

IDENTIFICATION OF FACTORS CAUSING TIME AND COST OVERRUN IN CONSTRUCTION PROJECTS IN INDIA

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Abstract: This study focuses on identifying and ranking the numerous elements that contribute to time and expense overruns in building projects. The main goal of this thesis was to use the literature to determine the numerous elements that cause time and expense overruns in construction projects and to create a questionnaire based on these factors. The detected criteria are listed in this questionnaire, along with a likert scale to indicate their importance. The survey was sent to several project stakeholders, including engineers, contractors, project managers, builders, and supervisors, who were asked to mark the criteria on the scale according to their comprehension. *Relative Important Index analysis is used to determine the components and their effects on time and cost overrun. Data was gathered by using a Google form to conduct a survey; responses from experienced and highly qualified individuals were gathered to determine the importance of the supplied parameters using the Likert scale. The criteria were rated according to their impact on cost and time after thorough analysis of the data gathered from the respondents.*

INTRODUCTION:

The outcome of development projects is reliant upon meeting the goal of the task and finishing the targets inside the predetermined time and financial plan. The board assumes a gigantic part in the effective finish of development projects. The main issues that is looked by the administration in the undertakings are strategies and cycle of execution, the board of laborers, gear, planning, and cash. Cost and time are typically the main inquiries that surface in any undertaking.

Assuming that we think about any development industry on the planet, the Indian development area has confronted a ton of challenges in land obtaining issues, unfriendly political and primary changes, lack of ability, plan and constructability issues, and high material and work costs. Because of the current degrees of material and work cost expansion and economic situations, workers for hire are expanding their normal by somewhere in the range of 6% and 9%. These increments are seen in higher delicate costs, especially on significant milestone improvements, albeit on more modest undertakings workers for hire are bound to retain the inflated expenses to stay in rivalry.

In arranging, planning, and developing a venture, the expense is critical. While conveying a venture the principal point of the association is to complete the undertaking inside arranged time and cost and whenever achieved thus, the task is said effective. Be that as it may, for all intents and purposes because of absence of information and disappointment in arranging and execution this is unimaginable. The development business is viewed as quite possibly the most basic ventures in Indium. It is notable that most development projects are presented to numerous disappointments to many reasons. Deferral and cost overwhelm are two of the significant imperfections in the development business. Be that as it may, for all intents and purposes because of absence of information and disappointment in arranging and execution this is absurd.

As indicated by PMI research, around half - 60% of ventures are effective and the rest flop because of cost invade and delays in project conveyance. Countless development projects have been deferred because of many reasons and issues, which have been concentrated in various investigates, yet these reasons in India, fluctuates from better place to put, because of different geography of the country. To the aversions of proprietor, worker for hire, and expert, in any case, many tasks experience a ton of postponements and along these lines lead to starting time invade and generally quotes. This issue is more found in the conventional kind of agreements in which the agreement is given to the most minimal bidder-the granting methodology of most of undertakings in emerging nations like India. As indicated by the Ministry of measurements, upwards of 369 ventures every value Rs. 150 crores or above, have shown cost invaded of over Rs. 3.58 lakh crores because of postponements and different reasons in the year 2018.

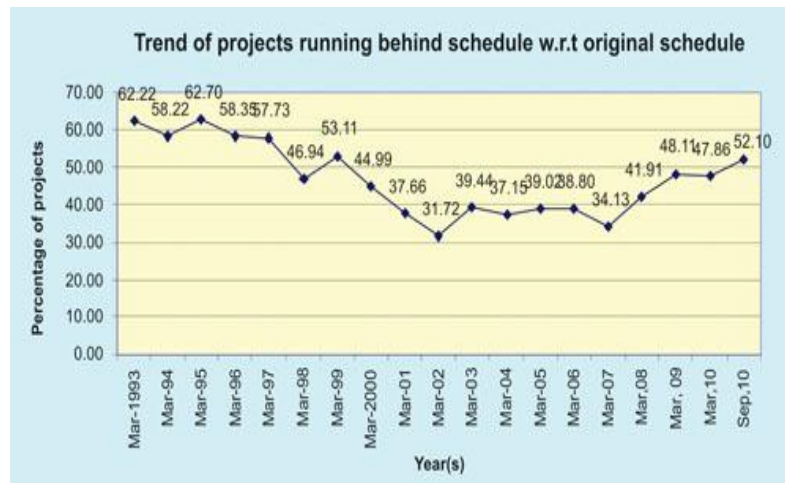


Fig.- 1: Graph showing trend of projects running behind schedule w.r.t original schedule

Source: (Time and Cost Overruns in Implementation of Infrastructure Projects, Problems and Remedies, January 2011)

The percentage of projects behind schedule in terms of time overrun also shows a downward trend in the report. The percentage of projects that are on schedule has risen from 62 percent in 1991 to 31.72 percent in March 2001, 34.13 percent in March 2007, and 52.10 percent in March 2008.

