

A REVIEW ON FACTORS AFFECTING TIME AND COST OVERRUN – INDIAN SCENARIO.

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Abstract - This thesis report is about A Review on Factors Affecting Time and Cost Overrun – Indian Scenario.

As per the 342nd Report of the Ministry of Statistics and Programmed Implementation in India projects of public sector in India are seriously affected by cost overruns due to various reasons. Four-hundred ten projects were reviewed out of 727 running projects all over India. It was found that 235 projects running were with cost overruns out of 410 projects. It was around 57% projects which has quite large and serious indication towards remedial measures. Delay and cost are common phenomena in projects worldwide. However, these are especially severe in developing countries. (MOSPI 2014 Infrastructure Statistics)

After the Covid-19, many projects in construction industry facing delays and cost overruns may be because of labor unavailability, funds scarcity. This project aims at finding the cost and time overruns of the public sector projects in the last 5 years. so, the outcome of this project would give an idea that measure to be taken in future projects.

Key Words: *Time and Cost Overrun in Global Scenario, Time and cost overrun- Indian scenario, Anova.*

1. INTRODUCTION

Delay and cost increase are common phenomena in projects worldwide. However, these are especially severe in developing countries Cost overrun can be simply defined as when the final cost of the project exceeds the original estimates. Time overload is a crucial factor, even with technical advancements and

improved understanding of project management by project managers, time overrun is a critical factor. Delays are caused by factors such as postponement of material delivery to the site, malfunction of equipment, political problems, and several weather conditions. Delays in some circumstances make the situation much more difficult. Recognizing the delay causes and selecting precise and correct measures to minimize the detrimental effect of delays on the length of projects is important for a thorough evaluation.

Cost overrun is an unexpected change in the project budget that ends up increasing the total project cost. It can happen due to three primary reasons:

- a) Economic factors that occur due to inaccuracies in project budget or scope.
- b) Technical reasons including erroneous estimates or incorrect data gathering.
- c) Psychological causes including the presence of scope creep or any decrease in project commitment levels.

2. LITERATURE REVIEW:

2.1. Time And Cost Overrun In Global Scenario:

1. Zayyana et. al., (2014), studied cost overrun in the Malaysian construction industry projects. Questionnaire conducted in two parts, where the first part is related to respondent and their project. Second part is related to specific features of project that were identified from the literature as having potential bearing on cost variance. Cost overrun is studied with respective to project

sector, type of project and type of procurement. Analysis based on procurement and tendering methods suggests that design and build was associated with reduced cost overrun, followed by traditional then project management; whereas, selective tendering experienced 48% cost overrun above 0%, followed by negotiated method (52%) then open method (60%) [19].

2. Love et. al., (2014), studied on overruns in transport infrastructure projects. It has been suggested that a balanced approach to understanding the overrun phenomenon, taking into account both the inside and outside view together with recognition of the engineering, management, complexity, geographic, and political characteristics of projects, will provide a better understanding of cost and time overruns. Explicit strategic decisions made by policy makers can have an adverse impact on governance and delivery strategies for a project. Evidence suggesting that optimism bias and strategic misrepresentation are the sole explanations for overruns is misleading, although transactional evidence indicates that they do account for a significant contribution to time and cost overruns of transportation infrastructure projects [9].
3. Larsen et. al., (2015), studied on factors affecting schedule delay, cost overrun, and quality level in public construction projects. A questionnaire with 26 factors sent to the full population of publicly employed project managers. Factors were ranked using the relative importance index and tested for significant differences using Friedman's test and Wilcoxon's test was used in a post-hoc analysis. It is concluded that construction project schedule, budget, and quality level are affected significantly differently by critical success factors [8].
4. Senouci et. al., (2016), conducted their study to identify factors causing cost overrun of the public construction projects in Qatar and developed the prediction models for predicting project cost over runs based on the contract price value. A total of 122 projects data is considered which includes Drainages, roads and buildings. ANOVA had been used to compare various samples and to determine the difference. It is concluded that cost overruns for buildings increased with price and for drainage projects cost over runs decreases [17].
5. Raj Kapur Shah (2016), studied on the causes for delay and cost overrun in construction projects in Australia, Malaysia and Ghana. This study outlines the comparative analysis of delay factors and to classify these factors into different priority level of influence in project delay from country to country. The survey results highlighted that the most critical factors causing delay and cost overrun were ranked from the most to least influential factors using RII method and highlighted the three factors for each of the country [13].
6. Sambasivan et. al., (2016), had done the analysis on analysis of delays in Tanzanian construction industry using transaction cost economics (TCE) and structural equation modeling (SEM) approach. A total of 308 respondents participated in the study. The relationships between the cause-and-effect factors were analyzed using SEM. The important findings of this study related to the effects of delays are: cost overrun can be explained by consultant-related, material-related and time overrun factors ($R^2=0.164$); disputes can be explained by cost overrun ($R^2=0.475$); arbitration can be explained by consultant related, cost overrun, and dispute factors ($R^2=0.541$); litigation can be explained by client-related, disputes, and arbitration factors ($R^2=0.653$); and abandonment can be explained by consultant

