CHAPTER 43

Cost Escalation in Construction Projects

Abhishek Gajanan Kolekar[1], Sahil Baba Inamdaar[2], Shrinivasa Sahoo[2], Yogesh Vitthal Mangate[2]*

ABSTRACT

Cost increases for construction projects affect economic progress, viability, and financial planning. This study, which uses the Relative Importance Index (RII) technique to analyse the primary causes, polled 111 industry experts. The findings indicate that budgetary constraints, labour shortages, worker productivity, and changes in material prices are significant factors. Stakeholders have a variety of concerns; experts highlight material costs, contractors highlight labour issues, and customers highlight financial constraints. The study highlights the importance of proactive cost projection, efficient scheduling, and stakeholder involvement. The efficiency, sustainability, and financial stability of construction may be improved by lowering risks using BIM, AI-based cost forecasting, and improved contract management.

Keywords: Construction; Construction projects; Project management; Cost; Escalation.

1.0 Introduction

The construction industry is crucial to economic growth due to its contributions to GDP, employment, and infrastructure. Nevertheless, cost escalation—when actual spending exceeds budgets—remains a serious issue. Numerous factors that impact profitability, such as design modifications, poor planning, variations in material prices, budgetary constraints, and execution delays, can cause project delays or abandonment. This problem needs to be fixed if the project is to be efficient and financially sustainable. Stakeholder disputes, poor financial management, and poor planning are the main causes of cost inflation, which affects 60% of construction projects in India. For this study, which employed the Relative Importance Index (RII) to determine significant causes of cost escalation, 111 industry experts were surveyed. The findings assist companies, project managers, and legislators in developing data-driven strategies to improve cost control and reduce financial risks. The cost escalation in the construction industry across various organisational structures is examined in this study. Financial issues like cash flow issues and late payments, as well as site management inefficiencies like subcontractor performance, are significant causes for concern.

[1]*Corresponding author; School of Construction, NICMAR University, Pune, Maharashtra, India (E-mail: P2370196@student.nicmar.ac.in)*
[2]*School of Construction, NICMAR University, Pune, Maharashtra, India*

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It also examines non-human factors like design modifications, stakeholder cooperation, and shifts in material costs and availability. The study's primary focus on development projects in India may limit its applicability to other places. The reliability of the data is also a disadvantage because survey responses are subject to bias due to participant experiences and opinions. Furthermore, shifting market conditions, such as shifts in labour availability and material prices, are not considered in real time.

2.0 Literature Review

Rising construction costs continue to be a significant issue that affects project budgets, long-term financial viability, and economic growth. Prior research has identified the primary causes of cost overruns and provided remedies. According to (Memon *et al.*,2020) found several important factors, such as poor planning, changes to the design, delayed payments, and variations in material costs. In a similar (Touran *et al.*,2006) emphasised inadequate cost projections and financial mishandling in significant infrastructure projects. (Kanchana *et al.*, 2018) discovered that a lack of manpower, poor site management, and contractor inefficiency were the primary drivers of cost inflation in the Indian context.

Additionally, (Lende *et al.*,2023) linked misaligned stakeholders and inefficient resource allocation to monetary losses. Stakeholders have differing opinions about the causes of cost increases. Contractors usually blame labour shortages and fluctuating material prices, while consultants emphasise poor documentation and frequent design revisions. (Mulla *et al.*, 2015) Study Conducted by (Welde *et al.*,2020) conducted a study in Nigeria and found that while customers focus on budgetary constraints and productivity losses, advisors prioritise procurement and clearance delays. Although prior research has examined the causes of cost escalation, few studies have examined the distinctions between project types (residential vs. infrastructure). Additionally, there is no information on how data analytics and artificial intelligence could aid in cost containment. According to the literature review, misaligned stakeholders, inadequate planning, a shortage of employees, and financial mismanagement are the main causes of cost increases. Even though earlier research provides useful information, more sophisticated cost modelling, AI-based prediction, and improved collaboration frameworks are needed to improve cost predictability and project efficiency.

