

KEY DETERMINANTS OF TQM PRACTICES IN CONSTRUCTION INDUSTRIES

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Abstract—The aim of this study is to measure the key determinants of TQM practices in construction industry. This study was conducted in Tamil Nadu. The researchers administered questionnaire method for collecting data from respondents. The questionnaire was developed and circulated to quality managers, site engineers. In the study eight dimensions of TQM implementation determinants was emerged. These are: commitment by management, employee's commitment, conducting training, improvements, customer assessment, organizational assessment, Leadership qualities and team work. Regarding the views on the factors in TQM implementation the significant difference among the private and public firms has been identify in case of conducting training and organizational assessment. Since their respective t-statistics are significant 5% level. The study also identified that there is a significant relationship among the entire dimension. This study findings would helps the management in formulating appropriate policy release to TQM implementation. This study considers only limited variables in future seven variables can be included to the study the TQM implementation.

Key words—Determinants, TQM, implementation, questionnaire method, dimensions

I. INTRODUCTION

While other industries have greatly increased their levels of quality and performance, the construction industry is still categorized by low efficiency, cost overruns, and poor value, therefore should learn from the experiences of the mechanized industry (Gallo et al. 2002 ,Forbes 2002, Egan 1998, Lema and Price 1995). Among a variety of techniques, total quality management TQM is debatably the most considerable in operations organization over the last years, and it can certainly have a collision on most industries (Slack et al. 2004). It is not shocking that TQM has been more and more introduced into the construction industry to get better the performance of delivering projects (Forbes 2002, Egan 1998, Arditi and Gunaydin 1997). The key factors influencing the successful introduction of TQM emerge well understood, being customer meeting point, dimension and enhancement, total participation, management, instruction, empowerment, cooperation, incentive, systems/processes approach, and traditions (Pheng and Teo 2004, Emison 2004, Chin and Choi 2003, Carr et al. 1999, Arditi and Gunaydin 1997). In recent times, the concepts of these factors have been standardized in ISO 9000 and the universal approach of this global standard has been implemented in many organizations in the production industry (Chini and Valdez 2003, Chin and Choi 2003, Gu and Zhou 2002).

Total quality management performance problems (inside construction and manufacturing) generally results beginning the fact that these industries are different from the developed industry, the industry that has most effectively utilized TQM. The construction industry differs from a "distinctive" TQM applicant industry in the next ways (Rosenfeld 1992, Strange and Vaughan 1993).

II. BACKGROUND OF THE SURVEY

TQM is a management advance that originated in Japan, was calculated in the 1950s, and steadily greater than before in recognition from the early 1980s to the 1990s. Its extraction has been

traced from side to side the development of inspection, quality control, and quality assurance (Dale 1999). Equipment that have been mentioned in combination with TQM comprise the seven quality manage tools, the seven administration tools, and the development sequence (Andersson et al. 2006). TQM is a continually developing program that focuses on managerial development. while no specific personal accountable is for its growth, the leading contributors, acknowledged as the large four, are Edwards Deming, Joseph Juran, and Kaoru Ishikawa.

Some recognizable companies recognized for implementing TQM comprise Ford Motor Company, Phillips Semiconductor, SGL Carbon, Motorola, and Toyota Motor Company. TQM focuses on the requirements and prospect of the system's clients, both interior and exterior. The importance of the system is to identify the cause of defects rather than the alteration of the defect. Deming explains the dissimilarity, stating that even though data may be familiar with the number of accidents that occur "in the home" vs. "on the road" or "at the work place," they do not give details how to decrease the incidence of accidents (Miller 1993).

