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ANALYSIS OF CRITICAL SUCCESS FACTORS FOR CONSTRUCTION PROJECTS IN INDIA

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ABSTRACT

The construction sector, the second largest industry in India after agriculture, often faces challenges of cost and schedule overruns. Addressing these issues requires effective management of "critical success factors" (CSFs), which influence the success of construction projects. This study identifies key CSFs by analyzing responses from a structured questionnaire survey completed by construction professionals and technocrats. Defining "success criteria" is crucial for evaluating project performance, but perceptions of success vary widely among stakeholders, making it difficult to measure. This research advocates for a unified framework, such as the "Iron Triangle" of Time, Quality, and Cost (TQC), to standardize success evaluation. The study also examines how quality, as a success criterion, evolves with stakeholder perceptions and project progress. Through the analysis of 40 survey responses, a comprehensive list of CSFs and sub-factors is developed, highlighting distinctions between smaller and larger projects. The findings provide actionable insights for improving project management practices, helping to mitigate cost and time overruns and enhance construction project outcomes in India.

1. INTRODUCTION

The construction industry plays a pivotal role in the economic development of any nation, and India is no exception. As the second largest industry in India after agriculture, the construction sector contributes significantly to the country's GDP, employment generation, and infrastructure development. However, the industry is fraught with challenges, with cost overruns and schedule delays being persistent issues that undermine the success of many projects. These problems not only lead to financial losses but also affect stakeholder satisfaction and project outcomes. Identifying and managing the factors that influence project success, commonly referred to as "Critical Success Factors" (CSFs), is therefore essential for improving the performance and efficiency of construction projects.

2. IMPORTANCE OF CRITICAL SUCCESS FACTORS IN CONSTRUCTION

Critical Success Factors are the essential elements or conditions that must be met for a project to achieve its intended objectives. In the context of construction, these factors encompass a wide range of variables, including project planning, resource management, stakeholder communication, risk assessment, and adherence to quality standards. The identification and effective management of CSFs can help mitigate risks, optimize resource utilization, and ensure that projects are completed within the stipulated time, cost, and quality parameters.

The "Iron Triangle" of Time, Cost, and Quality (TQC) has long been considered the cornerstone of project success criteria. However, as projects become increasingly complex and stakeholder expectations evolve, other dimensions such as sustainability, safety, and technological integration are also gaining prominence. This underscores the need for a comprehensive understanding of CSFs tailored to the unique characteristics of the Indian construction sector.

3. CHALLENGES IN THE INDIAN CONSTRUCTION INDUSTRY

The Indian construction industry operates in a dynamic and diverse environment characterized by rapid urbanization, infrastructural demands, and socio-economic disparities. These factors contribute to a unique set of challenges, including:

Resource Constraints: Limited availability of skilled labor, raw materials, and financial resources often leads to project delays and cost overruns.

Regulatory and Bureaucratic Hurdles: Stringent regulatory requirements, delays in obtaining approvals, and lack of transparency in tendering processes add complexity to project execution.

Technological Gaps: Despite advancements in construction technology globally, the adoption rate in India remains relatively low, hampering efficiency and innovation.

Stakeholder Misalignment: Divergent objectives and expectations among stakeholders, including clients, contractors, and consultants, can lead to conflicts and mismanagement.

Environmental and Social Factors: Projects often face resistance due to environmental concerns, land acquisition issues, and community opposition.

4. LITERATURE

Baishali Partra et.al (2014) conducted a study on performance of environmental critical factors in building construction project. Environmental protection must be considered as a significant aspect in any construction project. They have considered five building project across their state in which 31 buildings are under the project. The process includes preparation of checklist, weighing of different sub factors and rating them. The data's are collected by interactions with supervisors, engineers and workers associated with the project. With the help of average scores obtained by various buildings the scoring was made with the implementation of environmental sub factors and their respective weight.

Zainal Abidin Bin Akash et.al conducted a review of factors affecting the success of building maintenance projects. Building maintenance is much difficult and complex from other projects. Since, they are related to service works and help to interact with people. They identified 84 factors affecting success of project in building maintenance which are further groped into 8 main groups. They are: Project participants, Project Management, Quality, Time, Health and Safety, Finance, Environment and Site and others. The project which is delivered on time, in good quality and managed within budget is considered as a successful project. As a result, Project management and Project participants play a vital role in assessing success of the project when compared to other factors.

Abdelnasar Omran et.al evaluated the critical success factor for construction projects in Libya. The geographical area selected includes where the construction process are high. The questionnaire survey was used as tool for collecting data. Initially the data were collected using close ended self-administered questionnaires. And then this study was employed survey method to obtain the perception of the respondents towards the critical success factor. The first part of the questionnaire was designed for the purpose of eliciting information of the responder's background and years of worker's experience.

