

## Analysis of Critical Success Factor (CSFs) in TQM Implementation

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### Abstract

The present research paper identifies the critical success factors in the implementation of TQM, to evaluate their impact on the primary measures as expressed by the operational performance and the secondary measures as organizational performance, and to find out the effect of the operational and organizational performance of small and medium-sized enterprises (SMEs) in a selected industrial sector using the semi structured interview approach. A total 297 samples are identified for analysis. 139 responses received with all detail. Respondent's profiles are quality managers and deferent sectors are targeted. A focus is needed on analyzing various techniques and strategies to be adopted by the Indian companies.

**Keywords** -TQM, Performance measure, SMEs.

### INTRODUCTION

To improve competitiveness, organizations are looking for a higher level of effectiveness across all functions and processes and are choosing TQM as a strategy to stay in business. The increased awareness of senior executives, who have recognized that quality is an important strategic issue, is reflected as an important focus for all levels of the organization. This requires defining and implementing several factors (identified as critical factors in for the present research work).

Many companies are frustrated in their effort to improve quality through TQM because these companies have exclusively focused on financial measures instead of quality measures. Other studies, in the recent past also observed the failure of TQM. These failures are due to the too much- too soon effort without proper foundation and focus. Manufacturing firms, therefore, need to understand the TQM CSFs for the successful implementation of TQM. Therefore, there is a pressing need to establish TQM CSFs for manufacturing firms. This project will examine the TQM frameworks developed by scholars and businesses and develop the TQM CSFs for manufacturing firms.

### TOTAL QUALITY MANAGEMENT (TQM)

Definitions of quality have changed with the passage of time with changing customer's needs and requirements. But the essence has more or less been to develop an approach to problem solving, conformation to standards for customer satisfaction. With management functions getting complex, approaches to managing quality in functional areas are becoming difficult. Later, they have realized that TQM is much more than just shop-floor improvements. The definitions of quality incorporate factors like top management commitment, leadership, team work, training and development, rewards and recognition, involvement and empowerment of employees etc. These critical factors are the foundation for transformational orientation to create a sustainable improvement culture for competitive advantage on a continuous basis.

According to Selladurai Raj, TQM interventions or activities must be guided by four change principles, namely work processes, variability, analysis, and continuous improvement. Product design and production processes must be improved; variance must be controlled to ensure high quality; data must be systematically collected and analyzed in a problem-solving cycle; and commitment made to continuous learning by the employees about their work. With the rapid globalization, manufacturing firms are faced with a changing competitive environment. They are competing in creating the conditions that will enable them to be competitive in the domestic and international markets. One form of operations management practices is TQM which has received attention in the last two decades (Jung and Wang, 2006). Thus far, much has been written on TQM and its value in improving the performance of manufacturing industries in general. Literature on TQM implementation suggests that the TQM practices are positively associated with operational performance, but they marginally affect organizational performance (Broetzmann et al., 1995). On the other hand, research findings concluded that the success of SMEs has a direct impact on the economic development in both the developed and developing countries (Demirbag et al., 2006). They have the ability to generate employment with minimum cost, are pioneer in innovation realm and have high flexibility which allows them to meet the needs of the customers.

However, a review of the current literature on TQM practices indicated that much have been written about TQM implementation in large manufacturing companies, but little attention has been paid to their implementation in the SMEs. In a similar vein, there is a dearth of literature regarding the impact of TQM implementation on performance of SMEs, despite the potential synergies between the two areas (Demirbag et al., 2006; Sila, 2007).

