
Efficiency %	60	65
Team Approach	Weak	Strong
Reward System	No	Yes
TQM Knowledge of workers	No	Yes



### **Findings:**

1. A LPTC framework for TQM implementation
2. Higher productivity
3. Higher profits
4. Good environment by maintaining communication & teamwork
5. Overall lower implementation cost

### **Conclusion:**

A number of conclusions have been obtained from this research. Thus, a quality management theory related to Apparel Industry of Bangladesh has been developed.

First, the instruments for measuring TQM implementation are reliable and valid, and can be used by other researchers to test the effects of TQM. The reliable and valid instruments can also be used in testing the time dimension of TQM implementation.

Second, several conclusions have been obtained from testing the two theoretical models, which are listed as follows:

1. TQM implementation has positive effects on employee satisfaction, customer satisfaction, and strategic business performance;
2. Leadership including top management commitment is first and crucial factor for implementing TQM.
3. Vision statement, Quality policy and planning by communicating with all other department play vital role for implementing TQM. Employee participation, recognition and reward have positive effects on employee satisfaction;
4. Continuous improvement which is the main goal of TQM can be achieved through Training and Teamwork.
5. If we can ensure continuous improvement, then a culture will develop that will help to build relationship among management, employee, supplier and customer. Thus we can ensure employee, customer and supplier satisfaction.

Third, the case study reveals that the TQM implementation model developed in this study is applicable in practice. This model can be used in Apparel Industries of Bangladesh to improve their TQM implementation efforts.

### **Scope of further research:**

Further research could be directed to overcome limitations of current study. Since it is difficult for a pilot survey to reveal all information especially the real performance data from enterprises- studies based on case-study method would be more appropriate to develop precise empirical models.

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