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Identification of Obstacles in Implementation of Total Quality Management (Tqm) In Building Construction Industry in India –An Empirical Study

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Abstract. ***The purpose of this paper is to discuss the findings on obstacles associated with TQM implementation in building construction industry in India. The construction industry is the lifeline for a nation and building structures reflect the health of economy of a country. Building construction is a component of human endeavour towards improvement of the quality of life. Construction of dwelling units provides one of the basic needs of the citizens of the country and construction of buildings/structures strengthens the infrastructure for development. The quality management issues are becoming a necessity in the Indian context. The quality movement in India has undergone healthy changes from time to time. Though the performance of building construction industry is improving steadily, but it is still long way to go. There are not many research studies available on implementation of Total Quality Management (TQM) in building construction that could find out the reason for the poor performance of Indian building construction industry. This study is exploratory in nature and perhaps one of the few studies which has identified major obstacles for successful implementation of TQM and improving the performance of the construction industry in India. A questionnaire survey was conducted among the building construction firms to determine the major obstacles in the implementation of TQM in building construction industry. These obstacles were ranked by using SPSS software package. A higher mean rating implies a more significant barrier to TQM implementation in the building construction industry. If construction companies are aware of these obstacles in the implementation of TQM , they may accordingly prepare themselves to meet and address these challenges thus making the process of implementation of TQM smoother and faster for improving the quality of construction.***

Index Terms: Buildings, Construction firms, Obstacles, TQM.

I. INTRODUCTION

Originally TQM was implemented in the manufacturing industry. Generally it is believed that TQM cannot be implemented in the construction industry as it is unique in many ways like mobility of labour, diversity in the construction of projects, dependence on weather etc. In late 1970's , Japanese construction firms and in the late 1980's, U.S companies introduced TQM in the construction industry. However, the construction industry faces many problems such as time and cost in the implementation of TQM. Strange and Vaughan [1] pointed out that the construction leaders believe that due to the following five "can'ts" , TQM can not be implemented in the construction industry:

1. Industrial management solutions can not be applied to construction, because of the unique nature of the construction industry.
2. Statistical analysis can not be done for construction processes, because they are unique and non-repetitive.
3. Invest in training at the job level can not be done much , because individual employment is short-term, the people have no company loyalty and the environment is too difficult.
4. Money can not be spent on management training programmes, because there is too much competition and the margins won't allow it.
5. Much time can not be spared for organising the seminars/conferences, retreats or symposia.

As the construction industry is continuing age old practice of selecting the construction firms mainly on the lowest bid rather than experience or reputation for quality, it is the biggest hurdle in the implementation of TQM. So the construction firms give less importance to adoption of TQM principles.

II. RESEARCH METHODOLOGY

The study is analytical and empirical in nature, based mainly on primary data.

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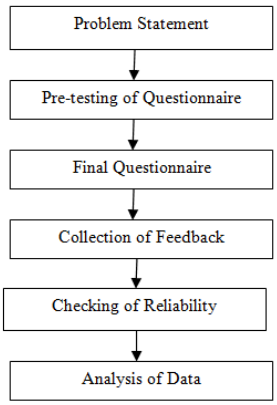
To collect the primary data regarding the obstacles in the implementation of TQM in building construction industry, a specially structured pre-tested questionnaire was used. A pretesting of the questionnaire was done on a representative sample of the building construction industry to check the effectiveness and relevance of the questions. The four building construction firms constituted the pilot test. Some comments and suggestions were received during this pilot test and these were used to refine the questionnaire. The suggestions of senior executives of construction industry and academicians were incorporated
and the questionnaire was revised. Then feedback was collected by distributing this structured questionnaire to various building construction firms in the northern states of India and the response rate was 72%**.** The respondents were asked the main obstacles in adopting TQM in their companies. They were required to rate the implementation barrier statements on basis of their agreement/disagreement about their organization using a five point scale (1= Strongly disagree,2=disagree,3=neutral, 4=agree,5= strongly agree).
A higher mean rating implies a more significant barrier to TQM implementation in the building construction industry. This methodology has been explained in the following flowchart:



III. RESULT ANALYSIS OF OBSTACLES IN THE IMPLEMENTATION OF TQM IN BUILDING CONSTRUCTION INDUSTRY

In this section, data analysis of main obstacles in the implementation of TQM in building construction industry are discussed in Indian context**.**

RELIABILITY: Chronbach's alpha is used to check the reliability of the instrument. Reliability of the instrument shows the degree of consistency or repeatability of the measurement. The reliability analysis was conducted on the questionnaire instrument. The reliability of questionnaire regarding this item was tested and is shown in the following table 1

Table 1 Reliability Statistics

S.No.	Chronbach Alpha	No of Items
1	0.933	12

The closer of Cronbach's alpha coefficient to 1, the highest the internal consistency of a dimension is, while generally values higher than 0.7 is regarded as satisfactory. Clearly, a crucial aspect of the feedback methodology was the development of a questionnaire. This shows that instrument is reliable to check the obstacles faced during TQM implementation.
The following null hypothesis was formed to find out the importance of obstacles in the implementation of TQM in the building construction industry
H0: The obstacles in the implementation of TQM from 1 to 12 have mean equal or less than 3.
H1: The obstacles in the implementation of TQM from 1 to 12 have mean greater than 3.

