

# Practices of TQM in the Garment Sector of Bangladesh-An Empirical Investigation

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## **ABSTRACT**

Organizations worldwide have been exploring 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 improvements in performance and remain competitive. A sample of 48 garment firms from Dhaka, Gajipur, Narayanganj, Savar and Dhaka EPZ of Bangladesh was chosen to conduct the study. A field survey with a structured questionnaire and interviews was conducted to gather necessary information from the companies. These companies were selected purposively to ensure the best possible scenario of TQM practices in Bangladesh.

The main thrust of this research is to examine the practice of TQM in the Bangladeshi garment firms and to see the relationship between TQM and product quality improvement. The research findings indicate that companies which adopted TQM as a working philosophy within their organizations can make improvement in product quality. So, it is important to create right awareness for all industries to realize these improvements.

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# 1. Introduction

Organizations worldwide have been exploring ways to improve business practices to gain competitive edge. In today's global competition and economic liberalization, quality has been considered as an important factor for achieving competitive advantage (Jha and Joshi, 2010). The use of quality management has become widespread among organizations during the last decades (Hansson, 2003). Quality in most organizations is an activity parallel to the way a company conducts its daily business. Maintaining a customer focus is one of the most important elements in today's business market. Other elements such as money, resources and labor etc, are clearly important but these elements cannot make optimum growth if the customers are not satisfied.(Karim,2009). Customer requirements should get the first priority. Firms are more concerned about customer satisfaction because they have now more options than before. Organizations have realized that survival is only possible through customer satisfaction, and satisfaction will come through quality goods and services with the lowest possible price.

Total Quality is a description of the philosophy, culture and attitude of a company that strives to provide customers with TQM with products and services that satisfy their needs. TQM Philosophy expects quality in all aspects of the company's operations with processes being done right at the first time and defects and waste eradicated from operations. It is a combination of quality and management tools aimed at increasing business and reducing losses due to wasteful practices(Moballegghi,M and Shivaraj, n.d).The last two decades have been a period of tremendous upheaval and change in the business environment (Mamun and Islam, 2002). Competition in many industries has become worldwide in scope, and the pace of innovation in products and services has accelerated (Karim, 2009). This has been good news for customers since intensified competition has generally led to lower prices, higher quality and more choices. To keep pace with this, it is necessary to have an appreciation of the ways in which organizations are transforming themselves to become more competitive. Since the early 1980s, many companies have gone through several waves of improvement programs, starting with the Just-in-Time (JIT), Total Quality Management (TQM), Six Sigma, Lean Production and so on (Talib et al., 2010). The emergence of quality as a top priority in many corporate entities is primarily clear to the globalization of world trade and the competitive pressure brought about by the escalating demands of consumers, who want better products and services (Thiagaragan et al., 2001). Implementation of TQM program can enhance quality, reduce cost, increase output, eliminate delays in responding to customers and ultimately increase profits (Garrison and Noreen, 2003).

## 1.1 Rationale of the Study

In developed countries like UK, USA and Japan, Total Quality Management has been the topical issue for many years in all business sectors particularly in manufacturing industry (Chowdhury 2010). Bangladesh historically lags behind in industrialization (Sharker et al., 2006). After liberation, the Government of Bangladesh has been endeavoring to improve its industrial growth (Karim, 2009). However, it faces manifold problems; one of them is excessive cost of production. Developing countries like Bangladesh are now enjoying an excellent favorable atmosphere in terms of supply of educated manpower. People are much aware and aggressive about acquiring knowledge and training on modern business and information technology. From an economically conservative culture Bangladesh is gradually processing towards the new era of open market policies and globalization. The concept of quality management and sophisticated production process is recent in Bangladesh and the country is in a partial awareness state (Mamun and Islam, 2002). In Bangladesh, some companies across the garment industry sector have been practicing total quality to remain

globally competitive in the face of fierce competition resulting from the rapid globalization of businesses. The organizations adopting quality management practices have experienced an overall improvement in corporate performance (Rahman, 1999). Thus, a movement has started among organizations to strive for higher quality management since more and more organizations are coming up with new quality products and competition has increased in the local as well as global market for the last few decades.

Few researches have been conducted in this particular field (Mamun and Afrin, 2001) especially on TQM implementation in garment firms. Over the past several years, Bangladesh Garments Industry has become a focus of interest for management researchers, along with the awareness of the important role it has played in the national economy. Research on TQM domain in relation to garments industry of Bangladesh, however, has not attracted much attention. Few researches have been conducted in this particular field (Mamun and Afrin, 2001, Mamun and Islam, 2002; Rahman and Masud, 2011) especially on TQM implementation at garment firms. The organizations adopting quality management practices have experienced an overall improvement in corporate performance (Rahman, 1999; Rahman and Masud, 2011). To date no large-scale empirical survey has been conducted to see the effects of TQM implementation on product quality in Bangladeshi garment firms. All this warrant an investigation to explore the effects of TQM practice product quality. This study will focus on the practice of TQM in the garments firms of Bangladesh as well as its impact on quality improvement.

## **2. Literature Review**

### **2.1 Concept of TQM**

The developments in the management of quality during the 1980s led increasingly to the international adoption of the principle of business improvement through total quality management (Manni et al., 1994). Total quality management has many definitions. Quality gurus such as Deming (1986), Juran (Juran and Gryna, 1993), Crosby (1979), Feigenbaum (1991), and Ishikawa (1985), have defined the concept in different ways but still the spirit and essence remained the same. Their views provide a good understanding of the TQM philosophy, principles, and practices.

Total quality becomes a strategic issue for attaining a competitive position. The concept of TQM was introduced in the 1920s when statistical approach was first used in the quality control in the factories in America (Islam and Mustafa, 2008). It is a management approach which is aimed at incorporating awareness of quality in all organizational processes (Savolainen, 2000). Total Quality Management (TQM) involves systematic activities to efficiently manage all organizations of an enterprise and contribute to the achievement of corporate goals so that quality goods and services can be provided and offered at an appropriate price at the right time (Khan and Hassan, 2009). TQM is an organization-wide philosophy that strives to continually improve quality and customer service while simultaneously pushing down costs (Grill and Whittle, 1992). It is a management strategy to increase the awareness of quality in all organization processes. It works through quality circles, which encourage the meeting of all kinds of the workforce in different departments in order to improve production and reduce wastage (Siddique and Rahman, 2006). It is a set of techniques and procedure used to reduce or eliminate variation from a production process. As discussed by the Pheng and Jesmine (2004), practice of TQM brings several benefits for the organizations such as: higher customer satisfaction, better quality products and higher market share. With the full adoption and implementation of TQM there should be a turnaround in corporate culture and management approaches as compared to the traditional way of



management in which the top management gives orders and employees merely obey them (Njie et al., 2008).

