

# Feasibility Analysis of Total Quality Management (TQM) Model in Small Scale Industry



## Engineering

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## ABSTRACT

*Total Quality Management (TQM) is a means for improving personal effectiveness and performance for aligning and focusing all individual efforts throughout an organization. Quality of product is still an important issue for the manufacturing industry. Only a few manufacturers are producing high quality products with higher customer satisfaction. In this paper an attempt has been made to identify the common critical factors of TQM for selected manufacturing industry by measuring the importance of TQM practices as perceived by respondents of the firm in their organizational context. This paper will also measure the implementation level of identified important practices, thus demonstrating the current status of TQM, and will finally identify implementation barrier to practices that are perceived important but not implemented by organizations.*

## 1. INTRODUCTION

In today's world, organizations are facing the growing challenges from global competition and more sophisticated customers in terms of what they want and their changing needs. Most organizations are starting to apply the Japanese methods of production and philosophies in the hope of achieving the required growth in the markets increasing profit. One of the main ideas that came from the Japanese industry is TQM, which means that all workers within a given organization must participate in improving the product or service quality, an activity that was previously the concern of the quality control department employees [13]. Many manufacturing firms implement Total Quality Management (TQM) with the aim of delivering high-quality products to their customers. Some of them become successful and some are not [10]. The extent to which SMEs understand Total Quality Management (TQM) is examined with the objective of encouraging SMEs to implement TQM and boost their competitiveness. This need to assist SMEs is reinforced by the report from The Department of Trade and Industry in 1996 that Stated that "small business population changes constantly. New businesses are started; others close, while some change ownership.

## 2 LITERATURE REVIEW

The main implication of the findings for managers is that with TQM practices, manufacturing organization are more likely to achieve better performance in customer satisfaction, employee relations, quality and business than without TQM practices. This study examines the association between total quality management practices and performance [1]. A articles presents a survey on current quality control practices within manufacturing industries to assess the potentiality of implementing TQM techniques and principle in order to improve the customer satisfactions and market share [2]. A study is Present to fill the gap by identifying the critical factors of managing the manufacturing quality by using TQM in small scale industries in North Karnataka. The benefits of this model helps its users in evaluating the strengths and weakness of their TQM implementation, targeting their improvement areas, Setting up an action plan for improvements, and tailoring a special part to the need of their firms [3].

Only a few manufacturers are producing high quality products with higher customer satisfaction. Many of them are holding quality certificates but a few has reached a stage of development where they are able to apply modern quality principles and techniques effectively. Research on product quality improvement shows that meeting customer satisfaction, increasing profits and reducing losses to a minimum level can attained through the application of modern quality philosophies and principles such as Total Quality Management (TQM). Understanding the tools and techniques of TQM is consider to be significant in order to get useful results [4-14].

## 3 METHODOLOGY

The objective of this study is feasibility analysis of total quality management (TQM) model by identifying critical success factor which are very common for successful implementation of a TQM model in manufacturing organization.

### 3.1 Survey Design and Preparation

A survey questionnaire is developed and distributed to the employee. The first part of the questionnaire is use to gather general information about respondents such as company and personnel details business type. The second part of questionnaire deal with the concept of total quality management (TQM). These are: Creation of quality of product management environment; Involvement of employee; Customer satisfaction; Supplier relationship; Benchmarking; Continuous Improvement. .. For scoring purpose, a five point Likert scale was employed with a score of .5= strongly disagree; 1 =disagree; 3=Agree; 4=partially agree; 5= strongly agree.

### 3.2 Data Collection

The data will be collected into two parts. The first part of the questionnaire is related to general information about company and its product. The second part of the questionnaire deal with the critical success factor of TQM model. In this questionnaire has develop and distributed to the employee of organization. The first part of the questionnaire is used to gather general information about respondents such as company and personnel details, product information, number of employee, number of customer being served by company types of customer, and whether they are using any type of quality tools in the organization. The source of data is developed from one to one questionnaire from following group of people.

### 3.3 Data Analysis

In this collected response of each factor has been converted into mean and standard deviation.

(a)Calculation of mean and Standard Deviation of each factor

**For factor 1: Creation of quality management environment**  
Total Employee=300 Strongly agree=141, Partially agree=125 Agree :19 ,Disagree:8 ,Strongly disagree:7

$$\text{Mean} = \frac{141 \times 5 + 125 \times 4 + 19 \times 3 + 8 \times 2 + 7 \times 1}{300}$$

$$= \frac{1273.5}{300} = 4.2$$

**For Factor 2: Involvement of employees in TQM efforts**

Strongly agree=98, Partially agree=130 Agree:60, Disagree:7 ,Strongly disagree

$$\text{Mean} = \frac{98 \times 5 + 130 \times 4 + 60 \times 3 + 7 \times 2 + 1 \times 1}{300}$$

=1199.5/300=3.998

**For factor 3: Focus on supplier relationship**

Strongly agree=101, partially agree=110 Agree: 58, Disagree: 17, strongly disagree: 13