Jing Yang et.al made an in-depth study on exploring critical success factor for stakeholder management in construction projects. They identified critical success factor associated with the project, explored their rankings and underlying relationship by conducting interviews and questionnaire with professionals in construction industry. The questionnaire include these 15 critical factors were given to project managers and 183 completed questionnaire were received. The topmost ranked factors are further subdivided into 5 groups. This helps to identify high prioritised factor, evaluate performance of management and identify areas for improvement.

Hassan Sharaffudin and Abdulla AL-Mutairi (2015) conducted a review on critical success factor for the implementation of Built Operate Transfer (BOT) project in Kuwait. The study is made to explore the attitudes of concessionaires and government officials for implementing BOT projects. The results revealed that there is an agreement between concessionaries and government officials toward the significant factor for implementing BOT project. However, the concessionaires give priority to stable political situation and appropriate project identification whereas government officials give priority to public safety and training local staffs.

Pankaj P. Bangale (2016) analysed the critical success factor for high rise building. They identified and analysed the critical success factor affecting the local construction project. A questionnaire contain two parts Part A and Part B. Part A includes the general information and respondent of the company and Part B includes different factors which affecting the success of the project. The ranking method is used for analysing the factors. The questionnaire was given to respondents and asked them to rank the factors from one to five based on their severity. The top 5 critical success factor were identified with respect to response of respondent.

5. METHODOLOGY

To achieve the set of objectives the method used here is as follows;

5.1. Expert Survey

Survey method is used to find the solutions for the problem & identifying the most critical success factors with guideline for the successful execution of the construction projects. Here in this method a feedback has been taken from different constructional professional personnel with different educational qualification through personal interview, mailing & analyzing the feedback comparing with credits assign so identified the most critical success factor for the construction project. This surveying involves the several steps which is as follows

- Develop the structured questionnaire for CSF
- Forwarding the questionnaire to Technocrats or Professional Personnel
- Collection of the feedback from Technocrats or Professional Personnel
- Analyzing the feedback of the questionnaire
- Tabulating the top ranked CSF
- Guidelines for successful execution of construction projects
- conclusions

6. RESULTS AND DISCUSSION

6.1. Effect of Time-Quality-Cost (TQC) on CSF

In general for any projects Time-Quality-Cost shall be the most viable success criteria.

Sometimes Time-Cost could be the success criteria without measuring quality because quality could be silent feature in any project as it just a perception of peoples who is looking for it.

Survey analysis presented in this report indicates that for smaller projects Cost-Quality forms significant criteria for formulating CSF whereas in larger projects the Time-Cost

forms significant criteria for formulating CSF. “Time & Quality” alone without considering Cost do not help for prioritizing the success criteria for CSF. This aspect is shown in Venn diagrams presented in Figures 1 to 3.

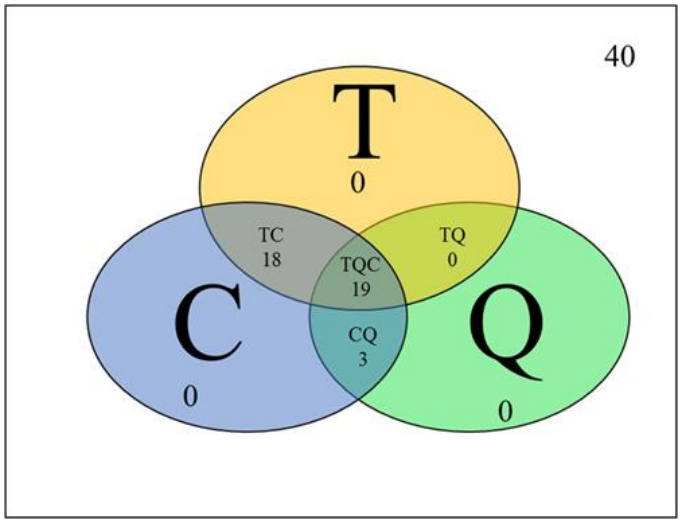

Figure 1. Venn diagram for the different combination of the success criteria for any projects

