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Identification of Critical Factors for the Implementation of TQM in Building Construction Industry

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Abstract: TQM cannot be implemented successfully without different techniques of quality management. These techniques consist of a set of tools and practices, which are derived from various critical factors and are the basic elements required to implement such factors. In this paper, these critical factors are discussed which effect the implementation of tqm in construction industry. These critical factors have been stressed upon by many researchers and quality gurus.
Keywords: TQM, Critical Success Factors

I. INTRODUCTION

Construction Industry is the prime activity of the country. It can well be said that it is a barometer of the prosperity of the country. The more prosperous the country is, the more active construction industry is. It is a capital-intensive industry. It is the backbone of socio-economic development with 30 million workforces and a huge fleet of matching machines and equipment. The demand for high quality buildings is growing in India. A number of social factors such as cost of construction, lack of time. quality of buildings etc, are pushing the construction industry towards industrialization. Consumers increasingly want their buildings to be built to the highest standard of quality. Therefore, construction industry should switch over to advanced techniques of management called TQM.

The survey of literature shows that although there is plethora of research on identifying critical success factors of TQM, but few research studies show that only a handful of studies are devoted to ranking of these factors. To prioritize the relative importance of critical success factors for implementation of TQM in building construction industry, the findings suggest that soft factors like top management commitment, leadership, customer satisfaction are more important than the hard factors like tools and techniques. Hellsten et al. (2000) stressed that TQM should be looked upon as a system. In order to form a whole, methodologies and parameters should support the chosen values. TQM parameters provide practical dimensions for problem solving and continuous improvement process. TQM parameters can help to "unlock creativity, encourage participation, capture objective data, document processes, measure performance, and analyze causes and effects. Literature review presented the wide variety of TQM practices, or elements as critical success factors (CSFs), which were used for formulating TQM implementation frameworks by the authors of empirical studies. Interestingly, more than 50 TQM CSFs have been highlighted from reviewing these studies, although they had different names and labels but their descriptions were similar. Thus, the content of extracted CSFs analyzed one by one carefully, and then TQM CSFs with similar concept identified and classified within a certain group under a title, for example, top management commitment, leadership, management support, executive commitment, senior executive involvement, quality leadership, top management involvement, top executive support were categorized under a label (Leadership). Consequently, based on this process, about 20 main factors were highlighted and indicated as TQM critical success factors (CSFs) of these empirical studies and there is no similarity between the content of each of these 20 TQM CSFs and others. There are numerous parameters, which are used in TQM.

II. IMPORTANT PARAMETERS OF TQM

A survey was conducted for 36 companies to identify the most important critical success factor of TQM in construction industry. A list of important parameters was prepared from literature and the organisations were asked to indicate on 5 point scale how important the parameter is (1-least important to 5-most important).

The reliability analysis was conducted on the questionnaire instrument. The reliability of the questionnaire regarding this item was tested and it is shown in the following table

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Table 1 Reliability Statistics

S.No	Chronbach Alpha	No of Items
1	.883	20

The following null hypothesis was formed to find out importance of different critical success factors
H1: The critical success factors of TQM from 1 to 20 have mean equal or less than 3.

Table 2 Ranking of Critical Success Factors

S.No	Item	Mean	Std.Deviation	Rank
1	Customer focus and satisfaction	4.75	0.439	1
2	Continuous improvement-Kaizen	4.44	.735	3
3	Quality Circles	4.25	0.866	8
4	Team work	4.22	0.637	9
5	Total Employees Involvement and empowerment	4.28	0.701	7
6	Just in Time	3.92	0.874	13
7	Benchmarking	4.00	0.774	12
8	Education and Training	4.39	0.549	5
9	Statistical Process Control	4.11	0.785	10
10	Recognition and Rewards	3.44	1.157	19
11	Leadership and commitment	4.47	0.736	2
12	Right First Time	3.81	0.822	15
13	Lean Construction	3.25	1.105	20
14	Total Preventive Maintenance	3.56	1.081	18
15	Vendor Development	4.31	0.577	6
16	Quality Management Systems	4.03	0.774	11
17	Organisation Structure	3.78	0.797	16
18	Process Improvement	4.42	0.695	4
19	Waste Minimization	3.89	.820	14
20	Inventory Minimization	3.75	.866	17

The above analysis shows that all critical success factors have mean greater than 3, so the hypothesis is rejected. The literature also indicates the above critical sucesss factors for adoption of initiatives.This research has identified seven critical success factors for the implementation of TQM in building construction industry.
These factors are listed as per their ranking and briefly described as below:

A. Customer focus and Satisfaction:

Customer focus and satisfaction is ranked very high (No 1).The foremost duty of every organisation is to satisfy its customers. In new market Economy " the customer is the king". The main purpose of TQM is not only to satisfy the needs of the customer but to provide him more than his expectations. It is well said that an organisation may not need financial pundits to tell how to run business as it is the customer who will tell this to the organisation. Business can survive only with delighted customers. Attracting customers is very tough. Losing them can be devastating. As TQM is a management philosophy in which the needs of the customer are of vital importance and therefore such a framework, environment and culture is to be developed such that those needs are provided at the lowest possible cost with high quality. Thus quality of construction must be maintained at each stage and thereby costly rework as well as other costs are minimized so that the quality of the final product satisfy the customer. Therefore a company must understand the requirements of customer and most importantly their complaints must be redressed. Every organisation must do customer need analysis and efforts should be made to find the gaps between what is expected and what is delivered.

