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“Factors Affecting Total Quality management in construction”

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Abstract : Construction industry is considered as one of the most important industries in India. Every of the largest construction companies are facing problems today and also bidding is strategic decision that helps contractor’s firm to survive. Conventionally, bidding management are highly unstructured in construction companies. During the tendering process for most major construction contracts there is the opportunity for bidders to suggest alternative innovative solutions. Clearly clients are keen to take advantages of these opportunities and equally contractors want to use their expertise to establish competitive advantages. This paper identifies the factors affecting total quality management in construction. After the validation from the experts’ 25 major factors was sorted out for the study. In this research questionnaires’ survey has been conducted by the physical interview and circulating google form. The questionnaire format created for get frequency and the fact of being severe (severity) to analysis and was distributed to 90 respondents in Ahmedabad that had good experience and keen knowledge tendering in either privet sector or government sector. Frequency analysis technique was adopted for ranking the most critical factors top 10 factors. The finding of this study shows a level of agreement among all contractors about the critical factors. The finding would benefit contractors and subcontractors by increasing their understanding of the major factors affecting the bidding strategy.

IndexTerms – Total Quality Management In construction, Factors, Construction Projects, Frequency index method, Questionnaire survey

I. INTRODUCTION

II. Poor building industry management led to both human and monetary losses for Indian society and the economy. The main goal of TQM is to create superior customer satisfaction through ongoing product and process improvement with the full commitment of every person involved in the production of that product. When compared to agriculture, India's construction industry ranks as the second largest employer. One of the most dangerous sectors in the world is the civil engineering construction sector. By keeping quality records properly up to date, holding regular meetings, and upgrading lab facilities to test materials and measure standards in accordance with Indian standards, we can greatly increase the success of construction projects while also enhancing the industry's ability to communicate, inspect, and test for customer satisfaction. Both the literature review and this conclusion are supported. One of the most dangerous fields of employment is civil engineering's realm of construction. the standards in accordance with Indian standards in order to enhance the industry's level of communication, inspection, and testing to quality control.

III. OBJECTIVES

- To identify factors total quality management in construction.
- To evaluate most important factors total quality management.

IV. RESEARCH METHODOLOGY :

1) LITERATURE REVIEW:

Literature review was done from previously published research paper on this topic from various international journals to know the previous work done on this type projects.

2) DATA COLLECTION:

Data collection done by questionnaire survey after identification of various factors from literatures and opinions of experts. Questionnaire will be prepared for the construction professionals in construction companies, consultancies for identify their views on factors affecting total quality management in construction.

3) DATA ANALYSIS:

Data analysis done on how respondent's respondents rate the questions by the various parameters based on their own experience and knowledge.

V. LITERATURE REVIEW

(David Arditi and H Murat Gunaydin) This review investigated at overall quality control in building. gathered through the use of four questionnaires sent to American clients and contractors. This technique is RII approach. conclude Most contractors agree that TQM is a philosophy that helps with budgeting and warranty. claims.

(Kiruthiga, April - June 2016) This paper's goal is to investigate the most important and critical problem that will hinder the successful implementation of total quality management. In this paper, a quantitative study was used as the data analysis technique. In addition, TQM implementation is the primary cause of the majority of the affected projects. The construction industry in India was the primary focus of this study's consideration of the factors influencing TQM implementation. Studies from the past have been done to comprehend the TQM idea.

(Suwandeja N. , 05-07 February 2015) This variable study's goal was to look into the aspects that affect whole quality management. In order to develop an appropriate are complete quality management model for the sub-district municipality, this study set out to look into the variables for total quality management modelling for a sub-district municipality. The qualitative method was used in this study's usage of in-depth interviews. The leaders from the sub-district municipality office served as the respondents in this factor analysis method. the goal of service and product upgrades is to ensure the organization's survival in a cutthroat market.

VI. METHODOLOGY

5.1 DATA COLLECTION : Likert scale was adopted for rating the framed question according to the parameters. Qualitative data collection method was also adopted to have better understanding on total quality management related to the success rate. Around questionnaire would be filled up by respective stakeholders for the desire solution matrix.

5.1.1 GENERAL :

- Data collection, which may be divided into two categories, quantitative approach and qualitative approach, generally refers to a plan of action that allows the objectives of the study to be questioned.
- Qualitative and quantitative approaches are the two categories into which the information received is split in order to create a plan that can be reviewed in order to accomplish the study goal
- The less systematic research method known as a qualitative survey is used to gather information about people's innermost thoughts and sources of inspiration

5.1.2 SURVEY PLANNING :

The Survey are sent through email and online platform is used for data collection work. The main goal is gathered information of factors affecting total quality management performance in high rise building.