3.0 Research Methodology

This study investigates the causes of the increase in building costs using a methodical approach. To share their thoughts, 111 professionals from the industry including consultants, contractors, and project owners completed a questionnaire survey. To ensure the accuracy of the data, the study, which focusses on the Indian building sector, selects specialists with a minimum of five years of experience.

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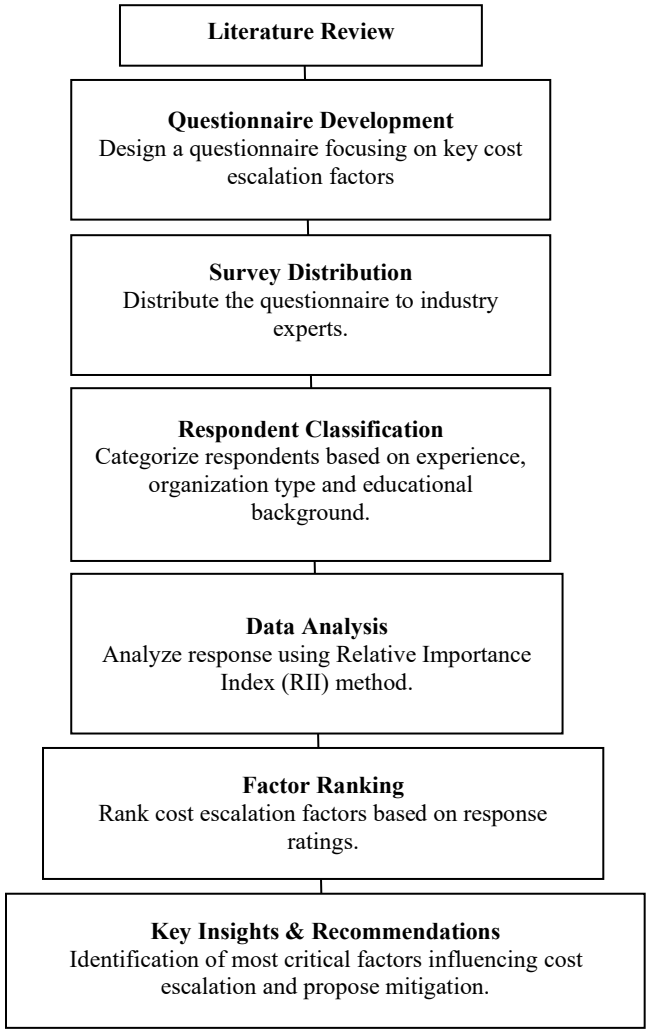

The present study will employ the ordinal scale as proposed by Enshassi *et al.*, (2022) which consists of follow mentioned categories: Extremely Significant (E.S), Very Significant (V.S), Slightly Significant (S.S), and Not Significant (N.S).

Likert Scale: The questionnaire utilized a 5-point Likert scale ranging from 1 to 5. Respondents were asked to rate a list of 13 factors causing cost escalation. To rank the factors influencing cost escalation, the Relative Importance Index (RII) was computed using the following formula RII = ∑W/A*N.

W = Weight assigned to each factor (1 to 5)

A = Highest possible weight (i.e., 5)

N = Total number of respondents

The higher the RII value, the greater the impact of that factor on cost escalation.

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4.0 Data Analysis

The respondents were categorized based on their years of experience, educational background, and kind of company to ensure diverse representation from a range of industrial sectors

4.1 Demographics of respondents

4.1.1 Educational background

The respondents had varying levels of education, ensuring a mix of academic and practical industry knowledge: The members' diverse educational backgrounds ensured a balance between practical and intellectual skills. The study's reliability was enhanced by the addition of specialised and field expertise from those with diplomas (7.21%) and PGDs (1.80%), which contrasted with the majority's master's (30.63%) and bachelor's (60.36%) degrees.