### **OBJECTIVES OF THE STUDY**

This research adds to the body of knowledge by providing new data and empirical insights into the relationship between the CSFs of TQM practices and operational and organizational performances of SMEs in India. Thus, based on the analysis of past research, the purpose of this paper is threefold:

- (1) To identify the CSFs of TQM practices of the SMEs in the Indian manufacturing sector;
- (2) To evaluate the impact of the TQM CSFs on the operational and the organizational performances of the SMEs;
- (3) To evaluate the impact of the TQM CSFs on the operational and the organizational performances of the SMEs;

### **CRITICAL SUCCESS FACTORS OF TQM PRACTICES IN THE SMEs**

Generally speaking, the CSFs can be defined as the critical areas which organization must accomplish to achieve its mission by examination and categorization of their impacts (Oakland, 1995). Thus, in the current study they can be viewed as those things that must go right in order to ensure the successful implementation of TQM. One of the earlier empirical studies in the quality management area that analyzed the TQM CSFs in the SMEs was conducted by Yusof and Aspinwall (2000). This study found that the CSFs for TQM implementation in the SMEs are management leadership, continuous improvement system, measurement and feedback, improvement tools and techniques, supplier quality assurance, human resource development, systems and processes, resources, education and training, and work environment and culture. More importantly, Hodgetts et al. (1999) found that the CSFs of TQM implementation in the SMEs are top management involvement, customer focus, employees "training, employees" empowerment and generating new ideas.

In this line of work, a study by Dayton (2003) used data from American industrial companies to determine whether the ten TQM critical factors (i.e. people and customer management, supplier partnerships, communications, customer satisfaction, external interface management, strategic quality management, teamwork structures for improvement, operational quality planning and quality improvement systems) identified by the Black and Porter (1996) study could be considered as important TQM CSFs by USA small and large companies. From his conclusion he identified the strategic quality management as the most important TQM critical factor. Demirbag et al. (2006) carried out an empirical study to identify factors critical to the success of TQM in the Turkish SMEs. They concluded that there are seven CSFs of TQM practices, i.e. quality data and reporting, role of top management, employee relations, supplier quality management, training, and quality policy and process management. However, in contrast to the previous studies, organization culture was used as a separate variable in the current study since an organization's culture affects behaviors and attitudes at all levels and it determines, to a large extent, how employees act (Robbins and DeCenzo, 2005).

### **RESEARCH DESIGN**

There is also the decision where and when to use open and closed questions. Open questions give the respondents a greater freedom to answer the question because they answer in a way that suits their interpretation. A mixed method with open and closed questions is possible and this can sometimes allow greater flexibility of response for some studies. So, semi structured questionnaire is used for the present study. The mail questionnaire offers a relatively cheaper method of data collection than the personal interview. Second, people can take their own time to fill in the questionnaire and consider their responses, third, as interviews are not used as this could lead to less bias that results from the way in which different interviewers ask the questions.

Our target population (297 SMEs) was obtained from listings provided by the Indian Organization for Industrial Consulting and from Industrial databases. These were carefully verified and cross-checked to ensure complete and up-to-date information. All of the firms were contacted personally while 45 refused to be involved in the research quoting confidentiality of data in the questionnaire as a reason. A total of 139 firms thus comprised the final sample which represents a (139/297) 46.8 percent response rate. Hair et al. (2006) pointed out that opinions regarding sample sizes have varied. They further said that most data analysis and estimation procedure (including the one used in this research) is maximum likelihood estimation (MLE) and they recommended that minimum sample sizes to ensure stable MLE solutions are 100 to 150. Thus, the sample size of 139 is considered as appropriate for this present research.

### **PROFILE OF THE RESPONDENTS**

Figure 1 presents the sector wise distribution of the respondents. The response rate was 46.8 per cent, i.e. 139 out of the 297 companies claiming to have implemented or have been implementing some of TQM practices. This is a healthy sign as it suggests that a substantial number of Indian SMEs realize the importance of TQM as a critical factor in the success and survival of manufacturing firms in the marketplace (Brah et al., 2002).

