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Analysis of Factors Influencing Project Success

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Abstract -This study was conducted in two stages as exploratory research and detailed research. The exploratory research was conducted by developing a questionnaire and collecting the response from construction experts and also from discussion with experts. There are seventeen factors identified as project success factors. A hierarchical model for construction project success is formed and thirty three individual factors were identified as overrun factors and they were grouped into 8 major factor categories and were ranked.
Keywords - Critical success factors of construction projects

I. INTRODUCTION

The construction industry in India is the second largest industry next to agriculture in terms of providing employment. Proper planning is essential for achievement of any pre-determined objective. Without proper planning, adherence to scheduled time and cost would be a matter of chance. In general, 70% projects are over the budget and behind the schedule. Also 52% of all projects are finished at 189% of their initial budget. Some of the projects are simply not completed after huge investment of time and money. How to answer these questions on percentage of complete, percentage of budget spent. %of work done. % of time elapsed. It is found to be subjective and incomplete in nature and draws false conclusions.

II. OBJECTIVES AND SCOPE

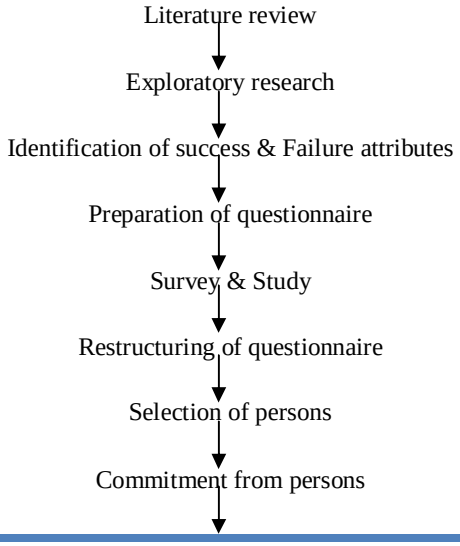
The objectives are Identification of critical success factors of construction projects in India, Evaluation of various success factors, Identification of various reasons causing schedule and cost overruns of construction projects in India, Evaluation of relative influence of various reasons of schedule and cost overruns, Suggestion of remedial measures.

III. RESEARCH METHODOLOGY

Two approaches can be employed to capture opinions in a survey: In the first approach, the respondents can be asked to identify a list of factors. In the second approach the respondents can be given a list of factors and asked to assess the influence of these based on a scale. In this first approach is used for exploratory research and second approach is employed for detail study, since an expert's opinion is considered worthy.

A. Flow Chart For Research Methodology

The following flowchart depicts the flow of events for the research methodology



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Collection of answers and analysis of data
↓
Interpretation of results
↓
Conclusion

B. Finding From Exploratory Research

The findings of the exploratory research are, Project success depends on :

1. Time 2.Productivity 3. Profitability 4.Environmental sustainability 5.Professional image 6.Aesthetics 7. Satisfaction 8.Technical performance 9.Cost & quality 10. Estimate 11.Health & safety 12.Completion 13. Absences of conflicts 14.Functionality

C. Detailed Research

1) Questionnaire was prepared to address the possible factors causing critical success in construction projects in India.
2) The questionnaire is organized in a form, where priority scaling can be done.
3) This study focused on three main groups who are working in construction project all over India.
4) These groups comprised of:
- *a)* Architects, Engineers / Quantity Surveyor officers working in different offices.
- *b)* Site executives such as Project Engineers, Asst. Project Engineers, Junior Engineers etc. posted at site.
- *c)* Contractors.

D. Questionnaire For Expert Respons

1) "Project Success" What does the term mean to you?

- *a)* Delivery of project that conforms to time, cost and quality parameters
- *b)* Performance of the end product
- *c)* Both a & b above

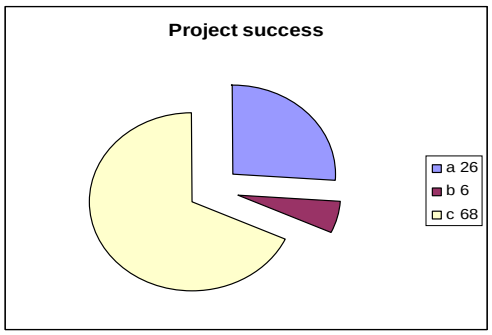


Fig 1**:** The responses for the Q-1 by the respondents of various groups

2) How important are the following success criteria in judging project success in your projects?