TQM can be seen as a change in management style that aims to continually increase value to customers by designing and continuously improving organizational processes and systems (Islam and Mustafa, 2008). TQM is an integrative philosophy of management for continuously improving the quality of products and processes to achieve customer satisfaction. Hackman and Wageman (1995) reviewed the propositions about TQM by the quality gurus (Deming, Juran, and Ishikawa). According to their review results, the following five interventions are the core of TQM: Explicit identification and measurement of customer wants and needs; creation of supplier partnership; use of functional teams to identify and solve quality problems; use of scientific methods to monitor performance and identify points of high leverage for performance improvement; use of process management heuristics to enhance team effectiveness. TQM in this study is exemplified by leadership, employee participation, customer focus and the supplier quality management.

### **2.1.1 Leadership**

There is no alternative to effective leadership to successfully execute TQM. According to Savolainen (2000) the ideological perspective on TQM has been focused on the aspect of leadership in TQM implementation. According to Ugboro and Obeng (2000), many advocates of TQM hold that the goal of customer satisfaction is achieved through top management leadership and commitment in creation of an organizational climate that empowers employees and as well focuses on the goal of customer satisfaction. The European Quality Award (1994) and the Malcolm Baldrige Quality Award (1999) recognized the crucial role of leadership in creating the goals, values and systems that direct the pursuit of continuous improvement. Strong, positive, open-minded leadership will give rise to long term and sustainable business success (Randell and Mannas, 1999). The concept of leadership in this study is exemplified by top management commitment, top management participation, top management encouragement and top management empowerment.

**Top Management Commitment:** Top management commitment is the first step and prerequisite for a firm's TQM implementation efforts. Top management plays a decisive role in paradigm shifts in critical areas such as quality management, product development and innovation (Hoffman and Hagerty, 1994; Johne and Snelson, 1989 ). Employees throughout the organization need to impress upper management in order to advance up the corporate ladder. When top management reveals its commitment to a given strategy, this provides subordinates with salient clues for impressing upper management ( Ahire et. al.,1996 ). Researchers have suggested that the effectiveness of the quality efforts is determined by clarity of quality goals for an organization (Senge, 1990; Stalk et al., 1992). Top managements responsibility is to set those clear goals. it is also the responsibility of top managers to provide resources such as human and financial resources ( Chapman et. al . , 1991) to the implementation of total quality management efforts. Jesmine (1995) emphasizes that if there is lack of commitment from top management then TQM cannot be implemented in its entirety and also stresses the fact that the support that management takes in implementing a total quality environment is very critical to the success of the TQM implementation. Top managers need to demonstrate their commitment through their actions rather than words (Njie, et al., 2008). Top management commitment can positively affect employees' commitment to TQM and culturally change people involved. If top management

views quality as more important than cost, more important than meeting product schedules, employees' quality awareness is easily improved. To implement TQM, top managers should be committed to establishing a firm that continually views quality as a primary goal. If the organizational culture does not embody quality, any quality improvement effort is probably shallow and short-lived (Dale, 1999; Juran and Gryna, 1993). As discussed by Zhang (2000), TQM requires top management commitment to ensure sufficient resources for solving quality problems. Research revealed that high levels of quality performance were always accompanied by an organizational commitment to that goal and high product quality did not exist without strong top management commitment. Quality policies will be developed by the leaders that contribute to firms improving product quality (Motwani et al., 1994).

**Top Management Participation:** It is very difficult to improve product quality and quality management if top managers do not lead and participate. Emerald (2005) emphasized that, for a successful application of the management theories and to achieve a long term goals, it is of great importance if top management could avoid losing focus on their managerial role, has role model and active participation in decision implementation. Quality improvement involves making decisions and creates something that did not exist before. It is not sufficient for top managers to stand on the sidelines and shout "improve product quality and intensify quality management". There is no way that a manufacturing firm can implement quality improvement activities if the top managers are bystanders. Particularly in a firm with an autocratic general manager, there is a strong trend that employees act on something only in proportion to the manager's degree of interest. Top management participation is crucial to a firm's quality improvement efforts; it obviously helps in spreading quality consciousness throughout a firm (Dale, 1999; Ikezawa, 1993). According to Zhang (2000) product quality improves if the top management leads and participates.

**Employee Empowerment through Top Management:** Top management commitment and employees empowerment is one of the most important and vital principles in total quality management because it is often assumed to have a strong relationship with product quality (Zhang, et al., 2000). Empowerment means giving permission to the workforce to unleash, develop, and utilize their skills and knowledge to their fullest potential for the firm. In TQM implementation top management commitment in creating an organizational climate that empowers employees is very imperative (Njie, et al., 2008). Thus this can be achieved with top management commitment in training employees and giving employees opportunities to be responsible for the quality of their work. Empowerment has many benefits such as increasing employees' motivation to reduce mistakes, increasing the opportunity for creativity and innovation, improving employee loyalty, and allowing top and middle management more time for strategic planning. It is necessary to utilize the strategy of moving toward more humanistic management as the specific objective of improving quality management. The masses have boundless creative power. Top management needs to empower employees to solve various problems and should rely on employees wholeheartedly (DuBrin, 1995; Juran and Gryna, 1993; Kolarik, 1995). Based on the leadership view of product quality improvement, the following hypothesis was developed:

***H1: Leadership has a positive effect on Product quality.***

### **2.1.2 Employee Participation**

Employee participation can be defined as the degree to which employees in a firm engage in various quality management activities. Employee participation is exemplified by things such as teamwork, employee suggestions, and employee commitment. A remarkable characteristic of employee participation is teamwork (e.g., cross-functional teams and within-functional teams). The aim of a team is to improve the input and output of any stage. Cross-functional quality teams and task forces are among the most common features of TQM firms (Hackman and Wageman, 1995). Teamwork can be characterized as collaboration between managers and non-managers, between different functions (Dean and Bowen, 1994). A quality control (QC) circle is a group of workforce-level people, usually from within one department, who volunteer to meet weekly to address quality problems that occur within their department (Juran and Gryna, 1993). QC circles have been successfully implemented in Japan, contributing a great deal to the Japanese economy (Lillrank and Kano, 1989). By actively participating in quality improvement activities, employees acquire new knowledge, see the benefit of the quality disciplines and have a sense of accomplishment by solving quality problems. (Zhang, et, al., 2000). Participation is vital in inspiring action on quality improvement (Juran and Gryna, 1993) It assists employees to improve their personal capabilities, increases their self respect, commits themselves to the success of their organization and creation of personality traits (Zhang, et, al., 2000). Employee's involvement may also allays employees' negative attitudes and encourage them to have a better understanding of the importance of product quality. A study (Cooke 1992) revealed the employee participation has significant effect on product quality. Many studies have been conducted on employee suggestions and their effect on quality. Hackman and Wageman (1995) stated that 65% TQM firms create employee suggestion systems. Production workers should regularly participate in operating decisions such as planning, goal setting, and monitoring of performance. They are encouraged to make suggestions and take a relatively high degree of responsibility for overall performance (Deming, 1986).