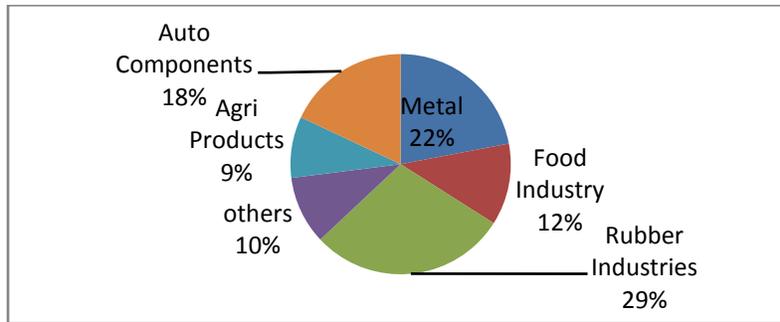


Figure 1: Sectors of the respondents

The responses indicated that a majority of the respondents completing the questionnaire were production managers, i.e. of the 139 respondents, 113 (81 per cent) were production managers. This result may stem from the fact that the introduction of TQM can result in, a dramatic increase in operational effectiveness (Slack et al., 2001).

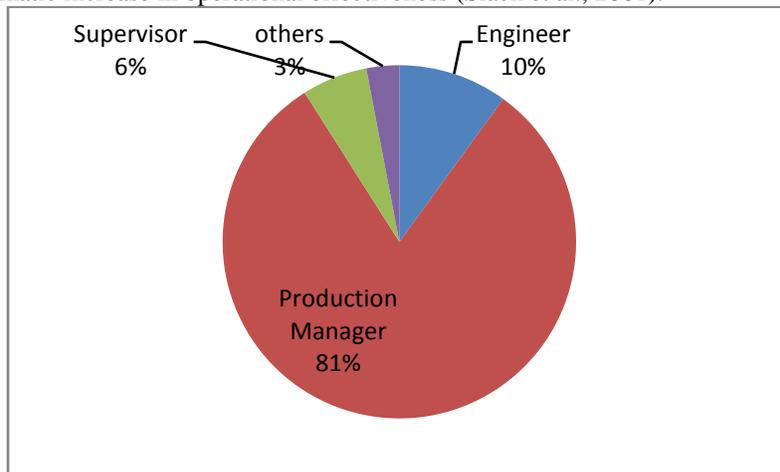


Figure 2: Professional Profile of Respondents in Companies

The metal, machinery and equipment firms constituted the largest portion of the respondents with 32.4 percent of respondents. This result supports the result of Rahman (2001) study which concluded that manufacturing firms in the engineering, manufacturing (durable), and manufacturing (non-durable) fields are the major industries in which TQM programs have been implemented. Figure 1 represents the sector wise distribution of selected respondent's companies.

### DESCRIPTIVE STATISTICS

From the analysis point of view, the factors which are taken into account are assembled in accordance to their effect on the performance of total quality management in small and medium scale enterprises. This is done by using the various quality control tools like flow chart, histogram etc. These factors are sorted out in accordance to their mean and their importance in the working habitat of the industries. After the sorting part is over, the view of respondents on the factors are analyzed and which factors are to be taken into account for improving the overall quality management are checked out.

On completion of the formation of basic structure of quality management practices, the actual statistical calculations of the factors are being done. Mean, median, standard deviation and variance of the influential factors along with their constituents are calculated. The outcome of the results is being shown in Table 1.

<b>Table 1: Descriptive analysis of factors</b>						
	Factors	Full Form	Mean	Median	Std. Dev	Variance
Operational Factors	PM	Process management	4.066667	4	0.827682	0.685057
	QA	Quality assurance	4.266666	5	0.691492	0.478161
	EI	Employee Involvement	4.3	4	0.702213	0.493103
	CI	Continuous improvement	4.333333	4	0.606478	0.367816
Organizational Factors	TMC	Top management commitment	4.4	4	.770132	0.593103
	HRM	Human Resource Management	4.133333	4	0.50741	0.257471
	BM	Benchmarking	4.166667	3	0.698932	0.488506
	SR	Social responsibility	4.233333	4	0.727932	0.529885
	ES	Employee satisfaction	3.866667	4	0.681445	0.464368
Strategic Factors	IA	Information and analysis	3.5	3	0.820008	0.672414
	TR	Training	3.966667	4	0.718395	0.516092
	SM	Supplier management	4.233333	4	0.568321	0.322989
	SP	Strategic Planning	4.066667	4	0.691492	0.478161
	EE	Employee empowerment	3.633333	4	0.76489	0.585057
Tactical Factors	CF	Customer focus	4.033333	5	0.718395	0.516092
	TW	Teamwork	3.766667	4	0.85836	0.736782
	PSD	Product & Service Design	4.333333	5	0.546672	0.298851
	PC	Process Control	3.933333	4	0.784915	0.616092