4.1.2 Experience level

To assess industry expertise, respondents were grouped based on their experience. Early-career professionals (1–5 years, 53.15%) offered fresh viewpoints, while mid-level specialists (6–10 years, 31.53%) balanced theory and practice. Senior professionals (11–15 years, 8.11%) and veterans (15+ years, 7.21%) contributed significant industry knowledge.

Figure 1: Education Level of Respondents

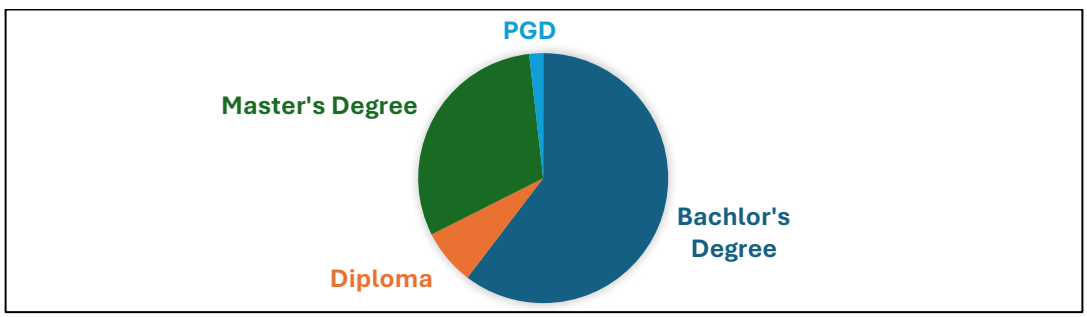
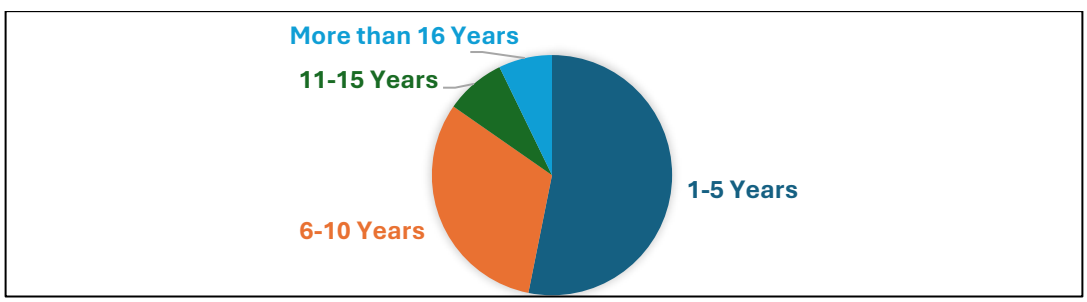


Figure 2: Experience of Respondents



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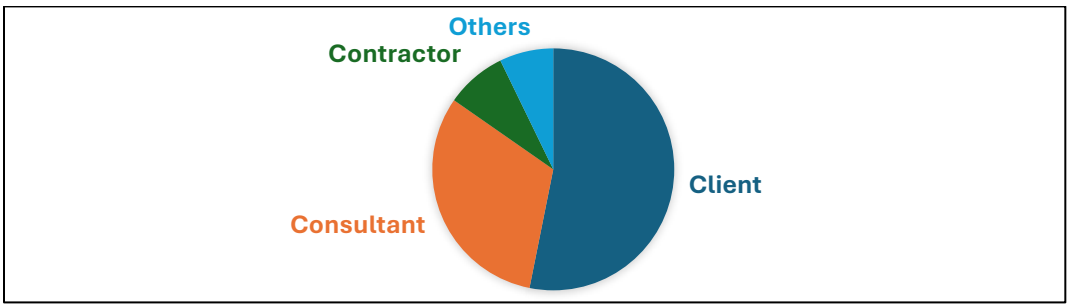
4.1.3 Organization type

Many people in the industry responded to the survey. Contractors (50.45%) focused on execution issues, consultants (18.91%) on design and planning, and clients/owners (18.02%) on budgetary constraints. The inclusion of fresh, business-focused perspectives from students and entrepreneurs (11.71%) guaranteed a comprehensive industrial outlook.