Therefore, the following hypothesis was proposed:

***H2: Employee participation has a positive effect on product quality.***

### **2.1.3 Supplier Quality Management**

In modern industrial production, the interdependence of buyers and suppliers has increased dramatically. The supplier becomes an extension of the buyer's organization to a certain extent. A revolution in the relationship between buyers and suppliers has emerged in the form of supplier partnership (Juran and Gryna, 1993). According to the review by Hackman and Wageman (1995), developing partnerships with suppliers is one of the major TQM implementation practices. The extensive literature review by Anderson et al. (1994a) indicated that external cooperation between a firm and its suppliers has merits in the just-in-time purchasing systems. Working collaboratively with suppliers on a long-term basis is truly beneficial. Deming (1986) strongly recommended working with the supplier as a partner in a long-term relationship of loyalty and trust to improve the quality of incoming materials and decrease costs. A long-term relationship between the purchaser and the supplier is necessary for the best economy. Superior quality of incoming material from technically competent, reliable and flexible supplier is a pre requisite to superior quality of the finished product (Juran,1981; Stamm and Golhar, 1993). In manufacturing organizations where the main focus is a quality product along with developing a long term cooperative relationship with suppliers through regular participation in supplier quality activities and giving feedback

on the performance of supplier's product are necessary to the continuous supply of raw materials with required quality (Zhang, et, al., 2000)

Deming (1986) and Ishikawa (1985) recommended that firms work directly with suppliers to ensure that their materials are of the highest possible quality. Firms should participate directly in supplier activities related to quality, such as supplier improvement projects and supplier training (Mann, 1992; Zhang, 2000a). Zhang (2000) also indicated that improving supplier quality management would contribute to the improvement of the firm's product quality. Therefore, the following hypothesis was developed:

***H3: Supplier quality management has a positive effect on product quality.***

#### **2.1.4 Customer Focus**

Customer focus can be defined as the degree to which a firm continuously satisfies customer needs and expectations. A successful firm recognizes the need to put the customer first in every decision made (Philips Quality, 1995). The key to quality management is maintaining a close relationship with the customer in order to fully determine the customer's needs, as well as to receive feedback on the extent to which those needs are being met.

Obtaining customer complaint information is to seek opportunities to improve product and service quality. Quality complaints have different problems that require different actions. Based on customer complaint information, it is important to identify the "vital few" serious complaints that demand in-depth study in order to discover the basic causes and to remedy those causes (Juran and Gryna, 1993). To improve customer focus efforts, customer complaints should therefore be treated with top priority.

Obtaining customer satisfaction information is essential for pursuing customer focus efforts. Intensive examination of finished products from the viewpoint of the customer can be a useful predictor of customer satisfaction. Such information includes data on field failures and service-call rates, and analysis and reporting of customer attitude trends regarding product quality. Such information is valuable for new product development (Feigenbaum, 1991). The results of customer satisfaction surveys can be used to take immediate action on customer complaints, identify problems requiring generic corrective action, and provide a quantitative measurement of customer satisfaction (Juran and Gryna, 1993). The insights gained can help the firm improve product quality.

Therefore, the following hypothesis was developed:

***H4: Customer focus has a positive effect on product quality.***

### **2.2 Product Quality**

Product quality is one of the most important factors for a manufacturing firm to be successful in the world market. It is argued that a quality image, once obtained, can improve a firm's ability to compete, as well as its long-term opportunity for success (Pfau, 1989). DuBrin (1995) stated that business strategy development must place a high priority on product quality, which is a crucial hinge for business success or failure in today's quality-performance-oriented markets. Product quality has become a major business strategy (Feigenbaum, 1991). Ahire et al. (1996a) suggested that improving product quality be the prime objective of a firm's quality management efforts, and product quality be used as a primary indicator of the firm's quality efforts. Increasingly, firms are recognizing the strategic importance of product quality (Anderson et al., 1994a). Product quality is

increasingly viewed as a strategic asset to improve a firm's global competitiveness (Steingard and Fitzgibbons, 1993). The literature review by Anderson et al. (1995) showed that product quality has often been cited as the highest competitive priority, an issue of strategic importance and survival, and a means of competitive performance. Zhang (2000) in his study measured the product quality based on performance, reliability, durability and conformity. Through these measures a firm can understand their product quality status by comparing present and previous performances. In order to improve the product quality it is essential to measure the existing product quality. to understand the size of quality issue and to identify the areas demanding attention for enhancing and upgrading product quality (Chowdhury et. al., n.d)

## **2.3 An Overview of Garment Industry in Bangladesh**

The garment industry is a very important sector and simultaneously contributing to the national economy of different countries especially in the developing world (Quddus, 2006; Haider, 2007; Dicken, 1998, Jones, 2002, Dickenson, 1995). This section reviews the literature surrounding the area of the garment industry as well as the practice of TQM in the garment industry of Bangladesh.

### **2.3.1 Garment Industry from Global Perspective**

Everywhere, the industrial sector has been the driver of growth as countries have moved from low-to middle income status (Yunus and Yamagata, 2012). The ready-made garment (RMG) is a labor intensive industry which generally uses low technology (Rashid, 2006). Due to foreign competition, the ready-made garment sector is facing high demands for more styles, smaller orders and shorter cycles of production. The global business scenario of the RMG sector is changing rapidly, and is heavily dependent on lead-time and price. The industry itself needs to be restructured and repositioned (Spinanger, 2001). Several countries are doing very well in garment manufacturing while others lag behind. Until the early 1980's India and Sri Lanka were the major South Asian suppliers of readymade garments to the USA and Western Europe (Spinanger, 2001). India is exploiting this industry for economic growth (Dicken, 1998; Jones, 2002; Dickenson, 1995). There are approximately 30,000 ready-made garment manufacturing units in India. The Indian garment industry has become a major market internationally. *"The USA and Bangladesh continue to be the largest markets of Indian Cotton Textiles with a share of over 10% in total exports"* (Indian Apparel Portal,n.d). When India has positioned itself in the international market, because of large scale textile industry, Pakistan has also attained credible position in the world. In the production of cotton it ranks fourth while in the consumption of cotton it ranks third in Asia (fibre2.fashion, 2006). But right now the Pakistani garment industry is in a stagnant condition because of higher production costs. Compared to Bangladesh, India and China, exports of Pakistan textiles are not praiseworthy. Currently the biggest exporter of textiles and garment products is China (HKCIC, 2004). The workforce is mainly made up of young women. The Chinese companies have the ability to produce products at short notice which earns them a competitive advantage.

While several countries are doing very well in this industry, literature (Bruce et al., 2004) indicates that the clothing manufacturing industry of United Kingdom (UK) has been facing major problems during recent years. According to Warner (2001), globalization is a major factor affecting the UK manufacturing industry and threat from low labor cost countries is the biggest problem. Labor, working conditions and wages are some critical political issues in the worldwide garment sector. In Australia, the garment industry has flourished based on

outsourcing. Its contribution to the Australian economy is also significant, accounting for around ten percent of the manufacturing sector (ANZ, 2005).