From the above statistics, the influencing factors are again shown in Table 2, where these factors are arranged in a sequence in accordance to their importance and impact on total quality management practices in the small and medium scale enterprises. It is apparent from the table 2, Top management commitment and continuous improvement with a mean value of 4.4 and 4.33 plays the most vital role in functioning of quality management practices in the firms. For successful implementation of TQM employee involvement and continuous improvement is very much important and the maximum enterprises have good management policy.

Now a day, enterprises are also taking utmost care in implementing continuous improvement plans in their production structure to make maximum use of man, machine, and material. Quality commitment and employee improvement also form critical success factors during implementation of TQM practices in SMEs but these factors are somehow sided by most enterprises and these factors has to be improved in order to have successful implementation of TQM. Most of the respondents from the firms also feel that team work management (mean = 3.7) is not worrying their working practices although it act as an important link in functioning of total quality management in the SMEs.

### **IMPORTANCE OF FACTORS**

The table 2 which shows the importance of all kind of factors as per their mean values in their descending orders of the factors shows that Indian small and medium scale industries are also following the same type of TQM structure as followed by their counterparts in other parts of the world. Indian SMEs are trying to satisfy with the findings of various research scholars regarding various critical factors like satisfaction of customer, effective participation of management and employees, incentives and reward schemes, communication system, supplier's power, statistical quality control, fast result techniques, quality arrangement and cost involved, systematic techniques etc.

<b>Table 2: Factors in descending order as per mean values</b>		
<b>FACTORS</b>	<b>FULL FORM</b>	<b>MEAN</b>
TMC	Top management commitment	4.4
CI	Continuous improvement	4.333333
PSD	Product & Service Design	4.333333
EI	Employee Involvement	4.3
QA	Quality assurance	4.266666
SR	Social responsibility	4.233333

SM	Supplier management	4.233333
BM	Benchmarking	4.166667
HRM	Human Resource Management	4.133333
PM	Process management	4.066667
SP	Strategic Planning	4.066667
CF	Customer focus	4.033333
TR	Training	3.966667
PC	Process Control	3.933333
ES	Employee satisfaction	3.866667
TW	Teamwork	3.766667
EE	Employee empowerment	3.633333
IA	Information and analysis	3.5

**MEAN DISTRIBUTION OF FACTORS**

From figure 3, it can be clearly seen that the factor TMC i.e. top management commitment has the highest mean value of 4.4. On further breakdown it is shown that about 70% of participants strongly agreed and 23.33% agreed while nobody disagreed with this factor. Now the factor with minimum mean value of 3.5 is IA i.e. Information and Analysis activities where maximum 13.33% of respondents strongly agreed and 30% only agreed with it. On contrary, 50% of the participants were not sure of this factor prevailing in their firms. The mean of all the factors is found to be 4.035208, factors with individual mean value smaller than that of the sample are taken into account and what steps are to be taken to inflate their number are discussed further. In the next section, top and bottom five individual sub factors affecting the total quality management practices in the SMEs are discussed.