5.1.3 QUESTIONNAIRE DESIGN :

To obtain the opinions of diverse respondents in the construction business, questionnaire surveys were undertaken. The results of the survey are utilised to enhance the capabilities of construction MSMEs.

1	2	3	4	5
Strongly Agree	Agree	Natural	Dis agree	Strongly dis agree

Table 1. Liker Scale

5.1.4 DETERMINATION OF QUESTIONNAIRE & SAMPLE SIZE DETERMINATION :

Several Owners, Engineers, Partners, and Project Managers received the questionnaire after being informed of the study's goals and having their agreement to participate in the study sought. Once the respondents in Ahmedabad demonstrated their initial consent. Calculator.net is used to determine the sample size. Here 98% confidence level is taken.

e is the sampling error to be estimated is 12%

Sample Size Calculator

Find Out The Sample Size

This calculator computes the minimum number of necessary samples to meet the desired statistical constraints.

Result

Sample size: **543**

This means 543 or more measurements/surveys are needed to have a confidence level of 98% that the real value is within $\pm 5\%$ of the measured/surveyed value.

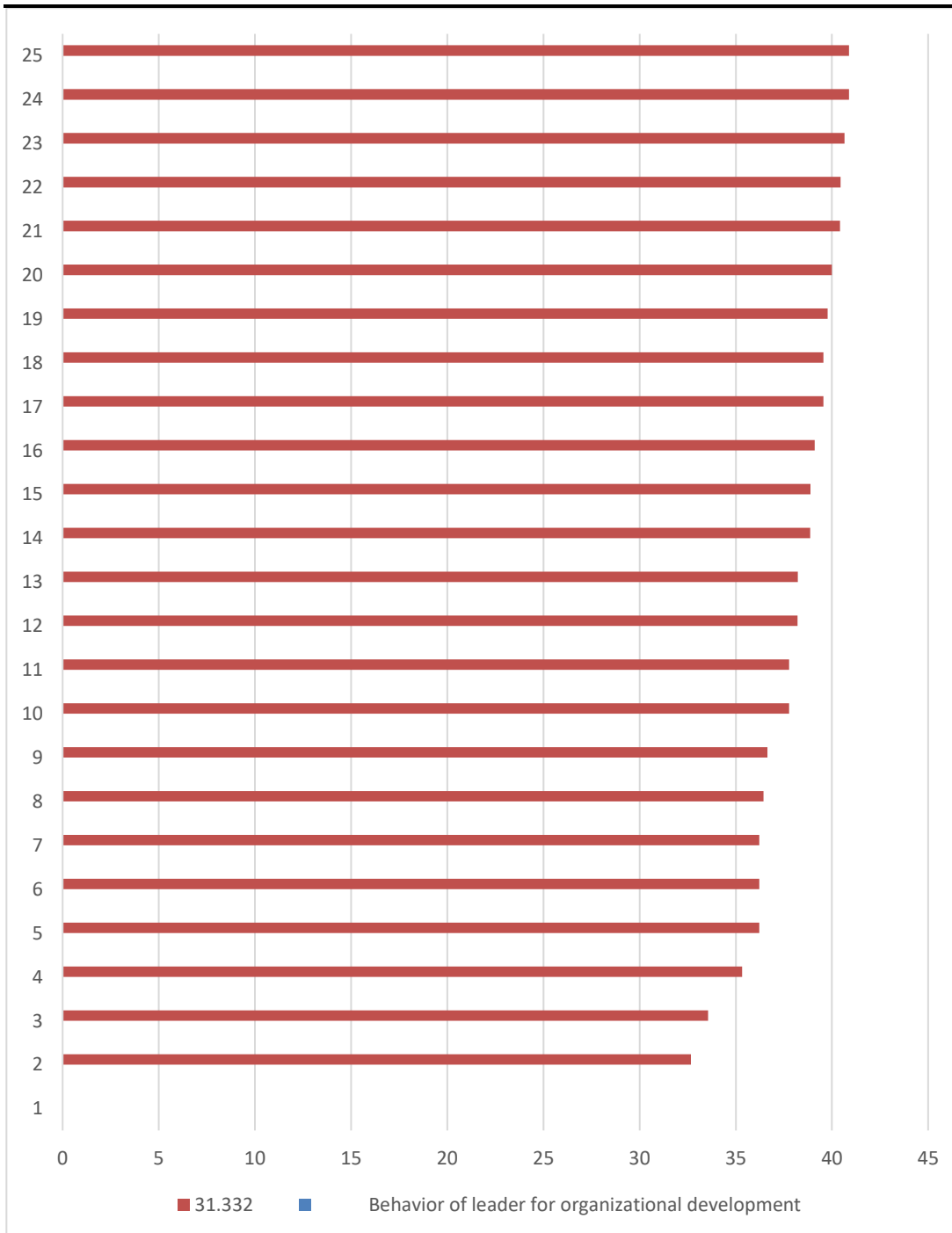
Confidence Level: <input type="text" value="98%"/>	<input type="text" value="5%"/>
Margin of Error: <input type="text" value="5%"/>	<input type="text" value="50%"/>
Population Proportion: <input type="text" value="50%"/>	Use 50% if not sure
Population Size: <input type="text"/>	Leave blank if unlimited population size.
<input type="button" value="Calculate"/>	<input type="button" value="Clear"/>