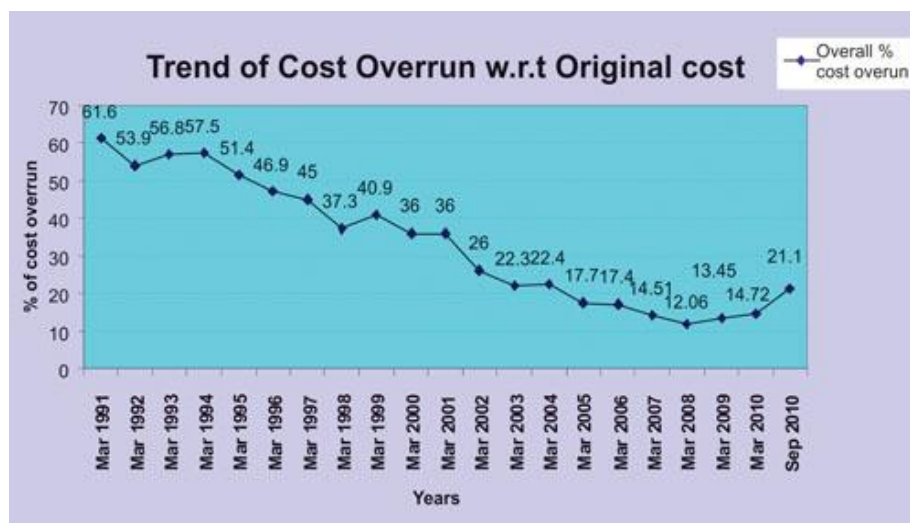


Fig.- 2: Graph showing trend of cost overrun w.r.t original cost

According to the Ministry of Statistics and Programme Implementation's research, project cost overruns decreased from 62 percent in March 1991 to 12 percent in March 2008, but climbed to 21 percent in September 2010. Over the course of ten years, this has resulted in indirect savings of more than Rs. 2,50,000 crore.

1.2 Significance of the paper

Conveyance of an effective venture can be checked by your general expense execution and capacity to finish projects on time. Project administrators need to can distribute time and assets appropriately to oversee spending plan and keep the venture on now is the ideal time. Practically all associations search for project chiefs with great undertaking the executives abilities since they exhibit your capacity to fit in coordinated and speak with colleagues, particularly while taking care of exceptionally complex tasks.

The paper will help the chiefs in the accompanying ways-

- A ton of ventures are deferred and over-planned; the paper will assist the supervisors with staying away from the variables which are justification behind the postponement in time and cost invade.
- The chiefs can build the benefit by appropriate booking and spending plan portion.
- By remembering the recognized basic factors and utilizing appropriate control estimates will assist the firm with building a decent standing on the lookout.
- As the installment for projects is based on the achievements so by finishing the achievements on time and on the allotted spending plan will assist the administrators with getting the cash for work.

This paper will assist the chiefs with giving consumer loyalty by keeping the venture on time and timetable.

Litreture Review :

Surabattuni Murali, 2019 analyzed the elements causing cost overwhelm and time postpone connected with the task in Lucknow. The creator attempted to gather information in regards to the material administration and a few physical, social, natural and monetary elements that are be answerable for the time and cost overwhelm.

The creator had talked with the specialists who were working at the capable situation in the organization, consultancy. Alongside that the poll review was done to gather the information exhaustively and positioned the elements causing the time and cost invade. After all the assortment the information examination was finished by utilizing the strategy for the overall significance file by utilizing recipe:

$$\sum_{(i=1)}^n \frac{[(X_i \times Y_i) \div N]}$$

Where,

X_i = reaction of rating

Y_i =number of point (values from 1 to 10)

N = number of reactions

As indicated by this the elements were recorded and positioned. By this creator saw that material administration, site conditions, incompetent works, worker for hire monetary troubles, machines and gear challenges are the significant elements which are answerable for the deferral and financial plan invade of the task.