Bangladesh always enjoys low wages because of labor surplus economy (Rashid, 2006). The wage structure in Bangladesh RMG sector is lower not only in comparison to other countries but also to other domestic industries such as leather, jute, food, beverage, chemical, plastic etc. As a result of inadequate production processes and methods, productivity and efficiency are still relatively low. Compared to the other main competing countries where garments are being produced, Bangladesh scores well (Spinanger, 2001). The global export of textile and apparels has substantially increased in 2005 (US\$ 275.6 billion with a growth rate of 6.4 percent) (Rahman et al., 2007). Due to the phase out of the MFA (Multi-Fiber Arrangement) which is a series of literally negotiated quota restrictions on trade in textiles and clothing between developed country importers and developing country exporters, under the quota, the exporter is allowed to supply a certain volume of textile and clothing products up to a specified ceiling and it is up to the exporter to allocate the quota allowance among its domestic producers” (Rahman et al., 2007, p.4). Bangladesh is now in great competition. It becomes a constraint for Bangladesh because it opens free market for other competitors also. The next section will provide an overview of the Bangladeshi garments industry.

### **2.3.2 Garment Industry in Bangladesh**

The garment industry in Bangladesh has been expanding almost uninterruptedly since the late 1970's (Yunus and Yamagata, 2012). It survived multi-Fiber Arrangement (MFA) phase out at the end of 2004, and remains internationally competitive to date. The garment and textile industries have been playing a vital role in the economic development in many countries in the world such as China, Hong Kong, Sri Lanka, India, Vietnam, Mexico, etc. This 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 earning. 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 (Haider, 2007). The garment product base ranges from ordinary shirts, T-shirts, trousers, shorts, pajamas, ladies wears, under garments for men, women, children and sports wear to sophisticated high value items like quality suits, branded jeans items, cotton and leather jackets, sweaters, and caps etc (Farhana, 2009).

Previously, the jute and tea industries were the largest export oriented sectors of Bangladesh (Rahman, 2004). The same study reported that gradually the manufacturing sector, especially the garment industry, has received greater attention. *“Among the top two dozen major exporters of clothing products in 1998 none has grown faster than Bangladesh since 1980's”* (Spinanger, 2001, p.1). The garment Industries in Bangladesh stand as an unique example of poor developing nations which has taken the advantage of participating in the global economy for fast economic development facilitated by recent trends in globalization (Quddus, 2006). In respect of industrialization, Bangladesh historically lags behind even the major sub-continental countries such as India, Pakistan, and Sri Lanka (Mannan, 1993). The textile sectors of Bangladesh are highly attractive for foreign investors. Since the late 1970s, the fully export-oriented garment industry of Bangladesh has witnessed significant growth (Rashid, 2006). Countries such as India, Pakistan, Sri Lanka, China etc. are now the main competitors of Bangladesh in the garments sector. *“This sector has weakness in some areas such as lack of diversity in export market, high concentration in a few products, and long-*

*lead-time etc.*” (Rahman, 2007, p. 3). Due to the strong competition, Bangladesh has made tremendous development in professionalism, supplier network, shortening lead-times, quality, human resource etc. (Rashid, 2006). Bangladesh has gained considerable attention from developed countries due to the low labor cost and quality products.

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 (Rahman et al., 2007). 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, 2006).

The pressure placed on firms in the garment and textile industries from international competition and dynamic changes in the retail sector have been enormous. *“The increase in competition has led to an increased focus on customer satisfaction as a survival of the company in the long run”* (Kapuge and Smith, 2007, p.304). In today’s competitive business world, firms are fighting against each other just to ensure their survival. In this highly competitive business market, the garment and textile industries are also searching for ways and techniques to cut cost and improve performance. When other industries are facing high pressure from competitors, the garment industry is also facing challenges such as- prices, delivery time and services offered etc. This worldwide market situation substantially affects the business operations of the companies under the present survey. These companies are also exporters to these countries that prompted them to use TQM techniques for improvement of quality and delivery of the shipment.

### **2.3.3 Literature on the practice of TQM in the Garment Industry in Bangladesh**

Bangladesh emerged as an important supplier of quality readymade garments in the global market (Haque et al., 2011). The spectacular growth of garment sector in Bangladesh in recent years has dramatically changed the landscape of export composition of the country. This section will review the TQM practice in Bangladeshi garment industry. The concept of quality management is recent in Bangladesh and the country is in a partial awareness state. The few organizations that have adopted quality management practices have experienced an overall improvement in corporate performance (Rahman, 1999). In nearly all cases, these organizations achieved better employee relations, higher productivity, better customer satisfaction, increased market share and improved profitability (Mamun and Islam, 2002).

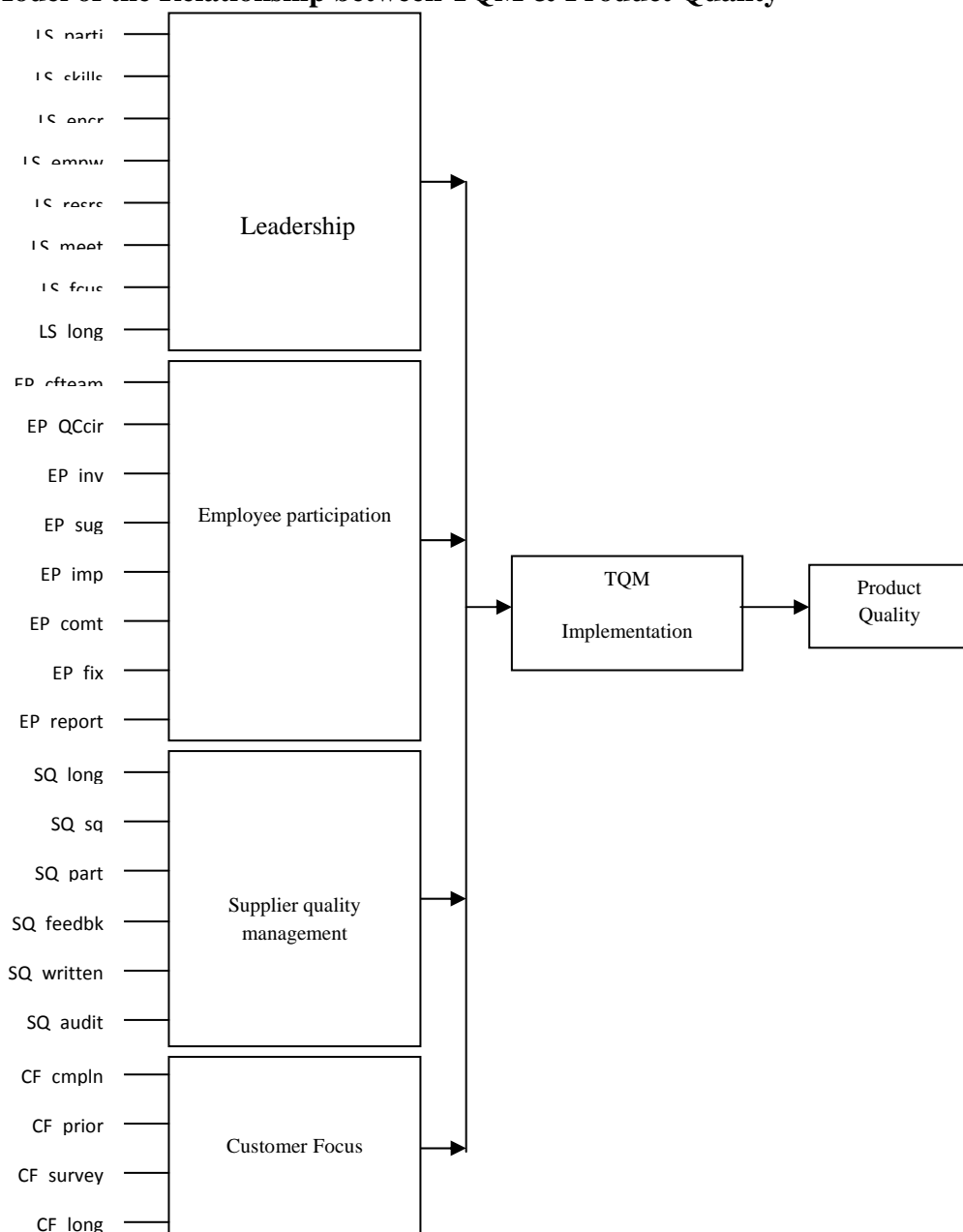
A study was conducted by Saha (2009), on implementation of TQM in the Bangladeshi organization. The study focused on the concept of TQM, organizational setup aiding the implementation of TQM, perception of TQM in the Bangladeshi management as well as the possible ways of transforming corporate culture into TQM culture. The findings revealed that the technical tools of quality improvement may be well developed but its theory and practice lag far behind. The concept of quality is only dimly understood by the practicing managers. Links to market share, cost and profitability are unclear.