In table 2, the mean and standard deviation values worked out by using SPSS software package for each of the items in the questionnaire are given. If the mean is higher, the importance of the obstacle is greater. These obstacles are "There are inadequate resources to effectively employ TQM" and "The workforce is resistant to change" as the most significant obstacles of TQM. Hence, the mean of these two factors is highest say 3.69 and 3.56, respectively. For construction engineers/managers, these two items appear to be of great importance.

Table 2 Ranking of obstacles faced during TQM implementation

S. No.	Item	Mean	Std. Dev.	Rank
1.	Top management is not visibly and explicitly committed to quality	3.03	1.158	12
2.	The workforce is not visibly and explicitly committed to quality	3.39	.838	4

3.	There are inadequate resources to effectively employ TQM	3.69	1.167	1
4.	Managers don't fully understand TQM	3.19	1.037	9
5.	Time constraints prohibit effective TQM implementation	3.19	1.117	8
6.	There are excess layers of management	3.17	1.298	10
7.	There is lack of customer focus	3.08	1.079	11
8.	The strategic plan is not customer driven	3.19	1.117	7
9.	There is lack of statistical process awareness	3.28	.974	6
10.	Quality is not everyone's responsibility	3.33	1.434	5
11.	Employees are resistant to change	3.56	1.081	2
12.	Employees and/or teams are not rewarded and recognized for achievements in quality improvement	3.44	1.229	3

The above analysis shows that obstacles in the implementation of TQM have mean greater than 3, so the null hypothesis is rejected. Identification of the obstacles in the implementation of TQM is a first step in effective implementation of TQM. These findings suggest that one of the major obstacles is inadequate resources to effectively employ TQM. Another group of obstacles is related to human resources management and development. The obstacles that belong to this group are given in table 2 at Sr. No.:

2. The workforce is not visibly and explicitly committed to quality.

11. Employees are resistant to change.

12. Employees and/or teams are not rewarded and recognized for achievements in quality improvement.

Third group is related to **top management and commitment**. The obstacles that belong to this group are given in table 2 at Sr. No.

1. Top management is not visibly and explicitly committed to quality.

6. There are excess layers of management

10. Quality is not everyone's responsibility.

There are also some major problems related to **lack of strategic planning** and **lack of knowledge about TQM.**

IV. DISCUSSION ON DATA ANALYSIS

Now we will discuss these five major group of obstacles one by one:

4.1 LACK OF RESOURCES:

The findings indicate that lack of resources is one of major obstacles to TQM implementation in building construction firms in India. The success of TQM depends on the resources used to carry out the implementation. For quality improvement, the building construction firms need to plan its internal and external resources efficiently. The most critical resources include money for training of employees, purchase of equipment, , data collection and analysis, time for meetings etc. Resources are required to implement and maintain quality of products and services, enhance customer satisfaction by meeting their requirements at all times. The construction organizations require additional resources for identifying competence needs and trainings to be provided to all such personnel whose activities effect quality. Normally, the workload of staff increases due to additional practices for the implementation of TQM. Huge funds are required for the specific and latest training of the staff so that they can perform the task assigned to them for the improvement of quality of building construction. Companies also require resources for the deployment of latest technical equipments. Resources are required to provide, review and maintain the infrastructure needed to achieve conformity to improvement of building construction and services. Infrastructure includes building, workspace, associated utilities such as power, water, process equipment(hardware and software) and supporting services such as transportation, communication, information processing systems, material handling equipment maintenance as applicable to the construction company. Building construction firms need to create necessary work environment with a view to achieve conformity with product requirements.

Therefore, additional resources are vital for implementing an effective TQM in any building construction firm.

4.2 HUMAN RESOURCES MANAGEMENT AND DEVELOPMENT:

A building construction firm's success depends upon the knowledge, creativity and motivation and skills of its human resources. Valuing them means committing to their satisfaction, well-being and development. Increasingly, this involves more flexible, high performance work practices tailored to employee's home life needs. Major challenges in the management of employees include:

i) Leader's commitment to employees' success

ii) Recognition of their work

iii) Development and progression of employees within the building construction firms

iv) Sharing of knowledge so that employees can serve better.

Moreover, management must motivate and train each employee to work for the goals of the construction organization. Therefore, each human resource has to be looked at, coached, motivated and enabled to be a performer. Sometimes politics also arise from the existence of different interests and perceptions among different group in the same construction organization. This organizational politics sometimes become hurdle to implementation of total quality management. Due to different interests, the decision making process is difficult and time consuming. In this scenario, TQM implementation becomes difficult. Therefore, management should create such an environment that potential of each human resource is fully developed and utilized. So HRD managers should make annual training plan for the employees. Each training plan should be evaluated for its effectiveness. The training of employees is a prerequisite for the successful implementation of TQM in any building construction firm.

