TQM Practices And Utilization Of Technology In The Ready Made Garments (RMG) Sector Of Bangladesh

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Abstract: Total Quality Management (TQM) practices and utilization of modern technology in the Ready Made Garments (RMG) sector of Bangladesh are considered to be very important, as RMG is becoming a thrust sector to the economy of the country. Without modern and sophisticated technology today's RMG sector is in vain. An expanding number of garment industries in creating nations are honing TQM with a specific end goal to produce enhancements in execution and stay aggressive. A sample of 50 garment industries from Dhaka, Narayanganj, Gajipur and Savar EPZ of Bangladesh was selected to conduct the study. A field overview with an organized poll and meetings was led to accumulating vital data from the organizations. These organizations were chosen purposefully to guarantee the best conceivable situation of TQM practices in Bangladesh. The central purpose of this paper is to inspect the performance of TQM in the RMG sector of Bangladesh. The exploration discoveries demonstrate that organizations, which grasp TQM as a working theory inside their associations can make a change in product quality. In this way, it is essential to make right mindfulness for all commercial enterprises to understand these upgrades.

Key words: TQM, Modern technology, Supplier quality management, Performance of TQM in RMG sector

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I. INTRODUCTION
Technology can bring a revolutionary changes not the organization only but the world. Garments is the regular and basic need of human being. Changing trends is the nature of human being and only the invention of technologies can people cope with the changes. The Ready Made Garments (RMG) is the largest exporting industry in Bangladesh that experienced remarkable growth during the last 30 years at large. It dominates an exceptional position in the Bangladesh economy. Organizations worldwide have been investigating approaches to enhance business practices to gain a competitive edge. In today's worldwide rivalry and financial liberalization, quality has been considered as an imperative component for attaining playing point. The utilization of value administration got to be boundless among associations amid the last decades (Hansson, 2003). Quality in many associations is a movement parallel to the way a company's behavior, it day by day business. Keeping up a client center is one of the most important components in today's business market. Different components, for example, cash, assets and labor and so forth, are unmistakably paramount, however, these components can't make an ideal development if the customers are not satisfied (Karim, 2009). Customer prerequisites ought to get the first priority. Firms are more worried about client fulfillment on the grounds that they have now more options than some time recently. Associations have understood that survival is just conceivable through customer satisfaction, and fulfillment will deliver the best quality merchandise and administrations with the lowest possible cost.

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Downright Quality is a portrayal of the theory, society and the state of mind of an organization that strives to furnish customers with TQM with products and administrations that fulfill their needs. TQM philosophy expects quality in all parts of the organization's operations with procedures being done comfortably first time and absconds and waste killed from operations. It is a combination of value and administration instruments for expanding business and reducing losses because of inefficient practices of TQM in garments products. The most recent two decades have been a time of huge change and change in the business environment (Mamun and Islam, 2012). Rivalry in numerous businesses has ended up worldwide in degree, and the pace of advancement in items and administrations has quickened (Karim, 2009). This has been good news for clients since strengthened rivalry has for the most part prompted lower costs, higher quality and more decisions. To keep pace with this, it is important to have a gratefulness of the routes in which associations are changing themselves to end up more focused (Rahman, 2014). Since the early 1980s, numerous organizations have experienced a few waves of improvement programs, beginning with the Just-in-Time (JIT), Total Quality Management (TQM), Sixsigma, Lean Production etc. (Talib et al., 2010). The rise of value as a top priority in numerous corporate elements is essentially clear to the globalization of world exchange and the focused weight achieved by the raising requests of customers, who want better products and management (Thiagaragan et al, 2001). Execution of a TQM project can enhance quality, decrease expense, build yield, wipe out deferrals in reacting to customers and at least expand benefits.

II. LITERATURE REVIEW

A. Leadership
There is no option to powerful administration to effectively execute TQM in the RMG sector and the ideological point of view on TQM has been centered on the part of the initiative in TQM execution. As indicated by Ugboro and Obeng (2000), numerous supporters of the TQM hold that the objective of client fulfillment is accomplished through top administration,

initiative and duty in the production of an authoritative atmosphere that engages representatives and too concentrates on the objective of client fulfillment. The European Quality Award since 1994 and the Malcolm Baldrige Quality Award since 1999 recognized the essential part of initiative in making the objectives, values and frameworks that guide the quest for constant change. Solid, positive, liberal administration will offer ascent to long haul and economical business achievement. The top administration duty, top administration interest, top administration console and top administration strengthening exemplify the idea of the initiative in this study.

H1: Leadership has a positive impact on Product quality.