Mamun and Islam (2002) have conducted a comparative study on Thai and Bangladeshi organizations. Bangladeshi companies showed TQM vision consciousness but in many cases they fall victim to treating TQM as a fad rather than an essential component. The management principles are narrowly viewed and understood in Bangladeshi companies even with well documented procedures and instructions. All the Bangladeshi companies concerned are well equipped and successful to some extent in achieving customer satisfaction with

regard to product and service quality excellence but they lack close working relationships, interest group and the promoting aspect of working environment. Bangladeshi companies make a visible effort in empowerment of quality control circles but apparently follow a rigid hierarchical structure but nonetheless are able to assure quality. In terms of organization and distribution, all of the concerned companies are suitably equipped and positioned, but suppliers are not benchmarked with respect to specific criteria and special quality ratings in terms of product attributes. Shareef et al. (2008), investigated 100 export oriented garment firms in Bangladesh to identify the meaning of Quality Management Practice, the extent and manner of the current method of quality practice and major problems in implementing quality management concepts. From the findings of the study they developed guidelines to use Quality Management Practice in the industrial sector of Bangladesh.

From the review of literature this study has developed the following conceptual framework.

### Conceptual Model of the Relationship between TQM & Product Quality



**Figure 1: Relationship between TQM Practice and Product Quality**



### 3. Research Objective

Based on the review of literature, this research aims at achieving the following research objective:

To obtain the effects of TQM implementation on product quality in the garment sector of Bangladesh;

Based on the research objective the following research questions are developed:

- What are the practices of TQM in the garment sector of Bangladesh?
- What is the relationship between TQM practice and product quality improvement in the garment firms of Bangladesh?

### 4. Research Design

This study has been carried out by applying both qualitative and quantitative approaches. The study used desk research and discussion with academics and concerned industry people to obtain information on quality implementation issues. The following table shows the interviewees' name, company name and designation of the interviewees.

**Table 1: Person Interviewed for qualitative study**

Company Name	Person Interviewed	Designation
1. Bangladesh Garment Manufacturers And Exporters Association (BGMEA)	Md. Zaglul Haider	Additional Secretary (Admin and HR)
2. BKMEA	Md. Hatem	Vice President
3. Rumi Garments	Md. Sabuj	Managing Director
4. Sterling Danim Ltd.	Md. Siddiqur Rahman	Chairman
5. Dhaka University	Dr.M.A Mannan	Professor

In addition to explanatory research, to examine effect of TQM practice on quality product, the study proposed a causal design of research, where the following model has been tested:

$$\log_e ( p/1-p) = a_0 + a_1x_1 + a_2x_2 + a_3x_3 + \dots \dots + a_ix_i$$

Where,

$$\log_e ( p/1-p) = \ln (\text{ODDS}) = \log \text{ of odds}$$

p= probability to have high product quality

a<sub>i</sub> = parameter to be estimated

x<sub>i</sub> = independent variable

<b>Table:2 Measurement of Variables</b>		
<b>Independent Variables</b>	<b>Indicators</b>	<b>Measurement Scale</b>
Leadership	Top management participation (LS_parti)	Interval
	Quality related concepts & skills (LS_skills)	Interval
	Encourage employee involvement (LS_encr)	Interval
	Vision for employee empowerment (LS_empw)	Interval
	Resource allocation for TQM application (LS_resrs)	Interval
	Meeting about TQM updates (LS_meet)	Interval
	Prime focus on product quality (LS_fcus)	Interval
	Long term focus of business (LS_long)	Interval
Employee Participation	Cross-functional team (Ep_cfteam)	Interval
	Quality control circle (EP_QCcir)	Interval
	Involvement in quality related activities (EP_inv)	Interval
	Suggestion inputs from employees (EP_sug)	Interval
	Implementation of employee suggestions (EP_imp)	Interval
	Employee commitment to quality (EP_compt)	Interval
	Employees can fix problems by themselves (EP_fix)	Interval
	Employee reporting to top management is encouraged (EP_report)	Interval
Supplier Quality Management	Long term relationship with suppliers (SQ_long)	Interval
	Product quality is the primary concern in supplier selection (SQ_pq)	Interval
	Supplier participation in quality programs (SQ_part)	Interval
	Feedback from suppliers (SQ_feedback)	Interval
	Witten quality documentation for supplies (SQ_written)	Interval
	Conducting supplier audit (SQ_audit)	Interval
Customer focus	Collects complaints from customer (CF_compln)	Interval
	Priority for quality related complaints (CF_prior)	Interval
	Customer satisfaction survey (CF_survey)	Interval
	Long term customer focus (CF_long)	Interval

## 5. Sampling Design

**5.1 Target Population:** At present there are a total of 5150 garment firms in Bangladesh (BGMEA, 2010-2011). For the study, 3488 garment firms have been considered as population on the basis of the importance of the locations.

**5.2 Sampling Frame:** A sampling frame has been developed with the lists of garment units obtained from the Bangladesh Garment Manufacturers and Exporters Associations (BGMEA), Bangladesh Knit Manufacturers and Exporters Association (BKMEA), and Bangladesh Export Processing Zone Authority (BEPZA). This sampling frame has been used for determining sample size and respondents.