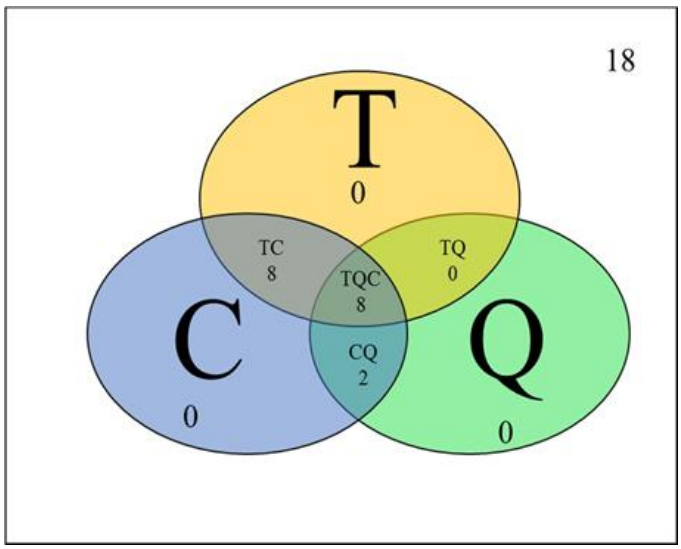

Figure 2. Venn diagram for the different combination of the success criteria for smaller projects

Index

T - Success criteria as Time
Q - Success criteria as Quality
C - Success criteria as Cost
TC - Success criteria as Time & Cost
TQ - Success criteria as Time & Quality
QC - Success criteria as Quality & Cost
TQC - Success criteria as Time, Quality & Cost

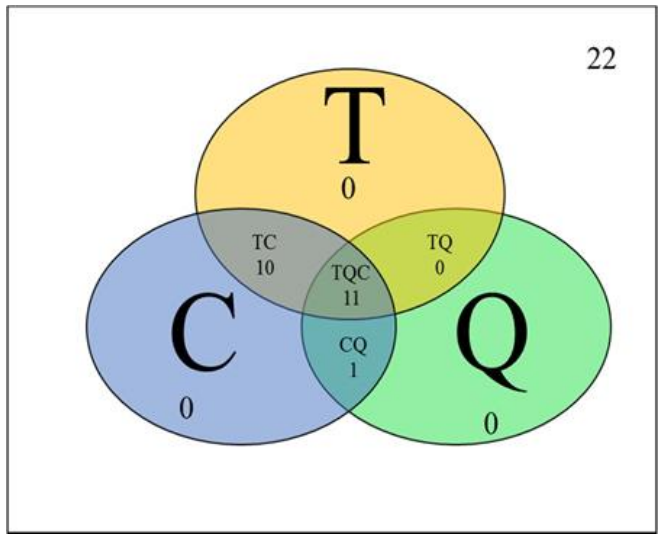

Figure 3. Venn diagram for the different combination of the of the success criteria for larger projects

7. CONCLUSION

The success criteria for the project success shall be depend on the TQC or Iron triangle, but the quality is quite silent node because it is just the state of the mind of any stakeholder and its changes as change in execution of the projects.

A questionnaire survey or method of survey has used to identify the list of critical success factors & sub factors after 40 personnel responded to questionnaire, analysis of the collected responses has been made with the priorities or ranking of the criticality.

There are the main seven categories of the critical success factors and there ranking are as follows

1. Project Management Related
2. Client Related
3. Contractor Related
4. Project Manager Related
5. Design Team Related
6. Procurement Related
7. Business & Work Environment Related

Analysis on these seven CSF with different criteria’s has been made to show the effects on smaller projects as well as larger projects.

All these seven critical categories of the CSF are further classified into the list of sub critical success factors so as to know the exact credits for the each category of CSF & to find out most top ten critically rated sub factors.

- For larger projects the project management related factors are more critical whereas for smaller projects client related factors are more critical.
- Business & work environment related factors are least significant CSF out of the seven identified CSF’s in any projects.
- In general for any projects Time-Quality-Cost shall be the most viable success criteria.
- The analysis shows that the choices of the number of CSF for any projects shall be at least five numbers of the CSF out of seven to be identified.

- Out of seven identified CSF the three factors viz; the project management, client & contractor management related together contribute 55 % of CSF. The project manager & design team related factors together contribute 29% CSF. The factors such as procurement & business and work related together contribute 16% CSF.
- The list of the seven critical success factors with their priorities shows that, the project management related factor is most critical one and has responsible towards the success of the projects followed by the client related factors, contractor related factors, project manager related factors, design team related factors, procurement related factors & business and work environment related factors.
- Mostly out of seven CSF's, critically five CSF's shall be identified & managed more for the effectiveness of the successful execution of the different phases of the projects.
- The rated & credited five sub factors forming part of CSF are as follows
  - Planning Effort
  - Site Management
  - Site Supervision
  - Contractor Experience
  - Communication System

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