B. Employee Participation

Worker interest can be characterized as the degree to which workers in a firm captivate in various quality administration exercises. Things, for example, collaboration, worker recommendations, and representative duty epitomize worker support. A striking characteristic of representative support is cooperation (e.g., cross-utilitarian groups and inside functional teams). The point of a group is to enhance the data and yield of any stage. Cross-functional quality groups and teams are among the most widely recognized peculiarities of TQM firms (Shareef, et al., 2013). Collaboration can be portrayed as coordinated effort between managers and non-administrators, between distinctive capacities (Dean and Bowen, 1994). A Quality Control (QC) ring is a gathering of workforce-level individuals, typically from inside one office, who volunteers to meet week by week to address quality issues that happen inside their department (Juran and Gryna, 1993). QC rounds have been effectively executed in Japan, contributing an extraordinary arrangement to the Japanese economy (Lee, 2004). By actively participating in quality change exercises, workers procure new learning, see the benefit of the quality teachers and have a feeling of achievement by comprehending quality problems. (Zhang, et al., 2000). Support is essential in rousing activity on quality improvement (Juran and Gryna, 1993) It supports workers to enhance their personal capabilities, expands their sense of pride, confers themselves to the achievement of their organization and making of identity attributes (Zhang, et al., 2000). Worker involvement may likewise mollifies workers' negative demeanor and sways them to have a better understanding of the imperatives of item quality. A study (Chapman, et al., 1991) uncovered the employee cooperation has a noteworthy impact on item quality. Numerous studies have been conducted on worker recommendations and their impact on quality. Hackman and Wageman (1995) expressed that 65% TQM firms make worker recommendation frameworks. Generation workers should frequently take part in working choices, for example, arranging, objective setting, and monitoring of execution. They are urged to make recommendations and take a relatively high level of obligation regarding the general execution. Therefore, the accompanying speculation was proposed:

H2: Employee investment has a positive impact on item quality.

C. Supplier Quality Management

In cutting edge mechanical generation, the association of purchasers and suppliers has expanded drastically. The supplier turns into an augmentation of the purchaser's association to a certain degree. Unrest in the relationship in the middle of purchasers and suppliers has developed as a supplier organization (Juran and Gryna, 1993). As per the inspection by Hackman and Wageman (1995), creating organizations with suppliers is one of the major TQM usage hones. The outside collaboration between a firm and its suppliers has justified in the quite recent intimae buying frameworks. Working collectively with suppliers on a long haul premise is positively useful. Working with the supplier is as an accomplice in a long haul relationship of devotion and trust to enhance the nature of approaching materials and lessening expenses. A long haul relationship between the buyer and the supplier is vital for the best economy. The prevalent nature of approaching the material from actually skillful, the solid and adaptable supplier is an essential to the predominant nature of the finished product. In assembling organizations where the fundamental center is a quality item alongside creating a long haul helpful relationship with suppliers through general cooperation in supplier quality exercises and giving criticism on the execution of supplier's item are important to the nonstop supply of crude materials with obliged quality (Zhang, et al., 2000). Organizations work specifically with suppliers to guarantee that their materials are of the most astounding conceivable quality. Firms ought to take part straightforwardly in supplier exercises identified with quality, for example, supplier change tasks and supplier preparing (Manni, et al. 1994). Zhang (2000) likewise demonstrated that enhancing supplier quality administration would help the change of the company's item quality. Along these lines, the accompanying theory was produced:

H3: Supplier quality administration has a positive impact on item quality.

D. Customer Focus

Customer orientation can be characterized as the degree to which a firm persistently fulfills client needs and desires. An effective firm perceives the need to put the customer first in every choice. The way to quality administration is keeping up a nearby association with the client to completely focus the client's requirements, and to get input on the degree to which those needs are continuously met. Acquiring client dissension data is to look for chances to enhance product and administration quality (Sharker, et al., 2013). Quality grievances have diverse issues that oblige distinctive activities. In view of client grumbling data, it is critical to distinguish the "indispensable few" genuine grievances that request inside and out study with a specific end goal to find the fundamental reasons and to cure those reasons (Juran and Gryna, 1993). To enhance client center endeavors, client dimensions ought to thusly be treated with top needle. Acquiring client fulfillment, data is key for seeking after client center endeavors. Concentrated examination of completed items from the perspective of the client can be a helpful indicator of client fulfillment. Such data incorporate information on field disappointments and administration call rates, and examination and reporting of client disposition patterns with respect to product quality (Islam and Mustafa, 2011). Such data are profitable for new item advancement. The consequences of client fulfillment studies can be utilized to make prompt move on client protestations, recognize issues obliging nonexclusive remedial action, and give a quantitative estimation of client fulfillment (Juran and Gryna, 1993). The bits of knowledge picked up can help the firm enhance item

quality. Accordingly, the accompanying theory was produced:
H4: Customer center has a positive impact on item quality.