<b>Table no 3: Distribution of Sampling Units</b>			
Places/location	Total number of units in a location	Proportion (%)	Selected units in each location
Dhaka	3058	87.67	128
Gazipur	163	4.67	7
Narayanganj	131	3.76	5
Savar	75	2.15	3
Chittagong EPZ	35	1.00	2
Dhaka EPZ	26	0.75	2
<b>Total</b>	3488	100.00	133

**5.3 Sampling Procedure:** For the study purpose, 133 garment manufacturing units were initially selected (see p. 27) as sample using stratified sampling technique. Due to time and budget constraints, lastly we have considered 59 firms by using purposive sampling technique.

**5.4 Sample Size:** The difficulties in accessibility into the garments made sample selection very difficult. A total of 59 garment firms have been selected initially. Due to the response bias and inconsistency in the response, 11 garment firms have been excluded. Finally, 48 firms have been selected as sample which is statistically a good size.

**Inclusion criteria:**

The management level employees are included as the respondents.

**Exclusion criteria:**

Non-managerial positions in the organizations are excluded from the respondent pool.

**5.5 Selection of Respondents:** The target respondents were the head of the firm and selected functional managers such as production manager, quality control manager of the selected garment firms.

## **6. Data Analysis and Discussions**

This section deals with the analysis and interpretation of data to come out with major findings from the study. Here, all findings are based on responses collected from 48 managerial level employees from 48 firms in the readymade garment industry of Bangladesh.

### **6.1 Pre-testing of the questionnaire**

#### **Pre-testing 1: Reconstruction of scales**

Initially, ratio scale has been used to measure the product conformity rate. Due to the non-cooperation of respondents to disclose such data on ratio scale, it has been changed to likert scale.

## Pre-testing 2: Reliability Analysis

Reliability analysis of a measuring instrument determines its ability to yield consistent measurement. So, reliability implies the extent to which an experiment, test or any measuring procedure yields the same result on repeated trials. Cronbach's Alfa 0.6 is an acceptable value. In this study the values for all variables ranged from 0.6 to 0.9. This indicates a strong internal consistency.

Variable	No of items	No of Items deleted	Cronbach's Alpha
Leadership	8	None	0.737
Employee Participation	8	None	0.835
Supplier Quality Management	6	None	0.688
Customer Focus	4	1	0.779
Product Quality	3	None	0.922

## 6.2 Validity Analysis

Validity is concerned with how well the concept is defined by its measures. Here researchers use content and criterion related validity.

- *Content Validity*

The main purpose of the content validity is to ensure the selection of construct items experienced in all past empirical issues, theories as well as practical considerations (Robinson et al., 1991). In this study, four factors for measuring quality management practice have content validity. The development of measurement items was based on extensive review of literatures and detailed evaluations by industry personnel. Moreover, pretest indicated that content of each factor was well represented by measurement items employed.

## 6.3 Coding of Responses

Responses were collected using likert scale to obtain categorical values for five different levels of independent variables. Because of low response variability, 17 variables were deducted for further analysis. There are virtually no differences in opinion. No variation in the measures of independent variables indicates that there would be no fluctuation in dependent variable due to variation in these independent variables. Other seven independent variables were considered for logistic regression analysis.

## 6.4 Descriptive Analysis

### 6.4.1 Concerned Department and Person Responsible for Quality Issues

Existence of Department	Frequency	Total response	Percentage
Independent quality control department	23	48	11.04%
Assigned manager (single) for quality control	19	48	9.12%
Common managerial position deals with quality issues	06	48	2.88%

The above table indicates that less than one fourth (11.04%) of the firms have individual quality control department. Only 9.12% of the firms showed to have a minimum of one assigned quality control manager. A very few (2.88%) respondents agreed to have designated positions responsible for quality activities.

### 6.5 Bivariate Analysis

Interaction between variables would be useful to gain managerial insight. For the analysis cross-tabulation has been used to describe two variables simultaneously.

#### Cross Tabulation 1: Employee empowerment by the management and resource allocation for TQM implementation

Table: 6 shows the percentages calculated column wise based on column totals:

- Among cases reporting high empowerment, majority (96.6%) reports high allocation of resources. Among cases reported low empowerment, half of the cases (52.6 %) report low allocation of resources.
- Among cases reporting low empowerment, 47.4 percent reports high allocation of resources. This indicates the resource direction is not toward employee empowerment.
- Only one respondent among 48 reported low level of resource allocation but at the same time high level of employee empowerment.

Table 6: Cross-Tabulation: Employee Empowerment* Resource Allocation			
	Empowering Employees		Total
	Low level of empowerment	High level of empowerment	
Low resource allocation	10	1	11
Resource allocation for quality issues	52.6%	3.4%	22.9 %
High resource allocation	9	28	37
	47.4%	96.6%	77.1 %
Total	19	29	48
	100%	100%	100 %

#### Cross Tabulation 2: Employee empowerment by the management and employee's freedom to fix problem by themselves

Table: 7 shows the percentages calculated column wise based on column totals:

- Among cases reporting high employee authority and greater freedom to fix problems. Majority (88.9%) reports high empowerment. Among cases reporting low employee authority, less than half cases (46.2%) reports about low empowerment.
- Among cases reporting low employee authority, 53.8 percent reports about high employee empowerment, which is not consistent.
-

Table 7: Cross-Tabulation: Empowering Employees*Employees Fix Problems by Themselves				
		Fix problem by themselves		Total
		Low level of employee authority	High level of employee authority	
Empowering employees	Low level of empowerment	18 46.2%	1 11.1%	19 39.6%
	High level of empowerment	21 53.8%	8 88.9%	29 60.4%
Total		39 100.0%	9 100.0%	48 100.0%

### Cross Tabulation 3: Resource allocation by the management for TQM implementation and conducting customer survey

Table: 8 presents the percentages calculated column wise based on column totals:

- Among cases reporting high resource allocation, majority (91.4%) reports regular customer survey. Among cases reporting low resource allocation, more than half of the cases (61.5%) reports occasional/ irregular customer survey
- Among cases reporting high resource allocation, less than half of the cases (38.5%) reports about occasional/ irregular customer survey-which indicates allocation of resources to address quality issues are not customer focused.

Table 8: Cross-Tabulation: Resource Allocation * Customer Survey				
		Customer satisfaction survey		Total
		Conducting customer survey occasionally	Conducting customer survey regularly	
Resources for employee training	Low resource allocation	8 61.5%	3 8.6%	11 22.9%
	High resource allocation	5 38.5%	32 91.4%	37 77.1%
Total		13 100.0%	35 100.0%	48 100.0%

### Cross Tabulation 4: System of customer complaint and conducting customer survey

Table: 9 shows the percentages calculated column wise based on column totals.