(Taye, 2019) concentrated on the numerous writing audits, reports and exploration papers and gathered verifiable information and recognized the variables influencing the invades in development projects. Likewise, the creator fostered the recreation method for the equivalent.

Approach adjusted by the creator was in four phases that are writing audit, information assortment, information investigation, and end. Information assortment were finished by essential and optional strategy, in the essential information assortment poll study, meetings and agreement report examination of continuous activities were gathered, and in auxiliary information was gathered by the historical backdrop of recently finished projects. The dissemination of the survey was done among the worker for hire, client and specialist.

Structure the gathered information different elements causing cost overwhelm was noticed and the general positioning of variables was finished by Relative Importance Index (RII).

(Ammar Zaki, 2019) concentrated on the different examination papers about the activities caused the expense overwhelm and time delay in Egyptian development industry. For deciding the variables the creator completed the field overview and attempted to acquire the data about the elements causing the time and cost overwhelm which he had concentrated in the recently concentrated on writing surveys writer have led seven semi organized interview with the master connected with the development business havin least 10 years of involvement. In the wake of getting criticism from

the master working experts poll was ready for the poll review. A poll review depended on the information and flowed among the proprietor, project worker and specialist and afterward classified.

Examination of information was done in view of the information gathered utilizing unwavering quality test by adjusting the Cronbach Alpha Method and it was determined by utilizing programming SPSS rendition 21.

Another technique utilized was Relative Importance Index for the positioning of the elements utilizing the equation,

$$RII = (\sum W) / (A \times N)$$

Where,

RII = Relative Importance Index

W = weighting given to each factor by the respondents (going from 1 to 5)

A = most noteworthy weight (for example 5)

N = all out number of respondents

At last, by papering every one of the causes and factors proposal of the proprietor, worker for hire and specialist were taken to keep away from the postponement and cost invade in the furthercoming projects.

(Shubham S. Deshmukh, 2018) tells about the state of the development business in India, and made sense of the issues connected with the timetable and spending plan overwhelm. In this paper different exploration papers were inspected which were distributed by the Indian creators and paper was finished.

Contingent upon the paper different elements were distinguished and they are recorded underneath.

Inaccessibility of materials at the site.

Blunders in plan.

Change in scope.

Unseemly and sufficient obtainment.

Absence of task the board abilities.

Absence of correspondence between project members.

As indicated by creator some place, the task group is liable for the timetable overwhelmed which makes the client disheartened.

Spending plan overwhelm may happen due to underrating of the expense and during assessing the value heightening ought to be thought about so the time and cost invade of the ventures ought to be stayed away from.

$$\text{Cost Overrun} = (\text{Final contract sum} - \text{Original agreement sum}) / (\text{Original agreement sum})$$

2 Working Adopted For the Paper

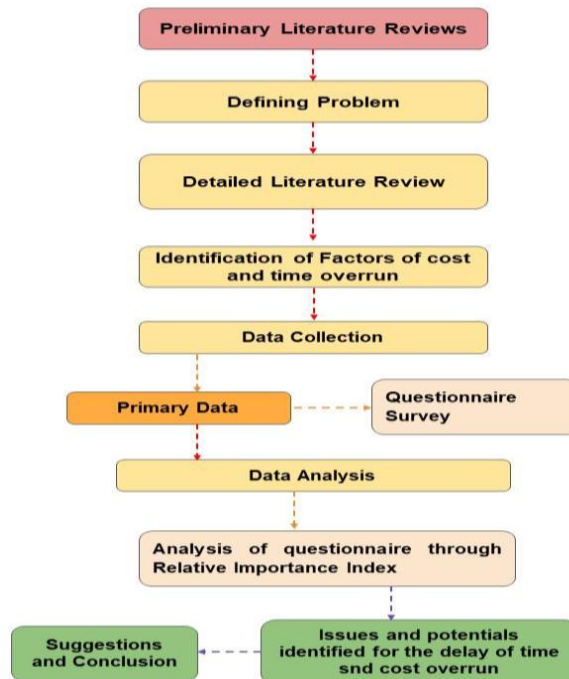


Fig.- 3: Flowchart showing methodology

Source: (Authors)