E. Product Quality

Product quality is a standout amongst the most paramount components for an assembling firm to be fruitful on the planet market. It is contended that a quality picture, once acquired, can enhance an association's capacity to contend, and its long haul open door for achievement. Business technique improvement must place a high need on item quality, which is a critical pivot for business achievement or disappointment in today's quality execution situated markets (DuBrin, et al., 1995). Product quality has turned into a real business system. Enhancing product quality be the prime goal of an association's quality administration exertions, and product quality be utilized as an essential marker of the firms' quality considerations. Product quality is progressively seen as a vital resource for enhancing a company's worldwide intensity. Product quality has regularly been referred to as the most noteworthy focused need, an issue of key significance and survival, and a method for aggressive execution. Zhang (2000) in his study measured the item quality focused around execution, dependability, sturdiness and congruity. Through these measures a firm can comprehend their item quality status by contrasting present and past exhibitions. To enhance the item quality it is fundamental to measure the current item quality. To comprehend the measure of value issue and to recognize the territories is requesting consideration for improving and updating product quality.

III. RESEARCH OBJECTIVES

In view of the review of literature, this paper goes for accomplishing the subsequent research objectives:
▪ to explore the performances of TQM in the RMG sector of Bangladesh
▪ to figure out the relationship between TQM practice and product quality change in the RMG sector of Bangladesh.

IV. METHODOLOGY

A. Research Design

Both qualitative and quantitative methodologies have been used to conduct this study. The study utilized work area exploration and exchange with scholastics and concerned industry individuals to gather data on quality usage issues. Measurement of variables is shown in appendix A. Notwithstanding illustrative examination, to inspect the impact of TQM practice on quality product, the study proposed a causal outline of exploration, where the accompanying model has been tried:
$\text{Log}_e (p/1-p) = a_0 + a_1x_1 + a_2x_2 + a_3x_3 + \ldots \ldots + a_ix_i$
Where,
$\text{Log}_e (p/1-p) = \ln (\text{ODDS}) = \log$ of chances
p= likelihood to have high product quality
a_i = parameter to be evaluated
x_i = autonomous variable

B. Sampling Design

Target Population: At present there is a total of 6500 garment firms in Bangladesh (BGMEA, 2013). For the study, 4883 garment firms have been considered as the population on the basis of the importance of the locations. For the study purpose, 135 garment-manufacturing units were initially

selected as sample using stratified sampling technique. Due to time and budget constraints, lastly, we have considered 61 firms by using purposive sampling technique. Formula for determination of sample size-

Population Size N= 4883
Error e=0.05
Z value=1.96
Sample proportion p=.01
q =1-p= .09

$$n= \frac{z^2.p.q.N}{e^2 (N-1) \, z^2.p.q}$$

$$= \frac{(1.96) 2*0.1*0.9*4883}{(0.05) 2* (4883-1) + (1.96)^2 (0.1*0.9)}$$

=135

The difficulties inaccessibility into the garments made sample selection very difficult. A total of 61 garment firms have been selected initially. Due to the response bias and inconsistency in the response, 11 garment firms have been excluded. Finally, 50 firms have been selected as sample that is statistically a good size.

C. 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.

V. MULTIVARIATE ANALYSIS

In logistic relapse, the log chances, that is, log e (p/1-p) is a straight capacity of the assessed parameters. Subsequently, if one unit expands xi, the log chances will increment by ai unit(s), when the impact of other autonomous variables is held consistent. Hence ai is the measure of the build in the log chances of the ward variable actually when one unit expands the relating independent variable xi, and the influence of the other free variables is held steady. Evaluated Logistic Regression Model: This study assessed the logistic relapse show in the following way: Every mistake term can expect just two qualities. Here, If the y=0, the mistake is p and if y=1, the error is 1-p. Thusly, we might want to gauge the parameter in a manner that the estimated values of p would be near 0 when y = 0 and near 1 when y=1. Our model will be developed by an iterative most extreme probability strategy. The program will begin with discretionary estimations of the relapse coefficients and will develop an initial model for anticipating the watched information. It will then assess lapses in such prediction and change the relapse coefficients in order to make the probability of the watched data greater under the new model. This strategy is rehashed until the model unites - that is, until the contrasts between the most current model and the past model are unimportant.

Model fit

In binary logistic regression, commonly used measures of model fit are based on the likelihood function and are Cox & Snell R^2 and Nagelkerke R^2. If estimated probability is greater

1145

than 0.5 then the predicted value of Y is set to 0.

Table 1: *Model Summary*

Step	-2 Log likelihood	Cox & Snell R^2	Nagelkerke R^2
1	22.974a	.351	.561

a. The cut value is .500

Under Model Summary we see that the -2 Log Likelihood statistic is 22.974. This statistic measures how poorly the model predicts the decisions that 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^2 (0.351) and Nagelkerke R^2 (0.561) measures indicate a reasonable fit of the model to the data.