Figure 1. Sample Size

1	Behavior of leader for organizational development
2	Loyalty to team
3	Inadequate number of staff
4	Poor labor
5	Unclear drawings and qualifications
6	Cost and time are ideal over quality
7	Poor coordination between Contractors and Subcontractors
8	Completion period is not practical
9	Management assurance and involvement
10	Lack of attention with in subcontractors and supplier
11	Lack of education
12	Rigid development
13	Lack of information.
14	Lack of knowledge regarding TQM
15	Lack material management
16	Lack of equipment management
17	Supplier and vendor failure
18	Poor project management
19	Miss communication between team
20	Failure to document changes and practices
21	Ignored audits and testing
22	Last minutes changes
23	Corruption charges
24	Lack of construction quality control inspection program
25	Continuous improvement

5.2 DATA ANALYSIS :

Remarks	Factors	FI
1	Behavior of leader for organizational development	31.332
2	Inadequate number of staff	32.664
3	Loyalty to team	33.552
4	Poor labor	35.33
5	Lack of attention with in subcontractors and supplier	36.216
6	Cost and time are ideal over quality	36.218
7	Lack of knowledge regarding TQM	36.218
8	Corruption charges	36.44
9	Unclear drawings and qualifications	36.652
10	Failure to document changes and practices	37.772
11	Rigid development	37.774
12	Lack material management	38.216
13	Lack of knowledge regarding TQM	38.218
14	Completion period is not practical	38.872
15	Lack of equipment management	38.886
16	Lack of construction quality control inspection program	39.108
17	Management assurance and involvement	39.552
18	Ignored audits and testing	39.552
19	Poor coordination between Contractors and Subcontractors	39.772
20	Continuous improvement	39.994
21	Poor project management	40.422
22	Lack of information.	40.442
23	Supplier and vendor failure	40.652
24	Last minutes changes	40.884
25	Miss communication between team	40.886



5.2.1 SAMPLE SIZE DETERMINATION :

No. of questionairedistributed	Total Responses	Responses in %
95	90	94.73 %

Table -3: Details of Responses

5.2.2 RELIABILITY TEST :

A researcher study's or a measuring test's consistency is referred to as its reliability. Under this work, Excel was used for analysis using CRONBACH'S method.

$$\alpha = \frac{K}{K-1} \left[1 - \frac{\sum s^2 y}{s^2 x} \right]$$

Where,

K = Number of the test items

$\sum s^2 y$ = Sum of the item variance

$s^2 x$ = Variance of the total score

$$= \frac{K}{K-1} \left[1 - \frac{s^2 y}{s^2 x} \right]$$

$$= \frac{39}{39-1} \left[1 - \frac{24.5}{285.20} \right]$$

$$= 0.9381$$

Table 5 RELIABILITY TEST

Variables	Description	Values	Internal Consistency
K	No. of items	25	<u>Good</u>
$\sum s^2 y$	Sum of the item variance	24.5	
$s^2 x$	Variance of total	285.20	
α	Cronbach's alpha	0.9381	