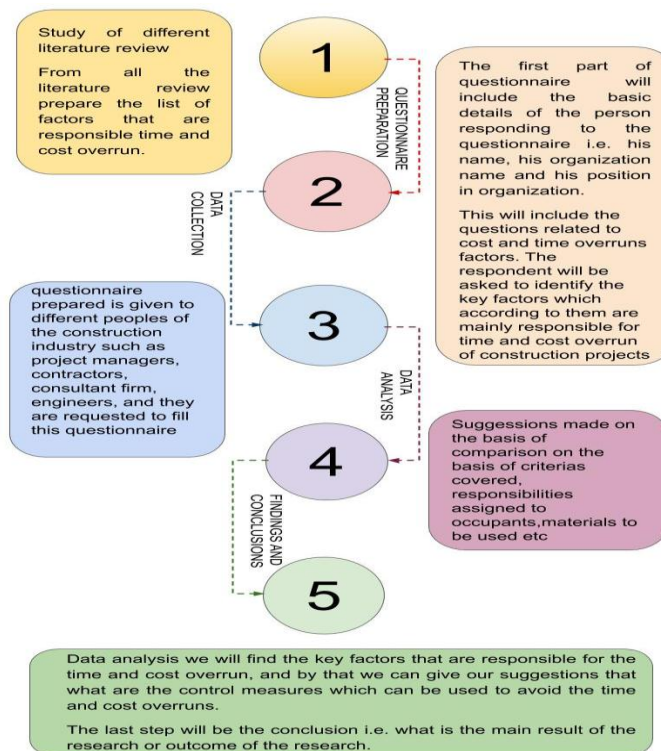


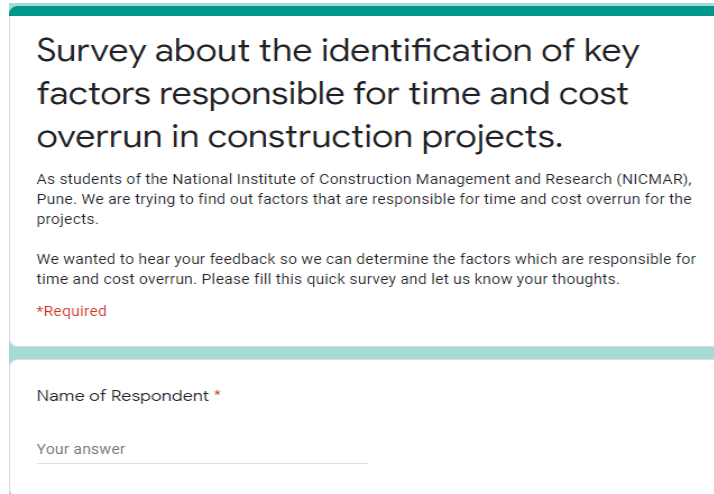
Fig.- 4: Process Flowchart

Source: (Authors)

3 Result and data collection:

To gather data for the paper, a questionnaire was created. There are two parts to the questionnaire that has been produced. The first section of the questionnaire will include the basic information about the person filling out the questionnaire, such as his name, the name of his organisation, and his position within the organisation.

The questions about cost and time overruns will be addressed in the second section. The respondent will be asked to score the elements that contribute to construction project time and cost overruns on a scale of one (1) to five (5) depending on their level of contribution. 1 = strongly disagree, 2 = strongly disagree, 3 = neutral, 4 = agree, 5 = strongly agree



Survey about the identification of key factors responsible for time and cost overrun in construction projects.

As students of the National Institute of Construction Management and Research (NICMAR), Pune. We are trying to find out factors that are responsible for time and cost overrun for the projects.

We wanted to hear your feedback so we can determine the factors which are responsible for time and cost overrun. Please fill this quick survey and let us know your thoughts.