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B. Leadership and Commitment

Leadership and Commitment is ranked at No 2 .There is no universal definition and many books have devoted to this topic differently. A leader is a one who instils purposes, not one who controls by force. A leader strengthens and inspires the followers to accomplish shared goals. Following are some of the main characteristics of a good leader:

1) Leaders shape the organizations values.
2) They give priority to external and internal customers and their needs
3) They empower rather than control the subordinates.
4) They emphasize improvement rather than maintenance.
5) They emphasize prevention rather than detection.
6) They train and coach rather than direct and supervise.
7) They recognize and encourage team efforts.
8) They continuously try to improve communication with their workers.
9) They learn from their problems.
10) They choose suppliers on the basis of quality not price.

For the success of any TQM programme, leadership and management commitment is very important. For the success of TQM, management should have a thorough understanding of TQM and should be committed to TQM. It must be coupled with leadership and support. If management is committed to TQM, then resources of time and money will be provided for improvement of quality. Top management, in the form of a Quality Committee, should draft a mission statement and vision statement which summarizes the philosophy of organization for comprehensive quality goal setting with stress upon quality and customer satisfaction.

C. Continuous Improvement (Kaizen)

Continuous improvement is ranked at No 3.Kaizen is a Japanese term to describe a continuous improvement. Improvement may be either small yet constant steps of progress or one drastic step is taken periodically. The aim is to achieve continuous improvement in costs, quality, flexibility and productivity. One of the characteristics of kaizen is that the improvements result in lower costs certainly much lower than other techniques such as process re-engineering. It is a commitment, continuous quality improvement. Kaizen means an ongoing improvement which involves every one in the organisation i.e. top, middle managers, supervisors and workers. It does not require sophisticated technology or huge investment. It nurtures small and ongoing change.

The components of continuous improvement are learning the appropriate processes, tools, and skills and practicing these skills on small achievable projects. The process for continuous improvement, first advanced many years ago by Deming, is Plan-Do-Check-Act (PDCA), a never-ending cycle of improvement that occurs in all phases of the organization.

D. Process Improvement

Role of process improvement is ranked at No 4. Continuous improvement has a mutual relationship with process improvement. In some literature, process improvement is referred to as statistical methods or Statistical Process Control (SPC) because measurement and analysis of data are very important for process improvement. The role of data is very important for both management and employees to take better decisions for the improvement of process.

Every organization must form a quality improvement team to examine the processes. This team should consist of a representative from each area that is involved in the process to identify and separate causes/problems of quality and suggest solutions. Then the best solution should be selected for TQM implementation. Then performance should be evaluated and it should be decided whether further action is required or not.

E. Education And Training

Education and training is low ranked critical success factor, ranked at number 5. There is a Japanese axiom that, “quality begins with training and ends with training” . Under TQM, quality becomes everyone’s responsibility and the training plan must be targeted for every level of the company. There should be customized training plans for management, engineer, technicians, support personnel and field labour. Education and training both are to be provided in TQM organisations. Education is learning of concepts for the purpose of knowledge whereas training is to do. TQM needs both as education is to know and training is proficiency in his/her work. These are needed to continually improve the quality of products and services which are delivered to the customers. This provides employees with a fundamental knowledge that can be linked to the instructions of the more technical topics. It is sometimes argued that the transient (or seasonal) construction work force is quite different from the relatively stable manufacturing work force. This transient nature may make it more difficult to train workers, particularly craft labour for the construction industry.

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However, many construction companies have started investing in training and education of their manpower at different levels. Although it is expensive but it is essential for the workforce to keep them updated. It gives significant results in terms of quality construction.

F. Vendor Development (Supplier Involvement)

Vendor development is at No 6. The concept of continually improving work processes is one of the fundamentle principle of TQM. Both the cotractors and suppliers have the same goal—to satisfy the end user. The better the supplier's quality, the better supplier's long term position because the customer will have better quality. As both have limited resources, they must work together as parteners to maximise the return in investment.

There are many forces which effect supplier relations. One of them is price. The Deming's 14 points stresses that companies must stop awarding businees based on low bidder because price has no basis without quality. Another force effecting suppliers relation is the introduction of just in time concept that is raw materials and components should reach the site in small quantities when required and not before.To be sucessful JIT requires exceptional quality and reduced setup times. In fact, true parternership exists with long term commitment,trust and shared vision.It should be family time relationship where each party has identity and independence.

G. Total Employees Involvement and Empowerment

Total employees involvement and empowerment is ranked at No 7. Total employees involvement is the backbone of TQM Implementation. An effective TQM implementation requires the involvement of each and every person. Employees involvement is a process to empower members of organization to take the decisions and solve problems. This process involves delegating power, knowledge and information to lower levels of the organization . Worth of each employee should never be underestimated. Empowerment encourages people to become the managers of their work activities. This is about removing barriers in the organisation which constraints performance and potential of employees. Of late, companies have realized the importance of employees' brainpower and they make use of it by partnering them in decision taking. Involvement is most effective if the employees are told their responsibilities and expectations from them. They are given training and information to maintain standards of quality. They are guided as well as treated with dignity and respect. Sometimes they may fail but are counselled in case of need.

