

## Study on Variables Influencing the TQM Implementation in Construction Industries

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**Abstract-** The aim of this study is to discover the various dimensions of TQM implementation. This study was conducted in Tamil Nadu. The researchers adopted questionnaire method for collecting data from respondents. The questionnaire was developed and scattered to quality managers, site engineers. In particular the hypothesis was developed to exploring the influence of TQM implemented in construction industry. In the study eight dimensions of TQM implementation was emerged. These are: Customer Satisfaction factors, Organisational factors, Process improvement factors, Management involvement factors, Employee's concern factors, Supplier related factors, and Job related factors and TQM training factors. Among the eight identified dimensions supplier related factors, job related factors and TQM training factors was viewed as the most vital dimension and it has a positive impact on TQM implementation. This study has the potential to enhance the understanding of TQM practices implementation in construction industry. The significantly associating profile variables regarding the site engineers, supervisors, project managers, perception on TQM implementation at their construction industry are the Nature of Industry, Years of Establishment, Employees Working, Management Level, Annual Turn Over, Forms of organization and Types of buildings, since their respective "F-statistics" are significant at 5% level.

**Key words:** TQM, implementation, questionnaire method, dimensions.

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### I. INTRODUCTION

Now a day's globalize market, competition is becoming ever more passionate. Many firms are trying very hard not only to assure their customer's needs but where possible exceed them. This can only be achieved through cost minimisation, enhancement in manufactured goods performance, increased customer accomplishment and a constant attempt on the way to world class organizations. In order for companies to stay alive and grow in the upcoming, it is necessary that they deliver high quality manufactured products and services. Those that can deliver quality in goods and services to their customers are the ones that will show a profit in the next century (Ross1994). Many companies appreciate that TQM is necessary for them to remain aggressive in economical, retaining their promoting shares and to be able to respond to changing competitive stipulate in today commerce world. Depending on some studies (Ross 1994, Ghobahdian 1995, Ahire et al., 1996 and Gulbro et al., 2000), not at all companies are able to execute TQM effectively. This is because it requires a similar implementation of TQM approach to cater for the altering requirements of the industries in order for effective implementation. Whereas other industries have very much increased their levels of excellence and concert, the construction industry is still categorized by low efficiency, cost overruns, and poor quality, so should study from the experiences of the mechanized industry (Gallo et al., 2002, Forbes 2002, Egan 1998, Lema and Price 1995). Between a range of techniques, TQM is questionably the most significant in operations management over the last years, and it can positively have a force on most industries (Slack et al. 2004).

TQM implementations within the building industry, in spite of the achievement of the official program, can have some usual results. At worst, undertaking a quality-improvement

program will increase the understanding of quality concepts and boost general awareness of quality (Rosenfeld 1992). Further than the quality process improvements connected with successful TQM execution, other potential profits are a reduction of employee turnover, an improvement of employee morale, and positive client feedback (Predvall 1994). In adding together, employees are found to have increased self-confidence, improved announcement skills, and strengthened conflict-resolution techniques (Culp 1993).

## II.SURVEY BACKGROUND

Organization consciousness of the importance of total quality management, alongside business process reengineering and other permanent improvement techniques was enthused by the benchmarking association to seek study, implement and improve on best practices (Zairi and Youssef, 1995). The commitment to constant improvement traditionally originated in industrialized firms but extend quickly to the service sector (e.g. teller transactions in banks, order processing in catalogue firms, etc.). Moreover, to decide crucial factors of total quality organization, various studies have been carried out and dissimilar instruments were developed by personally researchers and institutions such as Malcolm Baldrige Award and Deming Prize Criteria. Depending on these studies, a large variety of management subject, techniques, approaches, and organized experimental examination have been generated.

Accordingly, Saraph *et al.* (1989) urbanized 78 items, which were categorised into eight important factors to compute the recital of total quality management in an organization. These important factors are responsibility of divisional top administration and excellence policy, responsibility of the excellence branch, preparation, manufactured goods and service plan, dealer value management, process organization, quality data and treatment, and employee associations.