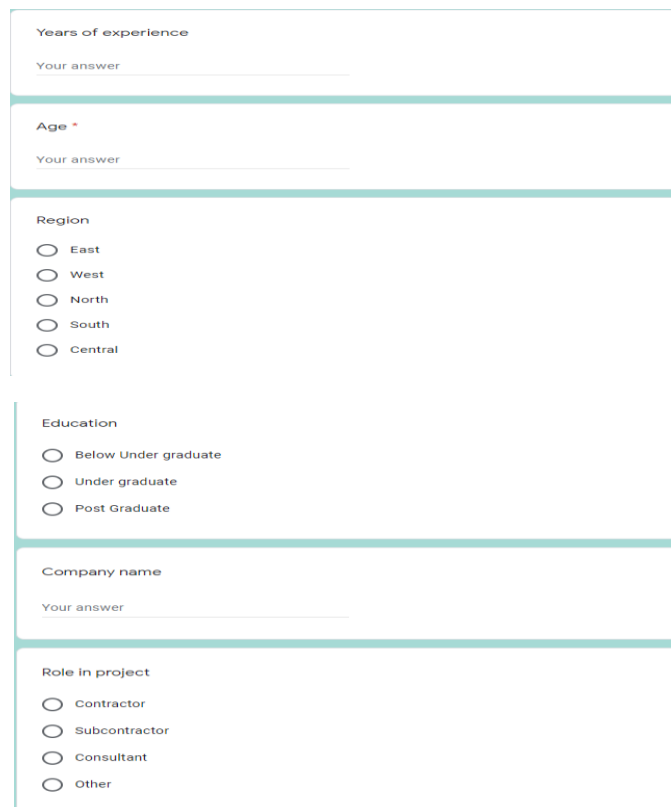
***Required**

Name of Respondent *

Your answer _____

Fig.- 5: Snapshots of Questionnaire

Source: (Authors)



Years of experience

Your answer _____

Age *

Your answer _____

Region

East

West

North

South

Central

Education

Below Under graduate

Under graduate

Post Graduate

Company name

Your answer _____

Role in project

Contractor

Subcontractor

Consultant

Other

Type of project. *

- Residential Building
- Commercial Building
- Both
- Other

A number of projects executed. *

- Less than or equals to 10
- 11-50
- 51-100
- More than 100

Survey about the identification of key factors responsible for time and cost overrun in construction projects.

Factors for the project overrun.

The Questionnaire is mainly based on the five ordinal measures from one (1) to five (5) according to the level of contributing. 1=Strongly disagree, 2= Disagree, 3=Neutral, 4=Agree, 5=Strongly agree.

We have mentioned some factors responsible for the time and cost overrun below. You just have to select your view regarding time and cost overrun for a particular factor.

Please fill this quick survey. You just have to click the most relevant option.

Note:- For a complete view of options (Strongly disagree, Disagree, Neutral, Agree, Strongly agree) slightly scroll left on the options panel.

1. Site clearance issues

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Improper drawings (Design error)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. Mistakes in planning and scheduling

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. Inefficient cost and monitoring

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. Shortage of the material

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Quality of material

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Material price fluctuation

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Labour supply

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Low productivity level of labors

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. Increase in labor price

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. Equipment availability and failure

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Inadequate modern equipment

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Site safety

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. Mistakes in the construction phase

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. Bad weather

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. Obstacles from the government

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. Problems with neighbors and site conditions

	Strongly disagr...	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. Slowness in decision making.

	Strongly disagr...	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. Poor site management

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. Lack of communication between parties

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21. Problems with

	Owner	Contractor	Subcontractor	Consultant
Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Fig.-6: Snapshots of Questionnaire

Source: (Authors)

3.1 DATA ANALYSIS AND FINDINGS:

A Total of 79 responses were received, the responses included experience people as well as post graduates and graduates. The interpretation of data is given below:-

- Years Of Experience**

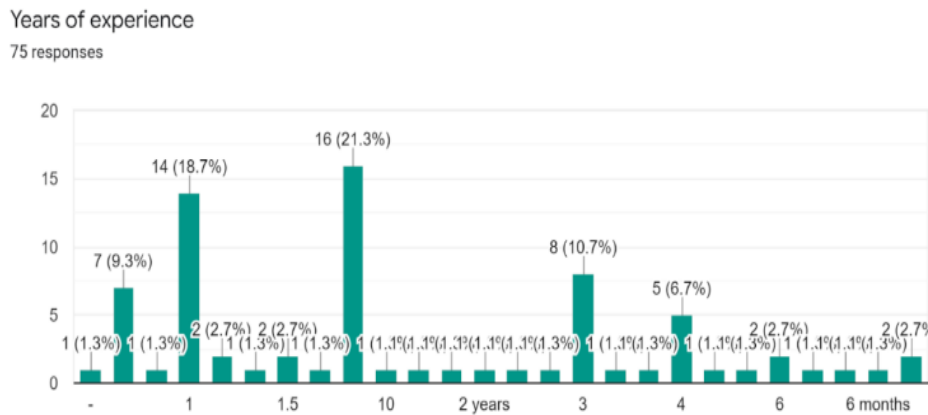


Fig.- 3: Bar chart showing experience of the respondents

Source: (Authors)

- From the total responses received the maximum percentage of the responses was from the people having experience.