TQM works to get enhanced the competitiveness of an organization by ensuring that the right possessions are done accurate the first time. This association de-emphasizes location and emphasizes the consequence of employee empowerment (Plutat 1994). It places the focus on maximizing client fulfilment at every level rather than achieving internal effectiveness. As a result, it is imperative that the right dimensions are used to represent and to drive the level of customer satisfaction at a exact point in the structure (Pheng and Teo 2004). The grades of TQM have been contentious. Harari (1997) considered all self-governing research performed by consulting firms and finished that only approximately 20% of TQM programs in the United States and in Europe achieved considerable improvement in any area. A study conducted by the American Quality establishment (Ernst and Young (1992)) supported that judgment in a survey of 584 firms in the United States, Canada, Germany, and Japan for the duration of a six month period. In that they found that many businesses may waste millions of dollars a year on quality development strategies that do not recover their presentation and may even impede their sequence.

Hendricks and Singhal (1997) contested those data in one more analysis, claiming that 85% of the information relating to the achievement and failure of TQM gain their results from opinions instead of from purpose data and numerical measurements of prosperity. Studies that use data centered results provided more aim marks but did not measure implementation achievement rates.

2.1. Objectives

This study is confined with the following objectives:

- To identify the crucial success factors of TQM implementation in construction industry.
- To evaluate their impact on organizational development.

2.2. Scope

The scope of this study is limited only to the spot supervisors, site engineers and Managers of the building projects Tamil Nadu.

2.3. Period of the study

This study was conducted during the period of August 2015 to February 2016.

2.4. Data collection method

The researchers collected primary data from the respondents through questionnaire method. Questionnaire consists of three important parts. The first part of the questionnaire deals with demographic profile of the respondents. The second part consists of variables leading to implementation of TQM in construction industries. The third part of the questionnaire deals about the variables relating to TQM implementation

2.5. Descriptive statistics

The demographic profile of the respondents consists of the Nature of Industry, Years of Establishment, Employees Working, Management Level, Annual Turn Over, Forms of organization and Types of buildings which is constructed in their industry. The total survey was conducted in Tamil Nadu. The Researchers have distributed 250 questionnaires to Respondents. Although Researchers made efforts they can able to collect only 133 questionnaires. The response rate of the survey was 53.2 percent. In Terms of the nature of the industries about 72 percent are falls under the small scale industries, 42 percent of the industries was established more than 10 years, whereas more than 250 employees were working in small scale industries, about 100 Crores was the annual turnover of large scale industries.

2.6. Content validity of questionnaire

Before administering questionnaire to the respondent the researcher constituted a committee which consist of one experts in TQM and one academicians based on their valuable suggestions some change were incorporated existing questionnaire.

III. ANALYSIS AND DISCUSSIONS

3.1. Reliability statistics

The coefficient alpha scores were calculated for assessing reliability of the TQM implementation, which are listed dimension wise in Table No 9. The coefficient alpha values for were commitment by management, employee's commitment, conducting training, improvements, customer assessment, organizational assessment, Leadership qualities and team work well above the criterion of 0.860 as recommended by Nunnally (1978) for assessing regularity of the scale.

Tables 1. Reliability Statistics

Cronbach's Alpha	No of Items
.860	28

3.2. Determinants for a successful Total Quality Management implementation

To identify some broad determinants of Total Quality Management implementation success, factor analysis has been accomplished. Kaiser-Meyer-Olkin calculate of sampling sufficiency was of an acceptable magnitude (KMO 0.771). Moreover; Bartlett's Sphericity test gave a consequence level of 0.000. Hence, all assumptions for carrying out factor analysis are met. The extraction method chosen was standard components and the rotated method was varimax.