This question is framed to assess the intensity of various factors identified for project success.17 criteria were identified as contributing to project success in construction projects. The weight age for each factor is calculated based on the following criteria.

Very High Important-5, High Important-4, Important-3
Low Important-2, Very Low Important-1, Not Important-0

a) Project completed on time,
b) Project completed within budget,
c) Users of the project are satisfied
d) Meeting the specifications,
e) Quality in construction,
f) Recognition earned by the project

g) Health, safety and zero accident,
h) Technical performance ,
i) Profitability
j) Risk management and mitigation of risk,
k) Variations and change orders during construction
l) nEfficiency of the project management process,
m) Functionality or fitness for purpose,
n) Cooperation among the project participants,
o) Personnel development of the project participants,
p) Acceptance of the project by the community,
q) Environmental sustainability

Rank of the seventeen different project success factors by various survey respondents: TABLE I

Rank	Factors for Project Success	Weighted Average RIW
1.	Quality in construction (5)	4.872
2.	Project completed on time (1)	4.651
3.	Meeting the Specifications (4)	4.635
4.	Users of the project are satisfied (3)	4.592
5.	Technical Performance (8)	4.558
6.	Efficiency of the project management process (12)	4.255
7.	Functionality or fitness for purpose (13)	4.254
8.	Environmental Sustainability (17)	4.185
9.	Health, safety and zero accident (7)	4.075
10.	Cooperation among the project participants (14)	4.024
11.	Project completed within budget (2)	3.974
12.	Acceptance of the project by the community (16)	3.940
13.	Recognition earned by the project (6)	3.915
14.	Risk management and mitigation of risk (10)	3.762
15.	Profitability (9)	3.736
16.	Management of variations and change orders (11)	3.652
17.	Personnel Development of the participants (15)	3.313

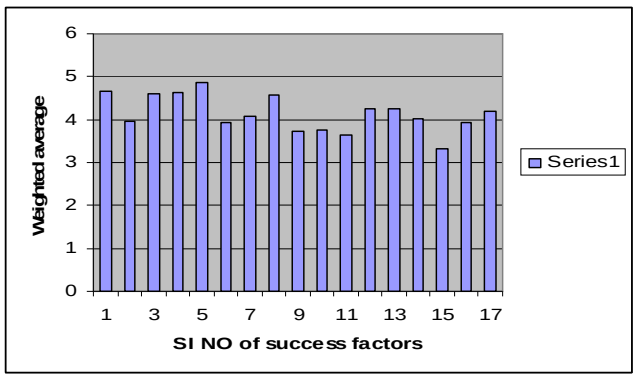


Fig 2: The responses for the Q-2 by the respondents of various groups

3) Analysis Of Effectiveness Of Pre-Project Planning

a) Do you believe that the department is exercising the Pre-Project planning effectively before execution of projects?

Engineers and Site Executives opined that the department is generally exercising the pre project planning effectively before execution of projects.

Contractors opined that the department is generally not exercising the pre project planning effectively before execution of projects.

4) Analysis Of Effectiveness Of Early Preparation Of Estimate

a) Do you think that the estimates of the projects are prepared sufficiently early by the department before tender action?

i. As per the test results Engineers and Site Executives opined that generally the department prepares the estimates sufficiently early before tender action.

ii. Whereas Contractors opined that department does not prepare the estimates sufficiently early before tender action.

iii. Hence the department must ensure that estimates must be prepared sufficiently early for proper checking, cross comparison etc for the success of the project.

5) Analysis Of Responses On Accuracy Of Estimates

a) Do you feel that the accuracy of the estimates prepared by the department is sufficient enough?

As per the test results Engineers and Site Executives opined that generally the department prepares the estimates sufficiently accurately before tender action.

Contractors opined that department does not prepared the estimates accurately before tender action.

Hence the department must ensure that estimates must be prepared sufficiently accurately by considering all the facts before tender action for a successful completion of a project.

6) Analysis Of Response On Effect Due To Deviation Of Orders

a) Do you agree that productivity will be negatively impacted due to the increase in change/deviation orders in a project?

As per the results of the survey Engineers and Contractors opined that

i. Generally the productivity will be negatively impacted due to the increase in change / deviation orders in a project.

ii. Site Executive opined that generally the productivity will not be negatively impacted due to increase in change / deviation orders in a project.

iii. Hence the department must ensure to incorporate all necessary requirements of the users during planning stage itself by proper liaison and also by conducting proper soil investigation before tender action.