- Age Of Respondents**

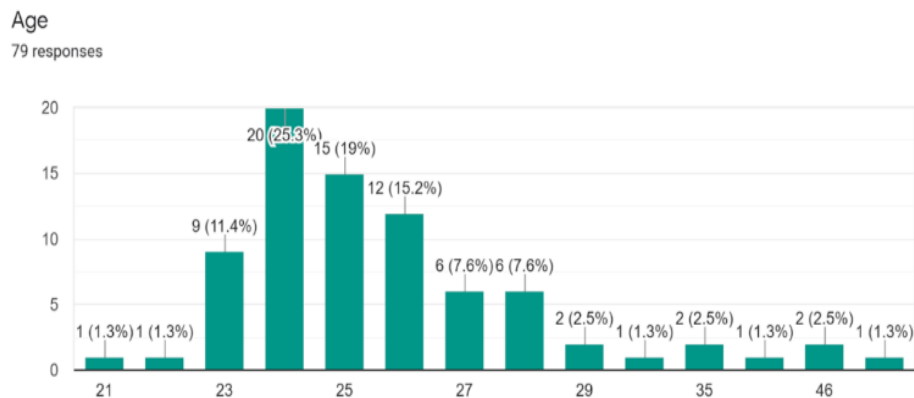


Fig.- 4: Bar chart representing age of respondents

Region The respondents with the highest number of responses are those between the ages of 23 and 28, with 11.4 percent, 20 percent, 19 percent, 15.2 percent, 7.6 percent, and 7.6 percent, respectively.

The minimal number of replies collected from people in the age groups of 21, 22, 20, 36, and 47, i.e. 1.3 percent of the total population

The age groups of 27 and 28 each answered with 7.6% of the total replies

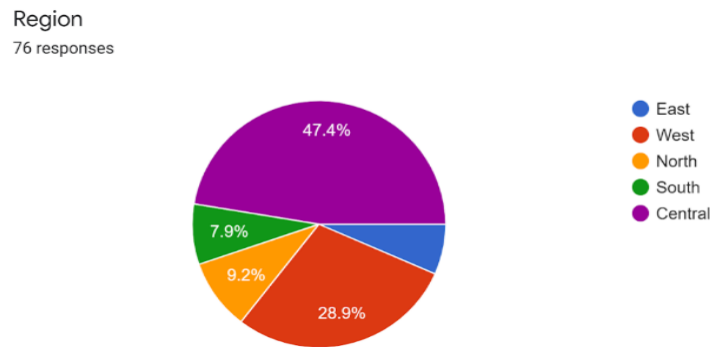


Fig.-7: Pie chart representing region of responses

The pie chart depicts the responses obtained from construction industry professionals by region. Because the respondent's region was not required to be mentioned, the number of responses differed from the prior responses.

The central area of India garnered the most responses (47.4%) out of the total of 76 received.

In terms of replies received, the West region of India is in second place with 28.9%.

The north and south regions were ranked third and fourth, respectively, with 9.2 percent and 7.9 percent recorded from each zone.

The east region had the lowest response rate, at only 6.6 percent.

Education Qualification

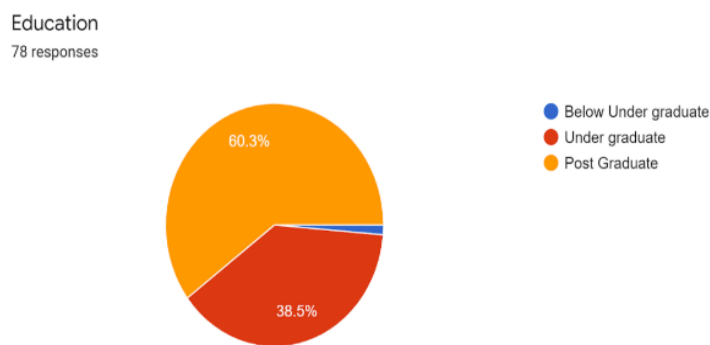


Fig.-8: Pie chart representing education qualification of respondents

As in the previous region, we did not make it mandatory to mention the respondent's qualification, hence we obtained a different number of responses.