4.3 TOP MANAGEMENT AND COMMITMENT:

Everyone is responsible for quality, especially top management. Top management has many responsibilities. Senior management should get out of the office and visit customers, departments/sections within the construction organization and various projects sites. This way, they will know what is happening with a particular customer, supplier and construction project. They should make their employees to think for themselves. Senior management's role is no longer to take final decision but to involve the whole team in decision making to the lowest level by delegating authority and responsibility aligned with quality policy of the construction organization. Senior managers/engineers must remain informed on the topic of quality improvement by reading books, attending seminars etc. They must provide the required resources to train their employees in the TQM tools and techniques. They must participate in the celebrations of success of their construction organization's quality efforts. They should play an active role to create awareness of the importance of TQM .They should drive out fear, breakdown barriers, minimize resistance to change and in general, change the construction organization culture. Only with involvement of top management, TQM can be a success. Management must have the capacity and willingness and commitment to introduce and support the TQM process if it is to succeed. The pivotal role of top management for quality improvement programs is embodied in the working definition of Haupt and Whiteman [2] of TQM for construction firms which states that:

"TQM is a continuous process whereby the top management of construction firms take whatever steps are necessary to enable everyone in the organization, especially construction field supervisors and construction workers in the course of executing all their activities on construction sites to establish and achieve standards, which include completion on time, within budget, to optimum quality standards, and without loss of life or limb, and exceed the needs and expectations of their clients, both internal and external."

Further, commitment is an essential element of TQM drive. Commitment must exist at every level. It is duty and responsibility of everyone that TQM works. Commitment is reflected by doing what you say, involving employees, doing right thing right first time and always and leading by example. Mostly employees resist for change as they crave for stability and security. Once they learn a job they do not want to do things differently. Managers who adopt a 'change drive' will succeed. If the management team fails to come up with a structured approach to TQM it will fail. Mostly TQM initiatives fail because they do not have the support of top management. Commitment is the foundation of effective TQM initiatives. Sometimes management fail to understand the level of commitment required for the working of TQM.

The role of top management and commitment can be summarized in the following words "The obvious barrier in the effective implementation of TQM in the building construction industry is the lack of complete top management commitment from start, and as a consequence, some of the other senior management also do not particularly support the process".

4.4 LACK OF STRATEGIC PLANNING:

The planning is an important activity in any construction organization. A prerequisite for establishing TQM in any building construction firm is the need for careful planning. The logical sequence Plan-Act-Review is often replaced by Act-Review-Correct Plan. Any attempt to implement TQM without systematic planning will have disastrous results. The building construction companies that lack a formal long-term "strategic plan" can experience delays in the completion of the quality construction project. There should be planning workshop of all senior construction managers where SWOT analysis of the building construction company may be done. The planning generally comprises four elements: objectives, targets, goals and performance measures.

The planning includes long term plan, annual plan, daily plan and implementation plan. This finishes with regular reviews of the progress. Special care is needed in the implementation as it is the most crucial and difficult portion of the planning. Often a senior manager can have implementation plan. Progress should be checked by reviewing the milestones. There may be
problems or things may be on the track. Any deviation from targets should be analysed and corrected. All this is possible if each step is planned otherwise confusion will arise and failures will ring the death-knell for any improvement envisaged from the implementation of TQM in any building construction company.

4.5 LACK OF KNOWLEDGE ABOUT TQM:

Many researchers [3-10] have highlighted the importance of TQM for the construction industry. Total quality management practices are often complex and hard to introduce without the assistance of the employees or consultants with prior experience of these practices. Building construction firms learn from the experiences (good and bad) of other firms experimenting with different practices, so not all will adopt immediately. Moreover, for the implementation of TQM, qualified personnel are required. Generally, it is very difficult to find an expert who can help in the implementation of TQM in construction company. These consultants charge very high fees. Then due to lack of financial resources, paying them salaries becomes an additional challenge/problem. These fees can not be paid over a long period of time. Then the maintenance of TQM practices has to be done by the internal people who are ignorant about all the complexities So lack of knowledge about TQM is a very big hurdle in the implementation of TQM in any construction company.

V. CONCLUSIONS

Growing number of construction companies who are implementing TQM shows increased acceptance of its importance. However, the construction industry faces many obstacles in the implementation of TQM . The construction industry can overcome these obstacles. A few construction companies already have it. It requires hard work and patience. These companies must realize that today's level of performance/quality will not be acceptable tomorrow. The major barriers for implementing TQM in building construction companies were found to be lack of resources, people attitudes and lack of top level commitment. The barriers identified in this study can be of great help to building construction managers while implementing TQM in their construction organizations. Although for different construction organisations, the intensity of these barriers may be different, but they exist in every construction organization. So for attainment of higher efficiency, the building construction industry must understand these barriers and allocate resources for the quality of their building construction. A company that will allocate more resources on quality improvement than its competitors will not only survive but also will prosper in the challenging times.

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