Figure 3: Organization Types of Respondents



4.2 Data analysis and results

The following table presents a comparative analysis of RII scores for the overall top-ranked cost escalation factors

Table 1: Overall Analysis of Cost Escalation Factors through RII & Ranking Method

Group	Factor	RII	Overall Rank
Contractor's site management related factors	Poor site management and supervision	0.62162	11
	Incompetent subcontractors & Lack of experience	0.68288	3
	Inadequate planning and scheduling or Schedule delay	0.65946	6
Design and documentation related factors	Mistakes and errors in design & Frequent design changes	0.66126	4
	Incomplete design at the time of tender	0.63423	9
Financial management related factors	Cash flow and financial difficulties faced by contractors	0.66126	4
	Financial difficulties & Delay in progress payment by the owner	0.62703	10
Information and Communication Related Factors	Lack of coordination between parties	0.65586	8
	Slow information flow between parties	0.60721	13
Human resource (workforce) related factors	Shortage of Site workers (Skilled, Unskilled) & technical personnel	0.68649	1
	Workers productivity & high cost	0.65766	7
Non-human resource related factors	Fluctuation of prices & Shortage of materials	0.68649	1
	Late delivery or Availability & Failure of Equipment and Materials	0.61982	12

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Table 2: Comparative Analysis of using Respondents' Organization Type – Client Perspective

Group	Factor	Client Perspective	
		RII	Rank
Contractor's site management related factors	Poor site management and supervision	0.69	9
	Incompetent subcontractors & Lack of experience	0.77	2
	Inadequate planning and scheduling or Schedule delay	0.72	7
Design and documentation related factors	Mistakes and errors in design & Frequent design changes	0.73	6
	Incomplete design at the time of tender	0.65	13
Financial management related factors	Cash flow and financial difficulties faced by contractors	0.7	8
	Financial difficulties & Delay in progress payment by the owner	0.66	10
Information and Communication Related Factors	Lack of coordination between parties	0.75	3
	Slow information flow between parties	0.66	10
Human resource (workforce) related factors	Shortage of Site workers (Skilled, Unskilled) & technical personnel	0.74	5
	Workers productivity & high cost	0.79	1
Non-human resource related factors	Fluctuation of prices & Shortage of materials	0.75	3
	Late delivery or Availability & Failure of Equipment and Materials	0.66	10

According to the results, the two primary drivers of rising building costs are labour shortages and shifts in material prices. Growing costs for steel, cement, and fuel put pressure on budgets, and a lack of workers leads to longer deadlines, more expensive labour, and delays, all of which lower project quality and emphasise the importance of workforce planning and stable prices. Customers identified the primary drivers of cost inflation as high expenses and employee productivity. Low productivity caused by inefficiencies, poor site management, and skill gaps leads to delays and higher labour costs. To lower labour-related costs and boost productivity, they strongly emphasise worker training, technology use, and efficient scheduling.

Experts acknowledge price fluctuations and material shortages as primary contributors to cost increases, often linked to inaccurate forecasts, inefficient designs, and contract modifications. Consultants place a strong emphasis on precise cost estimates, well-designed projects, and flexible contracts to lower these risks and improve budget stability.

Changes in material prices, incompetent subcontractors, and a lack of workers are the primary reasons given by contractors for cost increases. Lack of workers leads to poor performance, delays, and a greater need for expensive substitutes like overtime. They strongly emphasise better labour management, reliable subcontractor selection, and flexible procurement strategies to mitigate these challenges.