☐

The pie chart shows that out of 78 responses, 60.3 percent of working officials believe that post-graduation in their profession is important, which is the greatest percentage.

From the total number of respondents, 38.5 percent have finished their undergraduate thesis.

The minimal number of responders who met the criteria are listed below.

- Roles in Projects**

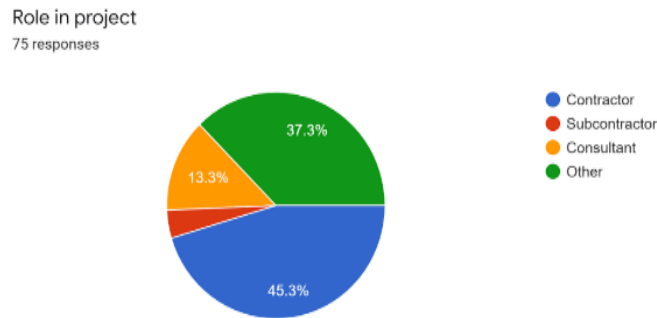


Fig.-9 Pie chart representing roles of respondents in project

We also inquired about the respondents' involvement in the project, and 75 of the 79 respondents responded with their role.

The contractor's firm accounts for the majority of the respondents, accounting for 45.3 percent of the total of 75 respondents.

The minimum number of respondents comes from the subcontractor side, accounting for 4.1 percent of the total.

13.3 percent of those who responded said they worked for a consulting firm.

Other than contractor, subcontractor, and consultant, this role has the second greatest number of respondents. They could be the owner or any other type of stakeholder

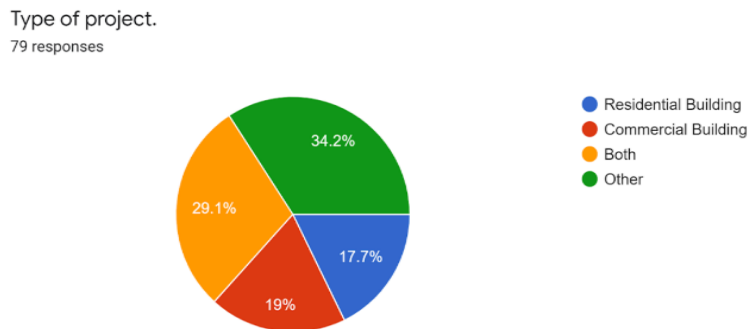


Fig.-10 Pie chart representing type of projects that the respondents were part of Source: (Authors)

- Type Of Projects**

As demonstrated in the pie chart, the majority of respondents have job experience in fields other than residential or commercial building projects, with 34.2 percent being the highest of all.

Working officials from both residential and commercial construction projects have answered with 29.1 percent.

19% of those polled have worked on commercial construction projects.

The least number of respondents (17.7%) came from residential construction projects.

4 CONCLUSIONS

This primary point of paper is to recognize the critical elements of time and cost invades in development projects in light of the study planned. As per the consequences of the paper, the principal factors which add to the expense invade are:

- Expansion in labor cost
- Work supply
- Botches in development stage.

The fundamental variables which add to the time invade are:

- Expansion in labor supply,
- Low efficiency of work
- Botches in arranging and planning.

Overall, 20 factors were dissected, as per the review led the previously mentioned three variables are the most basic factors that are answerable for the overwhelps of cost and time in a development project. Different variables are likewise answerable for plan postponements and cost overwhelps to the undertaking.

The last inquiry from the study expressed that proprietor is liable for cost invaded of the venture, as the proprietor is answerable for characterizing the extent of the undertaking, and assuming the degree changes the expense is impacted at a huge scope. While the worker for hire is liable for time invaded of the venture, as project worker is answerable for the execution of the task, in the event that legitimate checking isn't done then the timetable can be postponed.

However, it is seen that time and cost are exceptionally reliant upon one another and respond each other that is assuming we need to complete an undertaking before the booked date more assets are required and henceforth the expense increments.

The outcome shows that limit of the issues in development projects principally comes from the work related issue; it is expected that appropriate observing and controlling is done to stay away from expenses and time overwhelps. It is expected that the degree is perceived toward the start of the venture and the arranging is done as needs be to accomplish 100% extension. As though the booking is done right toward the starting then by legitimate checking and controlling of the venture the overwhelps can be kept away.

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