7) Analysis Of Responses On Transferring Of Knowledge

a) Do you think that there is value in creating a system for transferring experience / knowledge between projects and the same will improve the chances of project success?

i. As per the test results the respondents unanimously gave a very high value for creating a system for transferring experience or knowledge between projects for success.

ii. The successful implementation of the same requires a commitment from all levels of the organization.

iii. The advantages are employees can be trained more quickly, provide better support and avoid costly errors.

iv. In this regard a questionnaire can be prepared and distributed among the project participants immediately after completion of each project and the responses can be published among all the department offices for effective implementation and success of projects.

IV. TIME AND COST OVERRUN FACTORS

33 individual factors are identified as the overrun factors in construction projects. They are arranged under eight major factor categories

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A. Contractual Relationship Factors

The individual factors of the main factor category (i) Contractual relationship factors are:

1) Poor contract management
2) Claims and disputes
3) Acceptance of very low and unworkable bid
4) Slow decision-making
5) Improper selection of the main contractor
6) Delay in handing over site to the contractor
7) Absence of effective pre-bid conference between Department and tenderers.

B. Project Planning And Controlling Related Factors

The individual factors of the main factor category (ii) Project planning and controlling related factors are:

1) Planning and scheduling deficiencies
2) Delay in issuing contract documents, design detail, etc. by the department
3) Mistakes during construction
4) Ambiguity in specification and conflicting interpretation by different parties
5) Lack of proper qualification and experience among contractor's team
6) Absence of frequent site meetings chaired by higher officers to have better co-ordination between engineers, supervisors and contractors.
7) Absence of strong administrative leads to complete the project in time & budget.

C. Natural Conditions Factors

The individual factors of the main factor category (iii) Natural condition factors are:

1) Unexpected sub-soil condition
2) Bad weather
3) Unexpected natural events

D. Project Financing Factors

The individual factors of the main factor category (iii) Natural condition factors are:

1) Delay in making monthly payment to contractor
2) Contractor's financial difficulties
3) Absence of proper cash flow during construction

E. Material Factors

The individual factors of the main factor category (iii) Natural factors are:

1) Late delivery of materials and equipments
2) Shortage of materials
3) Non-availability of materials as per contract specification
4) Delay in approval of materials / samples

F. Labour Factors

The individual factors of the main factor category (vi) Labour factors are:

1) Labour shortages
2) Shortage of technical personnel
3) Problem related to workers health and safety, accidents during construction
4) Industrial relations

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G. Plant / Equipment Factors

The individual factors of the main factor category (vii) Plant / Equipment factors are:

1) Shortage of sufficient plant / equipment and its parts
2) Frequent breakdown
3) Unskilled operators

H. Economic Factors

The individual factors of the main factor category (viii) Economic factors are:

1) Inflation, escalation of material prices etc.
2) Increase in labour wages

Rank of the eight different major factors causing time and cost overrun in construction projects ranked by various survey respondents : TABLE II

Rank	Major Factor Category	Weighted Average RIW
1	Contractual Relationship Factors	3.987
2	Project Financing	3.705
3	Project Planning and Controlling Factors	3.657
4	Material Factors	3.572
5	Natural Conditions	3.566
6	Economic Factors	3.528
7	Plant / Equipment Factors	3.264
8	Labor factors	3.032

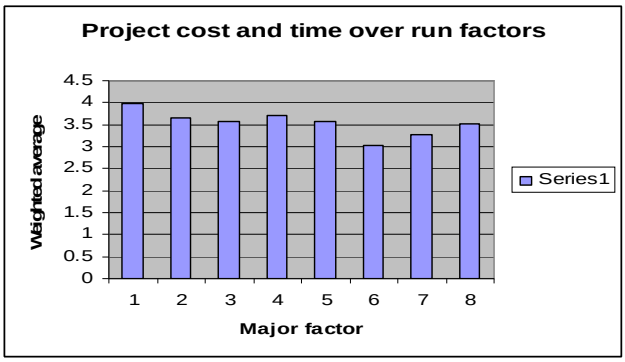


Fig 3: The responses for time and cost overrun factor by the respondents of various groups