Flynn *et al.* (1994) urbanized a different mechanism to establish critical factors of total quality management. Flynn *et al.* acknowledged seven value factors. These are top management sustain, quality in sequence, continuous process management, manufactured goods design, labour force management, contractor participation, and customer attachment. since it is seen, this mechanism is very comparable to the preceding mechanism that was urbanized by Saraph *et al.* (1989). Flynn *et al.* (1995) deliberate the force of total quality practices on eminence performance and economical benefit. In one more of note study, Anderson *et al.* (1994) urbanized the hypothetical foundation of quality organization practice by investigating Deming's 14 points. They condensed the numeral of concepts from 37 to 7 by means of the Delphi technique. These are creative leadership, inside and outside assistance, education, progression management, nonstop improvement, employee accomplishment, and customer fulfilment.

Black and Porter (1996) also acknowledged critical factors of the total quality management by means of the Malcolm Balridge Award criterion and investigated their strength by experimental means. They urbanized 32 substances, which were confidential into ten important factors. These factors are commercial quality culture, planned quality management, quality development dimension systems, people and customer management, operational quality planning, external interface management, dealer partnerships, collaboration structures, client satisfaction orientation, and announcement of improvement information. a diversity of authors have also assess the strength of Malcolm Balridge Award Criteria.

Ahire *et al.* (1996) urbanized twelve incorporated quality management construct through full analysis of invented story to decide critical factors of quality administration of organizations. They acknowledged twelve factors. These are supplier quality management, supplier performance, customer focus, statistical procedure control usage, benchmarking, interior quality information usage, worker participation, employee education, plan quality management, worker empowerment, manufactured goods quality, and top management promise.

## **A. Objectives**

This study is confined with the following objectives:

- To identify the important dimensions of TQM implementation in construction industry.
- To identify the significant association between demographic profile and their views on various dimension of TQM implementation.

## **B. Scope**

The scope of this knowledge is restricted only to the site supervisors, site engineers and Managers of the construction projects Tamil Nadu.

## **C. Period of the study**

This learning was conducted throughout the phase of August 2015 to February 2016.

## **D. 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.

## **E. Descriptive statistics**

The demographic profile in the questionnaire features 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 in that 250 out of 133 questionnaires could be collected. The response rate of the survey was 53.2 percent. 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.

## **F. 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 charge were incorporated existing questionnaire.

## **III ANALYSIS AND DISCUSSIONS**

### **A. 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 Customer Satisfaction factors, Organizational factors, Process improvement factors, Management involvement factors, Employees concern factors, Supplier related factors, and Job related factors and TQM training factors well above the criterion of 0.863 as recommended by Nunnally (1978) for assessing reliability of the scale.

*Tables 1. Reliability Statistics*

| Cronbach's Alpha | No of Items |
|------------------|-------------|
| .863             | 28          |

### **B. Determinants for a successful Total Quality Management implementation**

In order 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 0.764). Moreover; Bartlett's Sphericity test gave a significance level of 0.000. Hence, all assumptions for carrying out factor analysis are met. The extraction technique chosen was principle components and the rotated method was varimax.

*Table 2. KMO and Bartlett's Test*

|  |                    |          |
|--|--------------------|----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. |                    | 0.767    |
| Bartlett's Test of Sphericity                    | Approx. Chi-Square | 1083.981 |
|  | Df                 | 378      |
|  | Sig.               | 0.000    |

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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:

- Customer Satisfaction factors,
- Organisational factors,
- Process improvement factors,
- Management involvement factors,
- Employee's concern factors,
- Supplier related factors,
- Job related factors
- TQM training factors

*Table 3. Site engineers and project manager's perception on variables in TQM implementation*

| Factors                        | Mean score of Industries |       | t-statistics |
|--------------------------------|--------------------------|-------|--------------|
|                                | small                    | large |              |
| Customer Satisfaction factors  | 3.66                     | 3.57  | 0.805        |
| Organisational factors         | 3.71                     | 3.57  | 1.29         |
| Process improvement factors    | 3.66                     | 3.63  | .331         |
| Management involvement factors | 3.67                     | 3.70  | -.304        |
| Employees Concern factors      | 3.49                     | 3.39  | .824         |
| Supplier Related factors       | 3.82                     | 3.85  | -.304        |
| Job related factors            | 4.01                     | 4.07  | -.533        |
| TQM training factors           | 3.96                     | 3.97  | -.139        |