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Table 3: Analysis of Cost Escalation Factors through Consultants' Perspective

Group	Factor	Consultant's	
		RII	Rank
Contractor's site management related factors	Poor site management and supervision	0.59048	9
	Incompetent subcontractors & Lack of experience	0.73333	3
	Inadequate planning and scheduling or Schedule delay	0.64762	7
Design and documentation related factors	Mistakes and errors in design & Frequent design changes	0.68571	4
	Incomplete design at the time of tender	0.66667	5
Financial management related factors	Cash flow and financial difficulties faced by contractors	0.66667	5
	Financial difficulties & Delay in progress payment by the owner	0.5619	11
Information and Communication Related Factors	Lack of coordination between parties	0.62857	8
	Slow information flow between parties	0.52381	13
Human resource (workforce) related factors	Shortage of Site workers (Skilled, Unskilled) & technical personnel	0.74286	2
	Workers productivity & high cost	0.57143	10
Non-human resource related factors	Fluctuation of prices & Shortage of materials	0.77143	1
	Late delivery or Availability & Failure of Equipment and Materials	0.54286	12

Table 4: Cost Escalation Factors are Ranked based on Contractor's Perspective

Group	Factor	Contractor's Perspective	
		RII	Rank
Contractor's site management related factors	Poor site management and supervision	0.65	11
	Incompetent subcontractors & Lack of experience	0.65714	8
	Inadequate planning and scheduling or Schedule delay	0.66786	2
Design and documentation related factors	Mistakes and errors in design & Frequent design changes	0.65357	9
	Incomplete design at the time of tender	0.63929	13
Financial management related factors	Cash flow and financial difficulties faced by contractors	0.66786	2
	Financial difficulties & Delay in progress payment by the owner	0.66786	2
Information and Communication Related Factors	Lack of coordination between parties	0.66429	6
	Slow information flow between parties	0.65357	9
Human resource (workforce) related factors	Shortage of Site workers (Skilled, Unskilled) & technical personnel	0.675	1
	Workers productivity & high cost	0.66786	2
Non-human resource related factors	Fluctuation of prices & Shortage of materials	0.64643	12
	Late delivery or Availability & Failure of Equipment and Materials	0.66071	7

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Table 5: Others (Students and Entrepreneurs) Perspective towards Cost Escalation Factors

Group	Factor	Other's Perspective	
		RII	Rank
Contractor's site management related factors	Poor site management and supervision	0.47692	13
	Incompetent subcontractors & Lack of experience	0.6	2
	Inadequate planning and scheduling or Schedule delay	0.58462	3
Design and documentation related factors	Mistakes and errors in design & Frequent design changes	0.56923	6
	Incomplete design at the time of tender	0.56923	6
Financial management related factors	Cash flow and financial difficulties faced by contractors	0.58462	3
	Financial difficulties & Delay in progress payment by the owner	0.53846	10
Information and Communication Related Factors	Lack of coordination between parties	0.55385	8
	Slow information flow between parties	0.49231	12
Human resource (workforce) related factors	Shortage of Site workers (Skilled, Unskilled) & technical personnel	0.58462	3
	Workers productivity & high cost	0.55385	8
Non-human resource related factors	Fluctuation of prices & Shortage of materials	0.63077	1
	Late delivery or Availability & Failure of Equipment and Materials	0.53846	10

Other individuals (students and entrepreneurs): "Fluctuation of prices and shortage of materials" was e explanation that this group ranked highest because it combined academic and real-world knowledge about construction cost overruns.

5.0 Conclusion

According to the results, "Fluctuation of prices and shortage of materials" was shown to be the most important cause causing cost increases for all kinds of organizations. Furthermore, various stakeholders had differing opinions on which causes were most important:

- Clients identified "Worker productivity and high costs" as the primary concern.
- Consultants ranked "Fluctuation of prices and shortage of materials" as the top factor, often linked to cost prediction errors and contract inefficiencies.
- Contractors emphasized "Shortage of skilled and unskilled workers", affecting project execution.
- Others (students and business owners) also highlighted "Fluctuation of prices and shortage of materials" as a key concern.

In conclusion, addressing cost escalation requires collaboration between consultants, contractors, and clients through improved risk management and project governance. Future research should look at cost-control measures, technology adoption, and legislative frameworks

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to increase cost predictability in construction projects. If the study's findings are implemented, the construction industry will carry out projects more efficiently, fairly, and sustainably.

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