III. CONCLUSIONS

The main objective of this paper is to identify the important parameters of TQM which facilitate the application of TQM in building construction industry. Identification of the critical success factors essential for the philosophy of TQM is a first step in effective implementation of TQM. This paper has identified seven critical success factors for the implementation of TQM in building construction industry. These factors are: customer focus, total employees involvement and empowerment**,** top management commitment, continuous improvement, process improvement, suppliers development, education and training. Also, these factors are somewhat similar to those identified by various researchers all over the world. Still factors like use of award and recognition, quality circles have been included in very less number of studies. These factors provide a framework for organizations that are implementing TQM. The increasing interest in the TQM philosophy has grown due to a changing business climate. Increased foreign and domestic competition, as well as increased public awareness and expectations regarding quality have forced private corporations and government agencies to increase the value for money of their product or service to remain competitive or, in the case of government, retain the goodwill of taxpayers.

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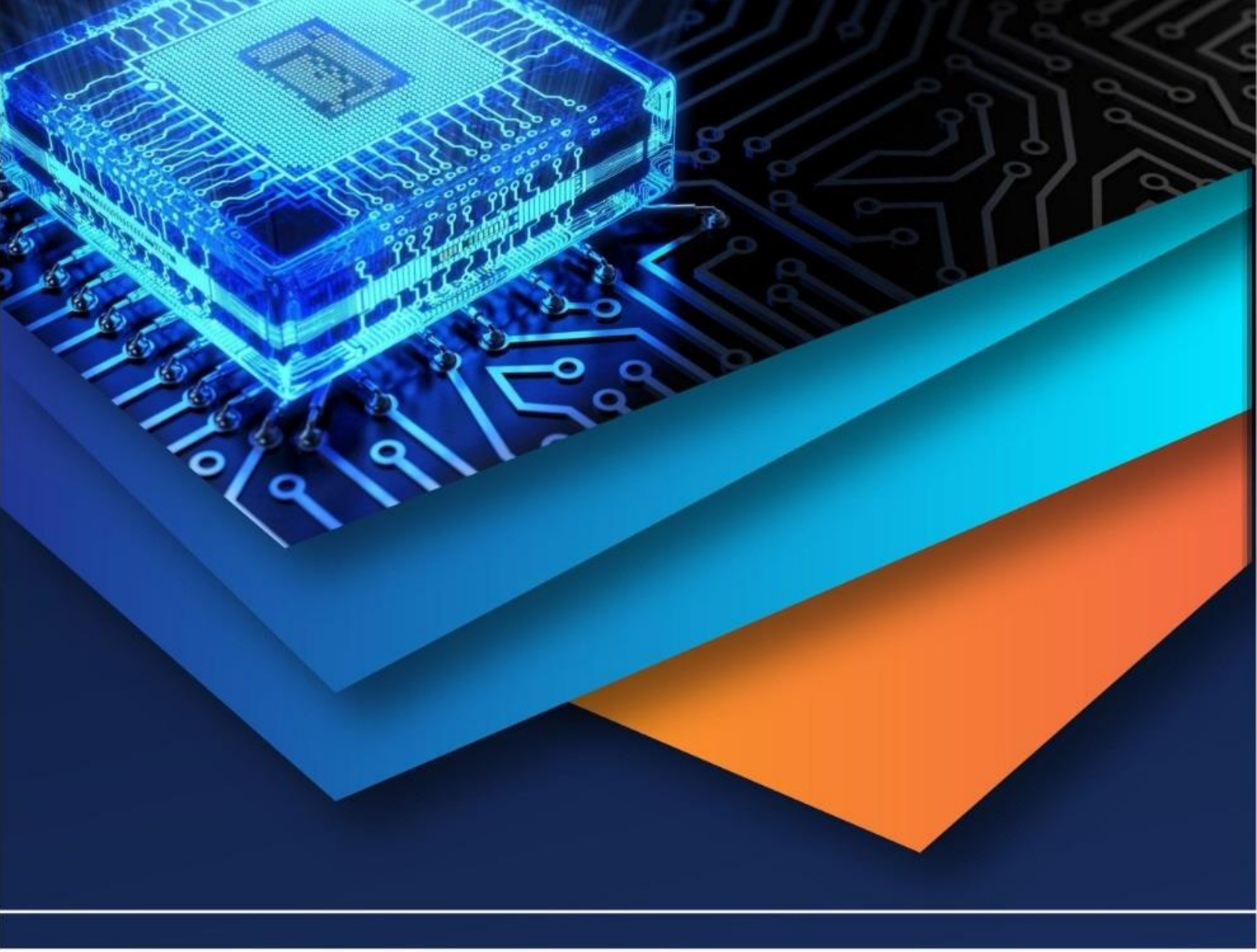

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