- Among cases reporting regular customer survey, majority of the cases (94.3%) reports regular collection of customer complaint. Among cases reporting occasional/ irregular customer survey, 23.1 percent reports occasional customer survey
- Among cases reporting regular customer survey, a very few (5.7%) reports occasional collection of customer complaint

Table 9: Cross-Tabulation: Collection of Customer Complaint * Customer Survey				
		Customer Satisfaction Survey		Total
		Conducting customer survey occasionally	Conducting customer survey regularly	
Collects complaints from customer	Collect customer complaint occasionally	3 23.1%	2 5.7%	5 10.4%
	Collect customer complaint regularly	10 76.9%	33 94.3%	43 89.6%
Total		13 100.0%	35 100.0%	48 100.0%

## 6.6 Multivariate Analysis

**Logistic Regression:** Logit Regression Model estimates the probability of an observation belonging to a particular group. Our regression model will be predicting the logit, that is, the natural log of the odds of having made one or the other decision. That is,

$$\log_e ( p/1-p) = a_0 + a_1x_1 + a_2x_2 + a_3x_3 + \dots \dots + a_ix_i$$

Where,

$$\log_e ( p/1-p) = \ln (ODDS) = \log \text{ of odds}$$

p= probability to have high product quality

a<sub>i</sub> = parameter to be estimated

x<sub>i</sub> = independent variable

In logistic regression, the log odds, that is,  $\log_e ( p/1-p)$  is a linear function of the estimated parameters. Thus, if x<sub>i</sub> is increased by one unit, the log odds will increase by a<sub>i</sub> unit(s), when the effect of other independent variables is held constant. Thus a<sub>i</sub> is the size of the increase in the log odds of the dependent variable even when the corresponding independent variable x<sub>i</sub> is increased by one unit and the effect of the other independent variables is held constant.

**Estimated Logit Regression Model:** This study estimated the logit regression model in the following way:

Each error term can assume only two values. Here, If the y=0, the error is p and if y=1, the error is 1-p. Therefore we would like to estimate the parameter in a way that the estimated values of p would be close to 0 when y = 0 and close to 1 when y=1.

Our model will be constructed by **an iterative maximum likelihood procedure**. The program will start with arbitrary values of the regression coefficients and will construct an initial model for predicting the observed data. It will then evaluate errors in such prediction and change the regression coefficients so as to make the likelihood of the observed data greater under the new model. This procedure is repeated until the model converges -- that is, until the differences between the newest model and the previous model are trivial.

## Model fit

In binary logistic regression, commonly used measures of model fit are based on the likelihood function and are Cox & Snell R square and Nagelkerke R square. If estimated probability is greater than 0.5 then the predicted value of Y is set to 0.

**Table 10: Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	23.934a	.331	.558

Under **Model Summary** we see that the **-2 Log Likelihood** statistic is 23.934. This statistic **measures how poorly the model predicts the decisions** -- the smaller the statistic the better the model. For this study, the statistic is quite satisfactory.

The **Cox & Snell  $R^2$**  can be interpreted like  $R^2$  in a multiple regression, but cannot reach a maximum value of 1. The **Nagelkerke  $R^2$**  can reach a maximum of 1. Cox & Snell R square (0.331) and Nagelkerke R square (0.558) measures indicate a reasonable fit of the model to the data.

The model fit is further verified by the Wald's statistic classification table (Table no.9) that reveals 85 percent of the cases are correctly classified. The significance of the estimated coefficients is based on Wald's statistic.

### Significance Testing

**Table 11: Omnibus Tests of Model Coefficients**

		Chi-square	df	Sig.
Step 1	Step	19.320	9	.023
	Block	19.320	9	.023
	Model	19.320	9	.023

**Omnibus Tests of Model Coefficients** gives us a Chi-Square of 19.320 on 9 *df*, significant beyond .05. This is a test of the null hypothesis that adding variables to be considered to the model has not significantly increased our ability to predict the decisions made by our subjects which is rejected and justify the research as per the expectation.

**Table 12: Variables in the Equation**

	B	S.E.	Wald	df	Sig.	Acceptance/rejection of hypotheses	Exp(B)
LS_empw(1)	.984	.491	4.013	1	.038	accepted	2.675
LS_resrs(1)	.427	.216	3.901	1	.043	accepted	1.534
EP_cftteam(1)	.051	.026	3.841	1	.050	accepted	1.052
EP_QCcir(1)	75.288	1.747E4	.000	1	.997	Not accepted	4.980E32
EP_fix(1)	.800	.401	3.982	1	.041	accepted	2.225



SQ_written(1)	-.120	1.025	.014	1	.907	Not accepted	.887
SQ_audit(1)	.912	.456	4.005	1	.021	accepted	2.489
CF_cmpln(1)	-.535	1.618	.109	1	.741	Not accepted	.586
CF_survey(1)	.814	.363	5.016	1	.027	accepted	2.257
Constant	.195	1.081	.032	1	.857	Not accepted	1.215

a. Variable(s) entered on step 1: LS\_empw, LS\_resrs, EP\_cfteam, EP\_QCcir, EP\_fix, SQ\_written, SQ\_audit, CF\_cmpln, CF\_survey.

The **Variables in the Equation** output shows us that the regression equation is

$$\log_e ( p/1-p) = a_0 + b_1x_1 + b_2x_2 + b_3x_3 + \dots + b_ix_i$$

Here,

$$\log_e ( p/1-p) = \ln (\text{ODDS}) = \log \text{ of odds}$$

p= probability to have high product quality

a<sub>i</sub> = parameter to be estimated

x<sub>i</sub> = independent variable

- **Predict the odds**

We can use this model to **predict the odds** that a subject of a given level of presence of variables such as leadership support, employee participation, supplier quality and customer focus will experience the high level of product conformity.

Here, the ODDS=1.215. Because of independent variables in the multiple logistic regressions, the higher level of product conformity is 1.215 is more likely to achieve than to experience lower product conformity.

- **The odds ratio**

The **Variables in the Equation** output also gives us the **Exp(B)**. This is better known as **the odds ratio** predicted by the model. This odds ratio can be computed by **raising the base of the natural log to the *b*th power, where *b* is the slope from our logistic regression equation**. For our model, we are presenting interpretation of odds ratio:

***Leadership- employee empowerment and product quality***

If our subject has employee empowerment, then the ODDS= 2.675. That means, a subject having high level of product conformity is 2.675 times higher for higher level of employee empowerment than low level of employee empowerment.

***Leadership- resource allocation for TQM implementation and product quality***

If our subject has resources for TQM deployment, then the ODDS= 1.534. That means, a subject having high level of product conformity is 2.675 times higher for higher level of resource allocation than low level of resource allocation.

***Employee participation in cross-functional team(s) and product quality***

Our subject can participate in cross-functional team, then the ODDS= 1.052. It means a subject having regular cross-functional team is 1.052 times as likely to have high level of product conformity than occasional cross functional team.

**Employee authority to fix problem and product quality**

If our subject enjoys authority to fix the TQM problems by the ODDS= 2.225. That indicates a subject perceived high level of employee authority is 2.225 times likely to have high level of product conformity than low level of employee authority.

**Supplier audit and product quality**

If our subject reports routine and frequent supplier audit, then the ODDS= 2.489. It means a subject reports regular and frequent supplier audit is 2.489 times likely to have high level of product conformity than infrequent and occasional audit.

**Customer survey and product quality**

If our subject reports regular consumer survey conducted by their enterprise, then the ODDS= 2.257. That means, a subject reports frequent consumer survey is 2.257 times likely to have high level of product conformity than occasional customer survey.