related, external related, disputes, arbitration ,and litigation factors ($R^2=0.472$) [15].

7. Ghulam et. al., (2017), studied on factors causing cost overrun in Afghanistan. In this study pilot study is conducted with 10 professionals in Afghanistan construction industry. Relative importance index was calculated to rank the cause of cost overruns. Significant cost for cost overrun found to be corruption, delay in progress payment by clients, difficulties in financing projects by contractors and change order by clients during construction phase [6].
8. Ahiaga-Dagbui et. al., (2017), presented systematic view on cost overrun causation in Infrastructure Projects. This study explored some of the methodological deficiencies in the approaches adopted in a majority of cost overrun research. These include a poor understanding of systemicity and embeddedness of the sources of overruns, a dependence on correlational analysis, a lack of demonstrable causality and superficiality of the research design [2].
9. Hedaya and Saad (2017), investigated on causes and effects of cost overrun on construction Project in Bahrain. A total 45 factors are framed as a questionnaire and survey is conducted with representatives from local contracting, consulting, and client firms. Data is analyzed using frequency and severity index. It is concluded that frequent design changes, mistakes during construction, and schedule delay were considered as the most important factors of cost overrun causes in Bahrain construction industry [1].
10. Hazim et. al., (2017), conducted their research on delay and cost overruns in infrastructure projects over Jordan. A total of 14 infrastructure projects were conducted for the survey and a total of 20 factors were taken for questionnaire. It is concluded that most critical factors are terrain conditions, weather conditions, variation in orders and unavailability of labour are identified as reason for time and cost overrun. The discrepancy in the estimated and actual cost found to be very high [3].
11. Samarghandi et. al., (2017), investigated on reasons for delay and cost overrun in construction projects in Iran. First various parameters were studied from literature review and they are compared with the interviews taken by various industry professionals. It was found that similarities exist. A multinomial probability model was developed to estimate the amount of contribution of each delay factor in a construction project. The delay factors were categorised under four broad groups and the probability of the occurrence of each group was determined: (1) owner defects (27%), (2) contractor defects (17%), (3) consultant defects (25%) and (4) law, regulation and other general defects (31%) [7].
12. Muhammad et. al., (2017), studied on Time Overrun in Construction Projects of Developing Countries. Two important kinds of time overrun are considered in this study to develop the frame-work: one is excusable delay and second is non-excusable delay. 16 factors are taken for excusable delay and 8 factors are taken in non-excusable delay. A five likert scale was adopted as 1- 5 (Not Significant - Extremely Significant). Level of significance were assessed with Statistical Software Package SPSS using frequency and Average Index (A I) method calculated with formula. "Delay in shop drawings and sample materials" is the top most causative factor of time overrun (Non-Excusable Delay), similarly fire and Poor site management and supervision by contractor are also the top most causative factor of time overrun (Excusable Delays) [7].

