

Analysis of Factors Influencing Quality in Construction Projects using Relative Importance Index Method

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Abstract: - *The Infrastructure sector in India plays a vital role in the economic progress of the country. The need for achieving quality of the finished product in the public infrastructure is very important. Quality is an essential element for sustainable infrastructure development. Quality in its simplest form can be defined as 'meeting the customer expectations'. This study is intended to provide clients, consultants and contractors with necessary information needed to better manage the quality of a public infrastructure construction projects by identify the factors that affect process quality of projects and to rank them by degree of importance. Certain organisations are identified and a questionnaire survey was carried out there. Then the data's from the organisation was collected. The ranking of the factors is done by using Relative Importance Index. Using that data's the major factors that affecting the quality have to be identified. Then from the results suitable suggestions was given to the organisations for improving their product & service quality*

Keywords: - *Infrastructure, Construction, Quality.*

I. INTRODUCTION

Quality has become a very popular subject in recent years due to conceptual changes in the construction industry. Quality and quality systems are topics which have been receiving increasing attention worldwide. The product in any industry should be manufactured to a desired standard, one that provides customer satisfaction and value for money. The need for achieving quality of the finished product in the building construction is very important. The high cost of buildings makes it necessary to ensure quality of the finished product. In Public Infrastructure projects, quality performance is considered as vital for public satisfaction. This study is intended to provide clients, project managers, designers, and contractors with necessary information needed to better manage the quality of infrastructure projects by identify the factors that affect the process of quality of construction projects and to rank them by degree of importance. Developing a quality system is the first step towards improving quality in infrastructure industry. For a user, quality is nothing but satisfaction with the appearance, performance, and reliability of the project for a given price range. In the project management, the schedule, cost and quality achievement is also referred to as the iron triangle. For project owners, there are many benefits to working only with contractors having formal quality management protocols. For one, working with such a contractor will reduce project costs and completion time,

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While enhancing safety. For another it will reduce the potential for construction defect and minimizing rework. There are also many obvious benefits to contractors as well. The maintenance of quality management creates a high-performance team atmosphere and a culture of continuous improvement, making it possible to work toward a zero rework environment. As a result, the contractor's reputation for workmanship, efficiency will result satisfied customers. In this study, it will be studied the factors affecting the quality performance of public infrastructure construction projects. It can be used to measure performance in construction projects. This will be a key component of any organization move towards achieving best practice in order to overcome the quality performance problem in the construction projects.

II. OBJECTIVES

The objectives of the case study are as follow,

- To identify various factors affecting the quality performance of construction projects and to rank them by degree of importance
- To suggest ways to improve the quality performance of construction projects

III. LITERATURE REVIEW

K. N. Jha & K. C. Iyer (2006), this paper identified the factors affecting the quality performance in construction projects and help to suggest possible remedial measures for improving the quality. Questionnaire survey was carried out and the data's are collecting from large construction industry. From the study the critical success factors obtained were: project manager's competence; top management's support; monitoring and feedback by project participants; interaction among project participants; and owners' Competence. The factors that adversely affected the quality performances of projects were: conflict among project participants; hostile socio-economic environment; harsh climatic condition; project manager's ignorance & lack of knowledge; faulty project conceptualization; and aggressive competition during tendering.

David ardit and H. Murat gunaydin (1998), carried out a study to identify the factors that affect process quality. Generic factors that affect process quality are, management Commitment to continuous quality improvement, management leadership in promoting high process quality, quality training of all personnel, efficient teamwork to promote quality issues at the corporate level, and effective cooperation between parties taking part in the project. Industry specific factors are, Drawings and specifications that are consistent, designers and contractors that are

selected on merit, communication practices between the parties that are effective and Inspection of quality on the construction site.

IV. METHODOLOGY OF THE STUDY

The methodology of the study is shown in Fig.1 A through literature review was conducted to identify the factors that affect quality

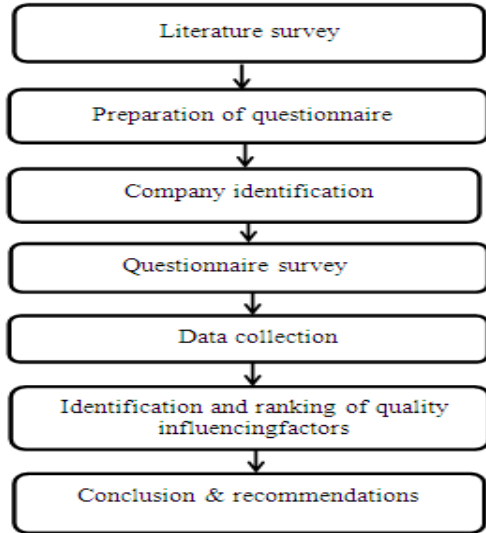


Figure 4.1 Research Methodology of the Study

Questionnaires were designed based on the factors influencing and it was distributed to two groups of respondents, namely developers and consultants. The survey was conducted and the results were analyzed.