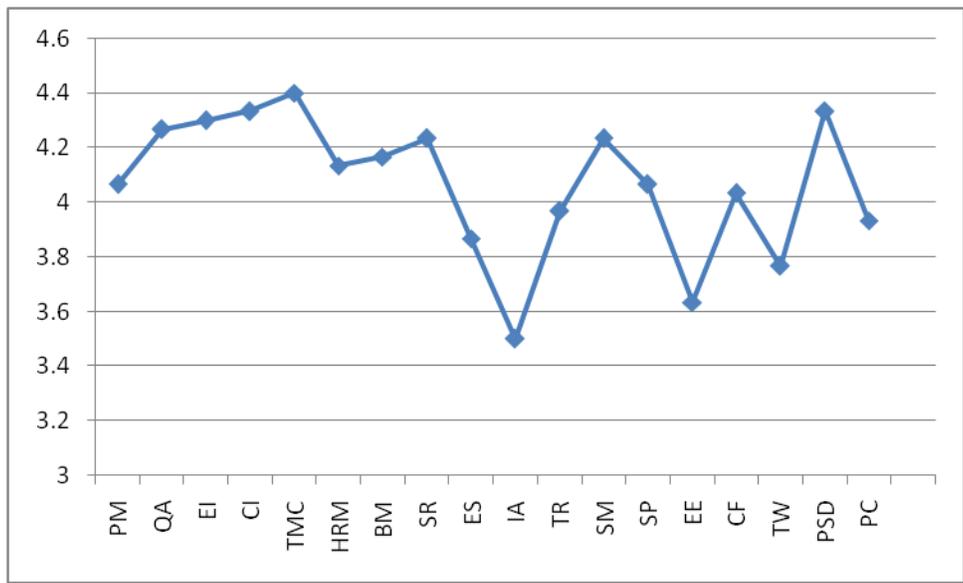


Figure 3: Mean Values of Factors

**A COMPREHENSIVE FRAMEWORK FOR CSFs**

The previous discussion covers the relevance and analysis of the CSFs used while TQM in Indian industries and it has been observed that many of the Indian firms that are taking strategic initiatives to implement TQM in their business units and care about the critical success factors to sustain in the competitive market.

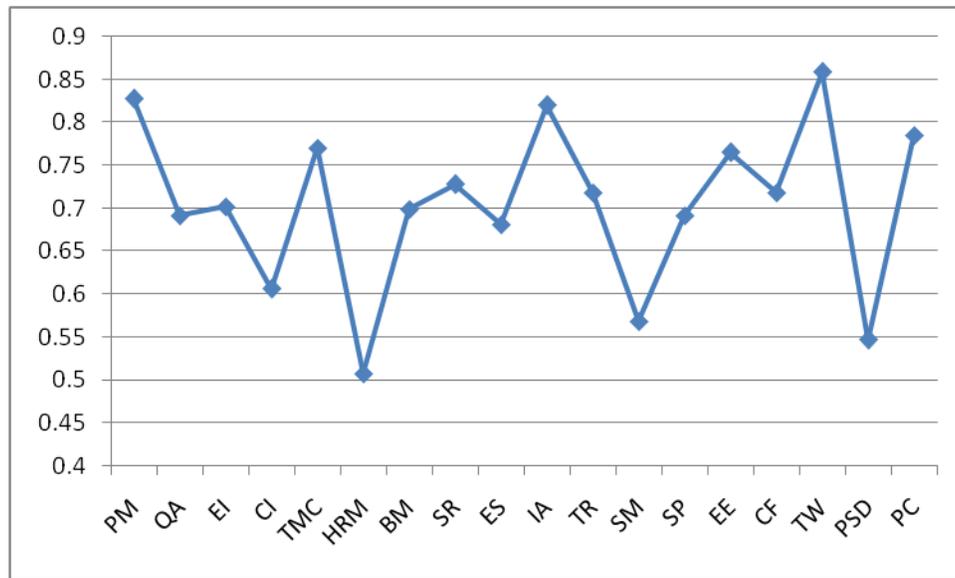


Figure 4: Standard Deviation Chart

After discussing the various sub factors above, now the standard deviation of all the factors are related to check whether the findings are acceptable or not and at last problems faced by SMEs for application of TQM are highlighted. Standard deviation act a great statistical tool to check the reliability and acceptability of the results found from the data collected. From fig no 4, it can be explained that the std. deviation of all the factors are in the range of 0.5-.9. This shows that the results obtained do not deviate largely from the findings of the survey. As the graph indicate most of the participants agreed with the critical success factors affecting total quality management practices in their organizations. Major amount of care is being taken to implement TQM practices in the firms by the respective management team.