- **Classify Subjects**

The **Classification Table** shows us that this rule allows us to correctly classify 39 / 40 = 97.5% of the subjects where the predicted event (influenced by predictor variables) was observed. This is known as the *sensitivity* of prediction, where the P(correct | event did occur) is the percentage of occurrences correctly predicted. We also see that this rule allows us to correctly classify 2 / 8 = 2.5% of the subjects where the predicted event was not observed. This is known as the *specificity* of prediction where the P (correct | event did not occur) is the percentage of nonoccurrence correctly predicted.

Table No: 13 Classification Table

Observed			Predicted		Percentage Correct
			Conformity Rate of Products		
			Low level of product conformity	High level of product conformity	
Step 1	Conformity rate of products	Low level of product conformity	2	6	2.5
		High level of product conformity	1	39	97.5
Overall Percentage					85.4

a. The cut value is .500

**7. Managerial Implications**

- Strategists, who are concerned about the implementation of quality issues in the organization, should conduct more precise research on the direction of resources that are employed for TQM implementation since there are a substantial amount of cases that indicate that they have the budget endowment but the employees are not

empowered. Essentially the empowerment of employees should have support from resources.

- Employees of certain firms reported high level of employee empowerment. Usually these firms allow fixing the quality related problem by the employees themselves which is the most likely event. But a substantial number of respondents (21 out of 48) indicated that they experience empowerment but they aren't allowed to fix problems by themselves.
- Empowering employees to the greater extent has the positive influence over the product quality. Managers who are empowering their employees can experience as much as 2.7 times higher than the cases where employee empowerment are low.

In case of resource allocation by the leaders, high level of resources allocated and directed for quality improvement can yield as much as 1.5 times higher than the cases where resource allocations are low.

- Employee participation through cross functional teaming on a regular basis yields 1.05 times higher product conformity than the firms using only the mandatory (occasional) involvement in cross-functional teams.

Employees' freedom to fix problems at their own discretion generates high product conformity which is 2.225 times higher than the cases where employees enjoy less freedom to fix own problem.

- Regular audit for supplier quality management can generate 2.5 times more conformity in products than those that are conducting regular supplier audit.
- Regular periodic consumer survey generates 2.257 times likely events to have higher product conformity than those who are conducting survey occasionally.

## 8. Research Limitations

The research has been completed. It is necessary to evaluate this study in the content of its limitations.

- First, data used to test the theoretical models came from only 48 companies. Although the samples were drawn using stratified Random Sampling Technique and obtained 133 as sample, due to time and cost limitations finally 48 firms have been chosen using purposive sampling techniques. The table no. 3 shows the distribution of sample using stratified random sampling.
- In the current study, ideal sampling technique was stratified sampling that derives necessary sample size of 133 garment firms. We have selected 59 of purposive firms based on convenience. Finally, 48 firms were selected based on their responses to the questions.

### Formula for determination of sample size

Population Size  $N= 3488$

Error  $e=0.05$

Z value= $1.96$

Sample proportion  $p=0.1$

$$q=1-p=0.9$$

$$n = \frac{z^2 \cdot p \cdot q \cdot N}{e^2 (N-1) z^2 \cdot p \cdot q}$$
$$= \frac{(1.96)^2 \cdot 0.1 \cdot 0.9 \cdot 3488}{(0.05)^2 \cdot (3488-1) + (1.96)^2 (0.1 \cdot 0.9)}$$
$$= 133$$

- This study sample only considers the management level but overlooks the shop-floor workers those who are directly related to the quality activities.
- Another limitation of the study is small sample size. Due to time and cost constraints the sample size was restricted to 48.

Metric data is a pre-requisite for applying sophisticated statistical tools. But due to the non-compliance of the respondents to ratio data, change in the scales to the Likert was necessary to uncover information. Our analysis was limited within logit regression. 48 firms are quite reasonable sample size to apply logit regression. Sophisticated econometric analyses give best results when sample size is greater.

- Product quality can be measured through several quality dimensions such as features, aesthetics, performance reliability, conformance durability etc. This study has used only conformity to measure product quality. From among several dimensions to measure product quality conformance dimension received much attention in several literatures such as (Zhang et al 2000; Karim, 2009) that is why we have only considered product conformity as a measure of dependent variable which can be considered as a limitation.

## 9. 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.

## 10. Conclusions

The main thrust of this report has been to examine the effects of TQM practices on product quality in the garment firms of Bangladesh. From the analysis of the data collected, it appears that companies which adopted TQM as a working philosophy within their organizations can make improvement in product quality. TQM practices such as leadership (employee empowerment, resource allocation), employee participation (cross-functional teams, employee authority), supplier relationship (supplier audit), customer focus (customer survey) have positive relationship with product quality. An analysis of the available data indicates that in the sample garment firms there are also relationships existing among the TQM

measures such as resource allocation with employee empowerment, resource allocation with customer survey, employee empowerment with fix problems, customer complaint with customer survey. If these sample Bangladeshi garment firms can achieve quality improvement then other garment companies of Bangladesh can also achieve the same. It is important to create right awareness among all industries to realize these improvements.

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## Appendix

Variables			Total respondents	Measurement scale
	High	Low		
Top Management participation (LS_parti)	45	3	48	Interval
Quality related concepts & skills (LS_skills)	40	8	48	Interval
Encourage employee involvement (LS_encr)	33	15	48	Interval
Vision for employee empowerment (LS_empw)	29	19	48	Interval
Resource allocation for TQM application (LS_resrs)	37	11	48	Interval
Meeting about TQM updates (LS_meet)	36	12	48	Interval
Prime focus on product quality (LS_fcus)	39	9	48	Interval
Long term focus of business (LS_long)	39	9	48	Interval
Cross-functional team (Ep_cfteam)	39	9	48	Interval
Quality control circle (EP_QCcir)	36	12	48	Interval
Involvement in quality related activities (EP_inv)	46	2	48	Interval
Suggestion inputs from employees (EP_sug)	47	1	48	Interval
Implementation of employee suggestions (EP_imp)	39	9	48	Interval
Employee commitment to quality (EP_compt)	39	9	48	Interval
Employees can fix problems by themselves (EP_fix)	9	39	48	Interval
Employee reporting to top management is encouraged (EP_report)	39	9	48	Interval
Long term relationship with suppliers (SQ_long)	48	0	48	Interval
Product quality is the primary concern in supplier selection (SQ_pq)	37	11	48	Interval
Supplier participation in quality programs (SQ_part)	34	14	48	Interval
Feedback from suppliers (SQ_feedback)	32	16	48	Interval
Written quality documentation for supplies (SQ_written)	29	19	48	Interval
Conducting supplier audit (SQ_audit)	4	44	48	Interval
Collects complaints from customer (CF_compln)	43	5	48	Interval
Priority for quality related complaints (CF_prior)	41	7	48	Interval
Customer satisfaction survey (CF_survey)	35	13	48	Interval
Long term customer focus (CF_long)	39	9	48	Interval

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## **About this working paper...**

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