The Relative Importance Index method (RII) was used to determine developers and consultants perception of the relative importance of the identified quality factors. Using this formula the major factors that affecting the quality was identified. The RII was computed as,

$$RII = \sum(W) \div AN$$

Where,

- RII** : Relative Importance Index,
- W** : Weighting given to each factor
(Ranging from 1 to 3)
- A** : Highest weight (i.e. 3)
- N** : Total number of respondents

V. RESULTS & DISCUSSION

The factors which affecting the quality are Design, Lack of communication, Conformance to codes and standards, selection of designer, co-operation of parties, management factors, selection of contractor, top management/Government support, labor, execution, material, equipment, financial issues, quality and safety systems, contract documents. Out of 60 questionnaires distributed 40 were returned. Perception of professionals in the construction industry was investigated. There are some correlations between the developers and consultants in case of quality influencing factors. The table that contain the ranking of developers and consultants is given,

No	Quality Factors	RII	
		Developers	Consultants
1	Codes and Standards	0.92	0.611
2	Selection of Contractor	0.88	0.463
3	Financial Issues	0.88	0.668
4	Top Management support	0.81	0.610
5	Material	0.875	0.722
6	Labour	0.86	0.685
7	Equipment	0.88	0.535
8	Management factors	0.775	0.537
9	Execution	0.745	0.520
10	Selection of designer	0.71	0.446
11	Lack of communication	0.69	0.345
12	Systems of Procedure	0.67	0.482
13	Co-operation of parties	0.64	0.426
14	Design	0.635	0.445
15	Contract documents	0.45	0.421

Table 5.1 Results of RII

Table illustrates the top significant factors affecting the quality of construction projects. The most important factors according to the perception of contractor and consultant are: Conformance to codes and standards, Materials, Labours, Financial problems. The consultants are interested in clients and technical factors. Consultants observed that the quality of raw materials in project, availability of personnel with high qualifications and conformance to codes and standards strongly affect the quality performance of construction projects.

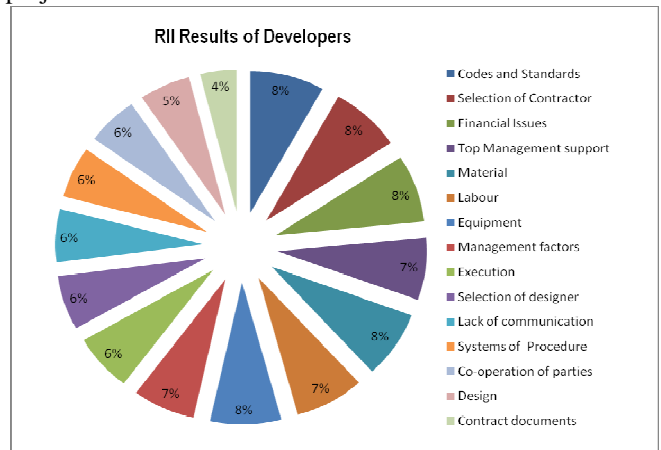


Figure 5.1 RII Results of Developers

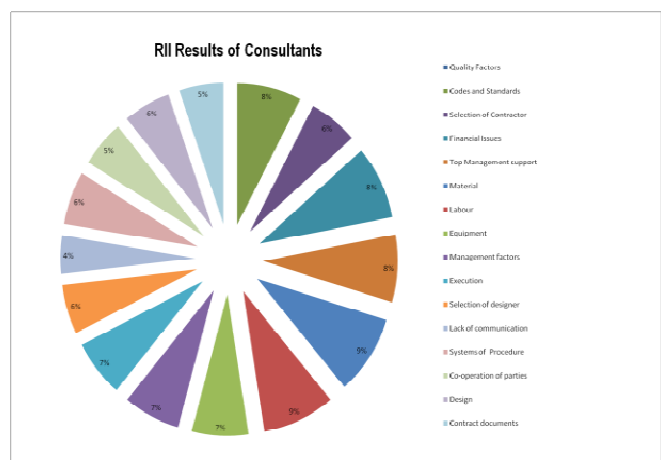


Figure 5.2 RII Results of Consultants

According to contractors point of view any standard methods and procedures adopted for selecting contractors & subcontractors will improve the quality. And also finance

problems will leads to delay of project, this will reduces the quality of work. Introduction and implementation of new management techniques in projects will raises the life of the project and customer satisfaction. Proper inspection throughout the work time will increases the quality and reduces the rework.

8. Tarek Elghamrawy & Tomoyashibayama. (2008) "Total Quality Management Implementation in the Egyptian Construction Industry",J. Manage. Eng

VI. CONCLUSION

A questionnaire based survey was used to find out the attitude of contractors and consultants towards factors affecting quality of construction project. 50 questionnaires were distributed and 30 were returned, 15 from contractor's and 15 from consultants. The respondents were asked to indicate their opinion about the quality factors as very important, important and low important.

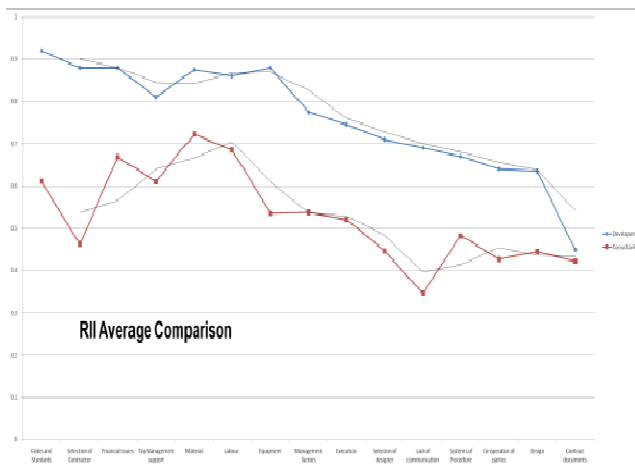


Figure 6.1 RII Average Results Comparison

The results show that the most important factor agreed by the contractors and consultants are: Conformance to codes and standards, Materials, Labours, Financial problems. Quality is an essential element for sustainability and customer satisfaction. The need for achieving quality of the finished product in the building construction is very important. The high cost of buildings makes it necessary to ensure quality of the finished product. Quality is an essential element for sustainability and customer satisfaction. In construction projects, quality performance is considered as vital for client satisfaction. Finding out of these factors will help to improve the quality. Quality training and meetings that is necessary for performing an improvement.

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