Tables 2. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.771
Bartlett's Test of Sphericity	Approx. Chi-Square	1110.39
	Df	378
	Sig.	0.000

Table 3. Antecedents of quality management practices in the construction industries

Factors	variables	Initial Eigen Values	Variance Explained	Percent of variance	Cumulative Percent
Commitment by Management	5	6.165	22.017	10.223	10.223
Employee's Commitment	5	2.070	7.393	9.463	19.686
Conducting Training	6	1.652	5.902	9.180	28.866
Improvements	4	1.571	5.612	6.764	35.630
Customer Assessment	2	1.524	5.443	6.594	42.225

Organizational Assessment	2	1.214	4.336	5.936	48.161
Leadership qualities	2	1.173	4.189	5.474	53.635
Team Work	2	1.139	4.067	5.326	58.960

Initially, all the 28 variables were used. After rejecting those items that have inadequate loadings, we reduced to nine factors. The identified factors explain percent of total variance. The factors are named as follows:

- commitment by management
- employee’s commitment
- conducting training
- improvements
- customer assessment
- organizational assessment
- Leadership qualities
- Team work

To identify the significant difference among private forms and public forms of organization with regard to implementation of TQM t-statistics has been administered.

Table 4. Site engineers and project manager’s opinion on key variables in TQM implementation

Factors	Mean score among		t-statistics
	Private firms	Pubic firms	
Commitment by Management	3.67	3.67	0.228
Employee’s Commitment	3.71	3.71	0.588
Conducting Training	4.01	4.01	6.365*
Improvements	3.77	3.77	1.509
Customer Assessment	3.68	3.68	.816
Organizational Assessment	3.68	3.68	1.938*
Leadership qualities	4.08	4.08	1.415
Team Work	3.73	3.73	1.493

*=**significant at 5%level**

The mean score of variables in TQM implementation among the private and public firms have been calculated individual along with its t-statistics. The highly viewed variables in TQM implementation among the private forms are “Leadership qualities and Conducting Training” because their mean score are 4.08 and 4.01 respectively. The highly viewed variables in TQM implementation among the public forms are also same as that of private forms. Regarding the views on the factors in TQM implementation the significant difference among the private and public firms has been identify in case of conducting training and organizational assessment. Since their respective t-statistics are significant 5% level.

Table No 5. Interco-relation among the TQM constructs

TQM factors	CBM	EC	CT	I	CA	OA	LQ	TW
Commitment by Management(CBM)	1	.449**	.415**	.565**	.326**	.350**	.249**	.642**
Employee’s Commitment(EC)		1	.459**	.389**	.266**	.403**	.219**	.308**
Conducting Training(CT)			1	.400**	.356**	.317**	.269**	.242**
Improvements (I)				1	.305**	.400**	.116	.316**
Customer					1	.245**	.140	.155

Assessment(CA)								
Organizational Assessment(OA)						1	.192*	.231**
Leadership qualities(LQ)							1	.204*
Team Work(TW)								1

**=1% significant level

* =5% significant level

The interrelationship between TQM implementation criteria dimensions among the employees is examined with the help of Karl Pearson correlation coefficient and its respective significance. Regarding commitment by management the significant positive relationship is identified with employee's commitment, conducting training, improvements, customer assessment, organizational assessment, Leadership qualities and team work. Regarding employee's commitment the significant positive relationship is identified with conducting training, improvements, customer assessment, organizational assessment, Leadership qualities and team work. Regarding conducting training the significant positive relationship is identified with improvements, customer assessment, organizational assessment, Leadership qualities and team work. Regarding improvements the significant positive relationship is identified with customer assessment, organizational assessment and team work. Regarding customer assessment the significant positive relationship is identified with organizational assessment. Regarding organizational assessment the significant positive relationship is identified with Leadership qualities and team work.

IV. CONCLUSION

This study has identified eight important dimensions of TQM implementation these are: commitment by management, employee's commitment, conducting training, improvements, customer assessment, organizational assessment, Leadership qualities and team work. Regarding the views on the factors in TQM implementation the significant difference among the private and public firms has been identified in case of conducting training and organizational assessment. Since their respective t-statistics are significant 5% level. The study also identified that there is a significant relationship among the entire dimension. This study findings would help the management in formulating appropriate policy release to TQM implementation. This study considers only limited variables in future seven variables can be included to the study the TQM implementation.

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