Mean=101\*5+110\*4+58\*3+17\*1+13\*.5/300=3.82

**For Factor 4: Focus on customer satisfaction**

Strongly agree=108, partially agree=103 Agree: 54, Disagree: 25, Strongly disagree: 10

Mean=108\*5+103\*4+54\*3+25\*1+10\*.5/300=3.81

**For factor 5: Benchmarking**

Strongly agree=105, partially agree=117 Agree: 60, Disagree: 10, Strongly disagree: 8

Mean=105\*5+117\*4+60\*3+10\*1+8\*.5/300=3.95

**For Factor 6: Continuous improvement of processes**

Strongly agree=58, partially agree=63 Agree: 79 Disagree: 52, strongly disagree: 48

Mean=58\*5+63\*4+79\*3+52\*1+48\*.5/300=2.85.

The overall result of Mean and Std, Deviation are shown in table 1.

(b) Calculation of T-Test using above values.

Confidence Level= 95% and number of degree of freedom= n-1=299

For Factor 1-2:  $\mu_1 = 4.2$   $\mu_2 = 3.998$   $S_1 = 1.0005$   $S_2 = 0.96$

$T = \frac{4.2 - 3.998}{\sqrt{\frac{(1.0005)^2}{299} + \frac{(0.96)^2}{299}}}$

= 0.202/0.080054

T (Value) = 2.523

P (value) = 0.121543

For Factor 1-3:  $\mu_1 = 4.2$   $\mu_3 = 3.82$   $S_1 = 1.0005$   $S_3 = 1.24$

$T = \frac{4.2 - 3.82}{\sqrt{\frac{(1.0005)^2}{299} + \frac{(1.24)^2}{299}}}$

= 0.38/0.0919

T (Value) = 4.13

P (value) = 0.00004712

For Factor 1-4:  $\mu_1 = 4.2$   $\mu_4 = 3.81$   $S_1 = 1.0005$   $S_4 = 1.28$

$T = \frac{4.2 - 3.81}{\sqrt{\frac{(1.0005)^2}{299} + \frac{(1.28)^2}{299}}}$

= 0.39/0.0937

T (Value) = 4.16

P (value) = 0.00004164

For Factor 1-5:  $\mu_1 = 4.2$   $\mu_5 = 3.95$   $S_1 = 1.0005$   $S_5 = 1.08$

$T = \frac{4.2 - 3.95}{\sqrt{\frac{(1.0005)^2}{299} + \frac{(1.08)^2}{299}}}$

= 0.25/0.0849

T (Value) = 2.94

P (value) = 0.00353818

For Factor 1-6:  $\mu_1 = 4.2$   $\mu_6 = 2.85$   $S_1 = 1.0005$   $S_6 = 1.629$

$T = \frac{4.2 - 2.85}{\sqrt{\frac{(1.0005)^2}{299} + \frac{(1.629)^2}{299}}}$

= 1.35/0.1103

T (Value) = 12.23

P (value) = 0.0000.

The overall result of t-test is shown in table 2.

**Table 1: Statistics of the pillars**

Factors	Mean	Std. deviation
Creation of quality management environment	4.2	1.0005
Involvement of employees in TQM efforts	3.998	0.96
Focus on supplier relationship	3.82	1.24
Focus on customer satisfaction	3.81	1.28
Benchmarking	3.95	1.08
Continuous improvement of processes	2.85	1.629

**Table 2: Result of T-Test**

	P2	P3	P4	P5	P6
P1	0.121543	0.000047120	0.00004164	0.00353818	0.00
P2		0.0502	0.043	0.5636	0.000
P3			0.922	0.1720	0.000
P4				0.1483	0.000
P5					0.000

**Table 3: Ranking of Pillars**

TQM Pillars	Rank
Creation of quality management environment	1
Involvement of employees in TQM efforts	2
Focus on supplier relationship	4
Focus on customer satisfaction	5
Benchmarking	3
Continuous improvement of processes	6

**RESULTS & DISCUSSION**

The descriptive statistics about the six pillars in the proposed framework are presented in table 1. According to the mean values, we could conclude that organization emphasize more on the creation of quality management environment and gives less priority on continuous improvement of process as the pillar of TQM implementation. However, further analysis is performed to identify the significant differences of mean values of all pillars. For this, two tailed T-test has been performed for paired comparison. the results of the T- test are presented in Table 2.

Judging the results of T-test, we can conclude that pillar 1, creation of quality management environment places itself at the top rank among all pillars. P6 is in the bottom rank and others pillars are in between the ranking scale .The overall ranking of the pillars is presented in Table3.

**CONCLUSIONS**

In this paper, an attempt has been made to discuss the key aspects of TQM implementation in the manufacturing organizations. According to the study , key pillars for TQM implementation are Creation of quality management environment, Involvement of employee in TQM efforts, Focus on customer satisfaction ,Focus on the closer relationship with suppliers, Continuous improvement of process, Benchmarking findings, Creation of quality management environment is being seen as the major pillar. Although Continuous improvement of process is rated low by the respondents while choosing the pillars, these are found directly or indirectly correlated to other pillars

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