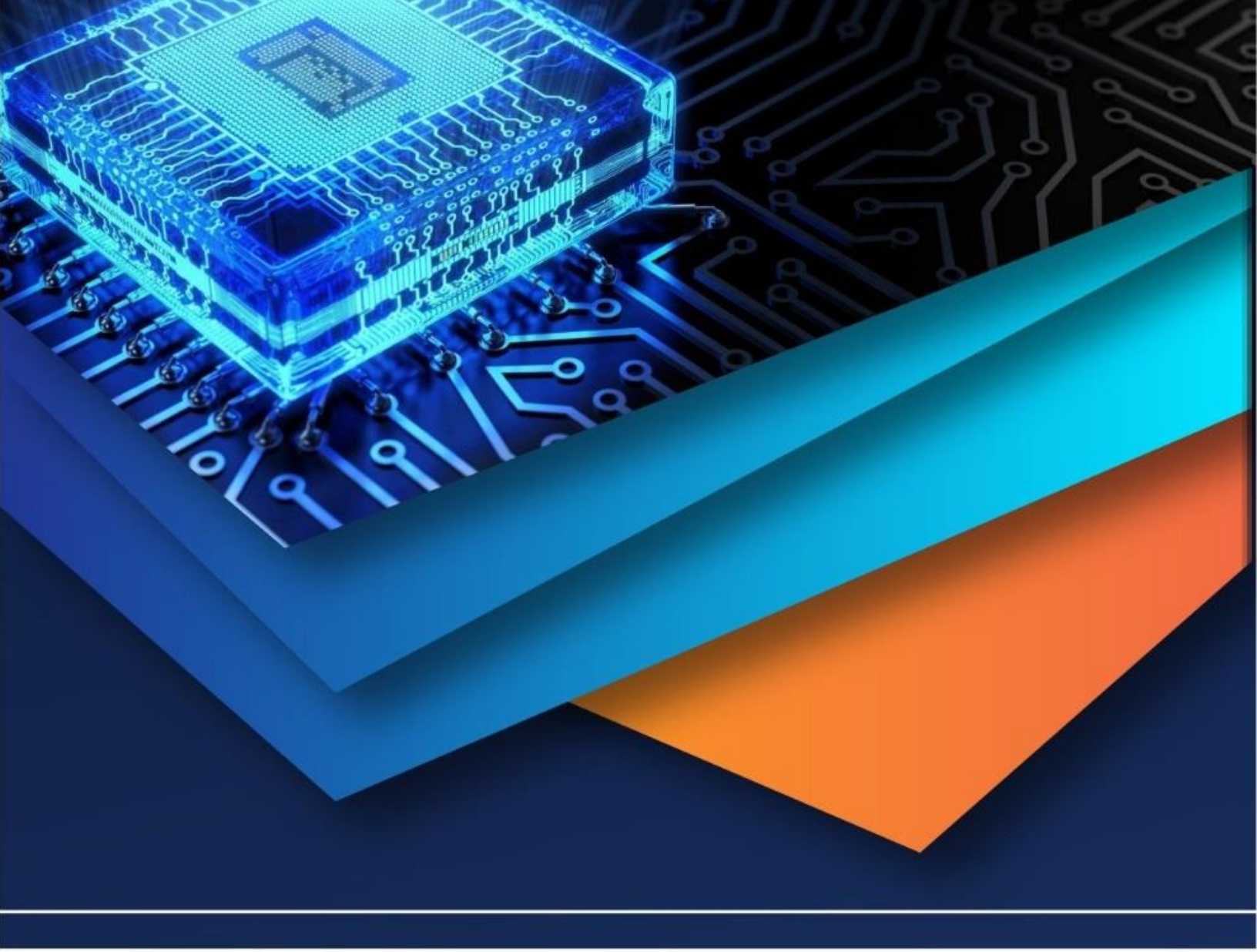
V. CONCLUSIONS

The survey focused on identifying and ranking in order of importance, the main factors for project success and the factors causing project delay and cost overrun. The result of the survey indicates that all the three groups felt that quality of project construction must be improved along with other 16 factors for project success. Also the three groups felt that contractual relationship factor is the major factor along with the other 6 factors for delay and cost overrun. A considerable importance must be given for the area of pre-project planning and the same will improve the chances of success in construction projects Department must ensure that estimates are prepared sufficient early and accurately. Department must ensure to incorporate all necessary suggestions/requirements of the users during planning stage itself by proper liaison and also conduct proper soil investigation before tender action. Department must create a system for transferring experience or knowledge between projects. Implementation of better quality management will reduce the project cost. Contract conditions need to be revised as fair and equitable for both parties.

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