### CONCLUSION

The analysis of eighteen of the most prominent critical success factors (CSFs) used in the sustainable analysis within the TQM frameworks has revealed that out of various CSFs, these CSFs are important. The analysis further pointed out that none of the frameworks are comprehensive. Apart from the exhaustive literature review, survey analysis is being done to examine the importance of identified CSFs and salient conclusion is being drawn from the result and discussion. Though there is ample evidence in the literature on the CSFs of quality initiatives. Using the four common CSFs such as operational factors, organizational factors, strategic factors and tactical factors are proposed for construction of TQM framework, and further it is divided namely, top management commitment, quality assurance, strategic quality management, product design, employee empowerment, employee involvement, process management, process control, supplier management, education and training, information and analysis, and customer focus & satisfaction. These CSFs presented act as a guide for manufacturing organizations contemplating a TQM initiative.

### REFERENCES

- [1] Brah, S., & Lim, H. (2006). The Effects of Technology and TQM on the Performance of Logistics Companies. *International Journal of Physical Distribution & Logistics Management*, 36(3), 192-209.
- [2] Broetzmann, S., Kemp, J., Rossano, M. and Marwaha, J. (1995), "Customer satisfaction-lip service or management tool?", *Managing Service Quality*, Vol. 5, pp. 13-18.
- [4] Black, S. and Porter, L. (1996), "Identification of critical factors of TQM", *Decision Sciences*, Vol. 27, pp. 1-21.
- [5] Deming. (1986). *Out Of the Crisis*: MIT Center for Advanced Engineering. Cambridge University Press
- [6] Demirbag, M., Tatoglu, E., Tekinkus, M., & Zaim, S. (2006). An Analysis of the Relationship between TQM Implementation and Organizational Performance. *Journal of Manufacturing Technology Management*, 17(6), 829-847.
- [7] Hair, J.F. Jr, Anderson, R., Tatham, R. and Black, W. (1995), *Multivariate Data Analysis*, Prentice-Hall, Upper Saddle River, NJ.
- [8] Jung, J. and Wang, Y. (2006), "Relationship between total quality management (TQM) and continuous improvement of international project management (CIIPM)", *Technovation*, Vol. 26 Nos 5-6, pp. 716-22.
- [9] Oakland, S. (1995), *Total Quality Management – Text with Cases*, BH Ltd, Oxford.

- [10] Yusof, S. and Aspinwall, E. (2000), "Critical success factors in small and medium enterprises: survey results", *Total Quality Management*, Vol. 11 No. 4, pp. 248-462.
- [11] Hodgetts, R., Kuratko, D. and Hornsby, J. (1999), "Quality implementation in small business: perspectives from the Baldrige award winners", *SAM Advanced Management Journal*, Vol. 64 No. 1, pp. 37-47.
- [12] Dayton, N. (2003), "The demise of total quality management (TQM)", *The TQM Magazine*, Vol. 15 No. 6, pp.391-6.
- [13] Robbins, S. and DeCenzo, D. (2005), *Fundamentals of Management: Essential Concepts and Applications*, 5th ed., Prentice-Hall, Englewood Cliffs, NJ.
- [14] Rahman, S. (2001), "A comparative study of TQM practice and organisational performance of SMEs with and without ISO 9000 certification", *International Journal of Quality & Reliability Journal*, Vol. 18 No. 1, pp. 35-49.
- [15] Sila, I. (2007). Examining the Effects of Contextual Factors on TQM and Performance Through the Lens of Organizational Theories: An Empirical Study. *Journal of Operations Management*, 83-109.
- [16] Slack, N., Chambers, S. and Johnston, R. (2001), *Operations Management*, 3rd ed., Prentice-Hall, Harlow.