In order to identify the significant difference among small scale industries and large scale industries with regard to implementation of TQM t-statistics has been administered. The mean score of variables in TQM implementation among the small scale industries and large scale industries have been calculated individual along with its t-statistics. The highly viewed variables in TQM implementation among the small scale industries are Job related factors and TQM training factors. Since their mean score are 4.01 and 3.96 respectively. The highly viewed variables in TQM implementation among the large scale industries are Job related factors and TQM training factors. Since their mean score are 4.07 and 3.97 respectively. Regarding the perception on variables in TQM

implementation the significant difference between the two group's customers has been administered in Process improvement factors and Management involvement factors. Since their respective t-statistics are significant at 5% of level.

*Table 4. Association between profile of site engineer's, supervisor's, project managers and their perception on implementation of TQM*

| Profile Variables      | F- Statistics                |                        |                             |                                |                           |                          |                     |                      |
|------------------------|------------------------------|------------------------|-----------------------------|--------------------------------|---------------------------|--------------------------|---------------------|----------------------|
|                        | Customer Satisfaction Factor | Organisational Factors | Process Improvement Factors | Management Involvement Factors | Employees Concern Factors | Supplier Related Factors | Job Related Factors | TQM Training Factors |
| Nature of Industry     | 9.838*                       | 16.12                  | 13.729                      | 9.868                          | 8.765*                    | 17.854                   | 9.760               | 4.678*               |
| Years of Establishment | .354*                        | 2.18*                  | 1.141                       | .489*                          | 1.181                     | .773                     | .433                | .407                 |
| Employees Working      | .788                         | .647                   | .640*                       | .673                           | .516                      | 1.010*                   | .704                | 1.053*               |
| Management Level       | .789*                        | .615*                  | 1.014                       | 1.117*                         | .877                      | .668                     | .592                | .102                 |
| Annual Turn Over       | .825*                        | 1.411                  | 1.066                       | .768                           | .821*                     | 1.702                    | .445*               | .334                 |
| Forms of organization  | 1.215*                       | .569                   | .849                        | .495                           | .756                      | .504*                    | 1.679               | .693                 |
| Types of buildings     | .828                         | .732                   | 1.228*                      | .383                           | .934                      | 1.047                    | 1.98*               | .882                 |

\*= Significance at 5% level

Regarding the perception on Customer Satisfaction Factors the significantly associating profile variables are Nature of Industry, Years of Establishment, Management Level, Annual Turn Over and Forms of organization, seeing as their respective F-statistics are significant at 5% level. Regarding the awareness on Organisational Factors the appreciably associating profile variables are Years of Establishment and Management Level, since their respective F-statistics are significant at 5% level. Regarding the perception on Process Improvement Factors the significantly associating profile variables are Types of buildings and Employees Working, since their respectively F-statistics are significant at 5% level. Regarding perception on Management Involvement Factors the significantly associating profile variables are Years of Establishment and Management Level, since their respective F-statistics are significant at 5% level. Regarding the perception on Employees Concern Factors the significantly associating profile variables are Nature of Industry and Annual Turn Over, since their respective F-statistics are significant at 5% level. Regarding perception on Supplier Related Factors the significantly associating profile variables are Employees Working and Forms of organization, since their respective F-statistics are significant at 5% level. Regarding perception on Job Related Factors the significantly associating profile variables are Types of buildings and Annual Turn Over, since their respective F-statistics are significant at 5% level. Regarding perception on TQM Training Factors the significantly associating profile variables are Nature of Industry and Employees Working, since their respective F-statistics are significant at 5% level.

#### IV CONCLUSION

In the study, eight dimensions of TQM implementation in construction industry emerged. These are namely Customer Satisfaction factors, Organizational factors, Process improvement factors, Management involvement factors, Employees concern factors, Supplier related factors, and

Job related factors and TQM training factors. The significantly associating profile variables regarding the site engineers, supervisors, project managers, perception on TQM implementation at their construction industry are the Nature of Industry, Years of Establishment, Employees Working, Management Level, Annual Turn Over, Forms of organization and Types of buildings, since their respective “F-statistics” are significant at 5% level.

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