Here,

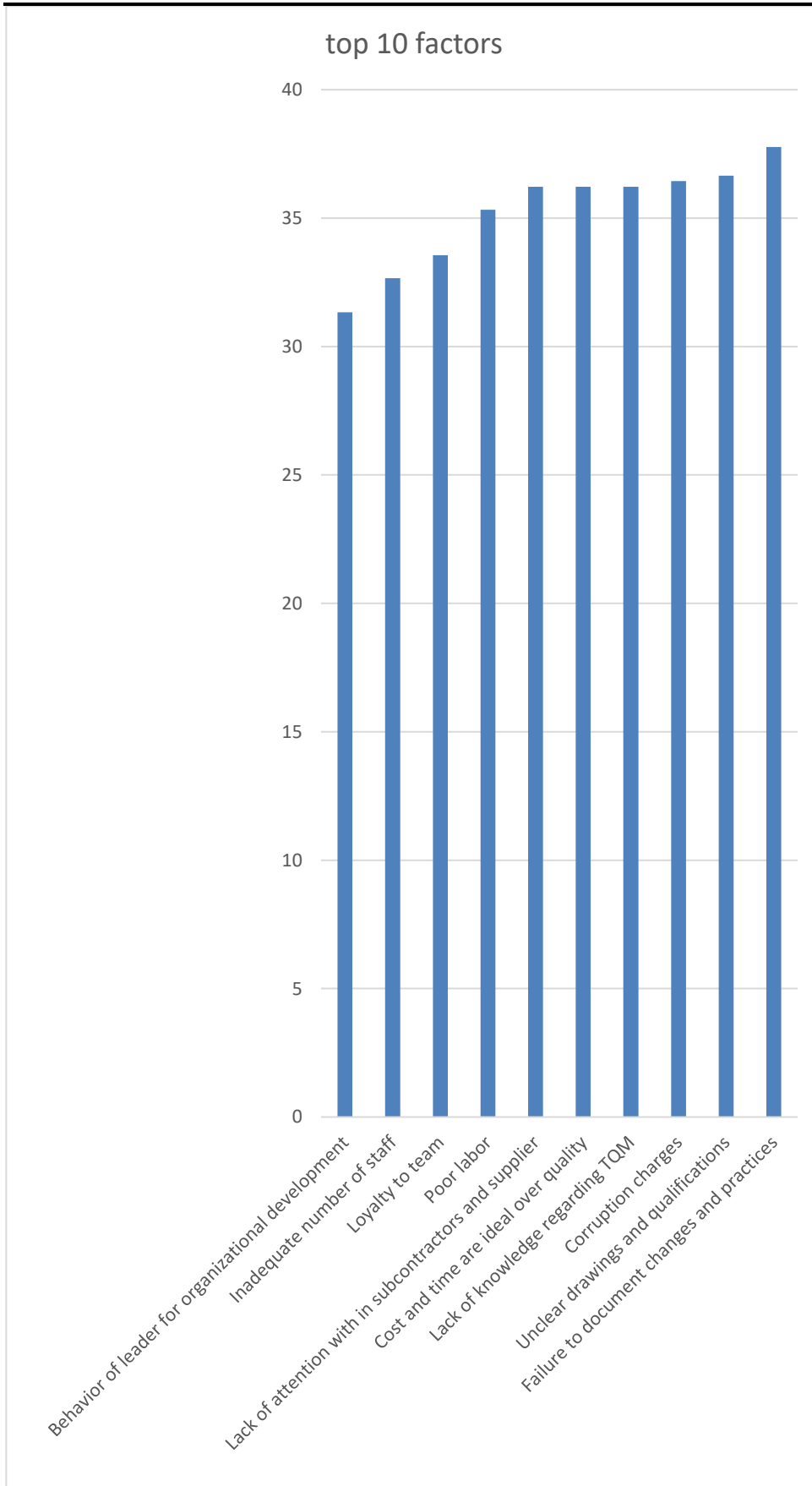
Value of α is . So it is GOOD.

5.2.3 OP 10 FACTORS AFFECTING Total Quality Management in Construction :

Table 5. Top 10 Factors

➤ **Top 10 Factors**

Remarks	Factors	results
1	Behavior of leader for organizational development	31.332
2	Inadequate number of staff	32.664
3	Loyalty to team	33.552
4	Poor labor	35.33
5	Lack of attention with in subcontractors and supplier	36.216
6	Cost and time are ideal over quality	36.218
7	Lack of knowledge regarding TQM	36.218
8	Corruption charges	36.44
9	Unclear drawings and qualifications	36.652
10	Failure to document changes and practices	37.772



CONCLUSION : After this study found that total quality management process is very important for the betterment of Construction process but there are some factors which affect the most to total quality management process are suppliers and vendor failure, Ignored audits and testing, Lack of equipment management. The least affecting factors are Loyalty of team Lack of Education and Inadequate number of staff.

This research work is done in five group of factors. Management, Material, Labour, External and quality Factors this five group include total 25 factors which affect productivity of labour this study identify all factors through a questionnaire form to this method used to Frequency Index method was used for analysis & Ranking of the factors.

This study is done for construction contractors and project manager In this study questionnaire are distributed (Response rate is 90 %) was to be collected.

Factors

Behavior of leader for organizational development
Inadequate number of staff
Loyalty to team
Poor labor
Lack of attention with in subcontractors and supplier
Cost and time are ideal over quality
Lack of knowledge regarding TQM
Corruption charges
Unclear drawings and qualifications
Failure to document changes and practices

FUTURE SCOPE: Further generalization up to national level or international level can be done by increasing the sample size.

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