Significance Testing

Table 2: *Omnibus Tests of Model Coefficients*

		Chi-square	Df	Sig.
Step 1	Step	18.994	9	.024
	Block	18.994	9	.024
	Model	18.994	9	.024

Omnibus Tests of Model Coefficients provide for us a Chi-Square of 18.994 on 9 df, huge past .05. This is a test of the invalid speculation that adding variables to be considered in the model has not altogether expanded our capacity to anticipate the choices made by our subjects, which is rejected and defend the exploration according to the desire.

Table 3: *Variables in the Equation*

	B	S.E.	Wald	Df	Sig.	Acceptance/rejection of hypotheses	Exp(B)
LS_empw(1)	.986	.494	4.017	1	.037	Accepted	2.680
LS_resrs(1)	.429	.219	3.950	1	.042	Accepted	1.537
EP_cfteam(1)	.0510	.0260	3.842	1	.050	Accepted	1.051
EP_QCcir(1)	75.290	1.746E4	.000	1	.998	Not Accepted	4.985E32
EP_fix(1)	.820	.421	3.986	1	.044	Accepted	2.229
SQ_written(1)	-.127	1.029	.0145	1	.909	Not Accepted	.884
SQ_audit(1)	.917	.457	4.007	1	.023	Accepted	2.491
CF_cmpln(1)	-.538	1.621	.112	1	.744	Not Accepted	.589
CF_survey(1)	.811	.361	5.014	1	.025	Accepted	2.255
Constant	.198	1.084	.035	1	.860	Not Accepted	1.218

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.

Anticipate the ODDS
We can utilize this model to anticipate the chances that a subject of a given level of vicinity of variables, for example, administration, helps, representative support, supplier quality and customer focus will encounter the abnormal state of item congruity. Here, the Odds=1.212. In view of autonomous variables in the numerous logistic regressions, the larger amount of item similarity is 1.212 is more inclined to accomplish than to experience lower item congruity.

The Degree of ODDS
The Variables in the Equation yield likewise provide for us the Exp (b). This is otherwise called the odds degree anticipated by the model. This chances proportion can be registered by raising the base of the characteristic log to the bTH power, where b is the slant from our logistic relapse mathematical statement. For our model, we are exhibiting an understanding of chances proportion: Leadership representative strengthening and product quality: On the off chance that our subject has represented strengthening, then the Odds= 2.671. That implies, a subject having abnormal state of item similarity is 2.671 times higher for the more elevated amount of employee empowerment than a low level of worker strengthening. Leadership resources designation for TQM execution and product quality: On the off chance that our subject has assets for TQM sending, then the Odds= 1.529. That implies a subject having abnormal state of product similarity is 2.671 times higher for the more elevated amount of asset allotment than low level of asset designation. Worker interest in cross-practical team(s) and product quality: Our subject can take part in cross-practical group, then the Odds= 1.057. It implies a subject having consistent cross-utilitarian group is 1.057 times as prone to have abnormal state of product congruity than incidental cross-practical group. Worker power to alter issue and product quality: In the event that our subject delights in power to alter the TQM issues by the Odds= 2.231. That indicates a subject saw the abnormal state of worker power is 2.231 times prone to have high levels

of item congruity than a low level of representative power. Supplier review and product quality: In the event that our subject reports normal and continuous supplier review, then the Odds= 2.484. It implies a subject reports normal and incessant supplier review is 2.484 times more prone to have abnormal state of product congruity than an occasional and periodic review. Customer overview and product quality: In the event that our subject reports consistent shopper overview led by their venture, then the Odds=2.261. That implies, a subject reports continuous purchaser overview is 2.261 times liable to have high levels of item congruity than incidental client study.

VI. CONCLUSION AND RECOMMENDATION

The central purpose of this report has been to analyze the impacts of TQM practices on product quality in the piece of clothing firms of Bangladesh. From the examination of the information gathered, it appears that organizations that embraced TQM as a working logic inside their associations can make change in item quality. TQM practices, for example, administration (employee empowerment, asset assignment), worker interest (cross-practical teams, employee power), supplier relationship (supplier review), customer center (client survey) have positive associations with item quality. An examination of the accessible information indicates that in the specimen piece of clothing firms, there are likewise connections existing among the TQM measures, for example, the asset portion with representative strengthening, asset designation with customer study, worker strengthening with fix issues, client objection with customer review. On the off chance that these specimen Bangladeshi pieces of clothing firms can accomplish quality improvement, then another piece of clothing organizations of Bangladesh can likewise attain the same. It is important to make right mindfulness among all commercial enterprises to understand these enhancements.

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