13. Johnson and Babu (2018), conducted their analysis on Time and cost overruns in the UAE construction industry. Mixed methods approach or triangulation method is adopted as a means of collecting data in this research. The top five causes for time overrun were concluded as design variation from client and consultant, unrealistic schedules and completion dates projected by clients, delay in obtaining government permits and approvals, inaccurate time estimation by the consultants and change orders from clients. Whereas, the top five causes of cost overrun were summarized as design variation, poor cost estimation, delay in client's decision-making process, financial constraints of client and inappropriate procurement method [14].
14. Francisco et. al., (2019), studied on the determinants of cost deviations and overruns in Transport projects. Past research is enhanced by analyzing a new database of 1,091 projects, and, most importantly, by testing the effects of political, regulatory and legal, and economic determinants. This research concludes that exogenous determinants are also important for enhancing, or mitigating, cost overruns, both in terms of their statistical significance as well as the size of impact. This may have profound implications concerning public policy, because when undertaking large infrastructure developments plans, and estimating their potential cost [5].
15. Abdulaziz et. al., (2019), conducted their study on time and cost overrun in the Saudi Arabian oil and gas construction industry. They have conducted survey by taking total of 38 causes. To measure the significance of a certain cause, the significant index was employed. Five major causes of time and cost overrun, combined, were found to be "changing of design and scope by client during construction", "poor planning and scheduling of project", "design errors", "Inadequate comprehension of scope of work at the bidding stage", and "underestimating of cost and schedules/overestimating of benefits". Major cause of cost overrun was found to be underestimating of cost and schedules/overestimating of benefits [16].
16. Andric et. al., (2019), studied the cost performance and causes of overruns in infrastructure development projects in Asia. The evaluation of 102 major infrastructure projects was performed covering railways, roadways and energy sectors in different regions in Asia. The data about infrastructure projects is collected from Asian Development Bank (ADB). ADB has archived Project Completion Reports, which contain detailed information about estimated cost, actual cost, duration, causes of cost escalation and schedule delays. One-way ANOVA is used to compare the mean values of cost overruns for different types of infrastructure and cost overruns for projects in different geographical location and for identifying and analyzing causes of cost overruns in projects in Asia, a qualitative method is used with the aid of software package NVivo12. Approximately, cost overruns in infrastructure projects in Asia decrease by 1% every year. The key causes of cost overruns are: increase cost of resources (construction materials, equipment, and labor), construction works, changes in design specifications, land acquisition and resettlement, and changes in currency exchange [4].

2.2. Time and cost overrun- Indian scenario:

1. Subramani et. al., (2014), done a study on causes of cost overrun in construction. Spearman rank order correlation analysis was used to evaluate whether consensus of opinions exists between groups of

respondents (client versus consultant, client versus contractor and consultant versus contractor). From the analysis of the results, it was concluded that consensus of opinion exists between respondents on the causes of cost overrun. The results showed that, slow decision making, poor schedule management, increase in material/machine prices, poor contract management, poor design/ delay in providing design, rework due to wrong work, problems in land acquisition, wrong estimation/ estimation method, and long period between design and time of bidding/tendering are the major causes of cost overrun [19].

2. Wanjari and Dobariya (2016), conducted their study to identify the factors causing cost overrun of the construction projects in India. They have taken short questionnaire on a four-point Likert scale with 15 prominent factors responsible for cost overrun. These factors include price escalation of raw materials, dispute on bill settlement, delay in planned activity, ambiguous or incomplete tender document, additional work, frequent design changes, lack of co-ordination between construction parties, fraudulent practices and kickbacks, mistake during construction, force majeure, high quality expectation from owner, shortening of contract period, wastage on site, relation between site management and labour, poor financial control on site. A total of 85 responses were received from clients, contractors and consultants. it was analysed using various statistical tools such as analysis of variance (ANOVA) and factor analysis tool using SPSS. Top three factors affecting cost overruns were identified such as price escalation of raw material, delay in planned activity and lack of co-ordination between construction parties. Based on this results solution are proposed for above three factors [21].

3. Venkateswaran and Rajiah (2017), studied on time delay and cost overrun of Road over Bridge (ROB) Construction Projects in India. In this study, the topmost factors were ranked based on the frequency of occurrences. The correlation among owners, contractors, and consultants on ranking of factors was derived by Spearman rank correlation. Factor analysis was used to classify the factors into groups and identify the key groups responsible for time delay and cost overrun of projects. The five top most factors identified as responsible for causing time delay and cost overrun of ROB construction projects in the order of significance are: (1) land acquisition, (2) many stakeholders, (3) displacement of network, (4) legal requirements, and (5) claims and disputes [20].
4. Prasad et. al., (2018), done a study on critical causes of time overrun in Indian construction projects and mitigation measures. Sixty causes of delay identified from literature were selected for the study and ranked using the Importance Index (II). Financial related causes viz., delay in settlement of claims by owner, contractor's financial difficulties, delay in payment for extra work/ variations and late payment from contractor to subcontractors/suppliers were found to be the most critical causes of delay in all the type of projects [13].

3. PROPOSED WORK:

a) Objectives:

- 1) To study the literature and identify the factors that are most commonly affecting the time and cost overrun in road infrastructure projects.
- 2) To prepare and conduct questionnaire survey to collect data of time and cost overrun effect in road infrastructure projects.

- 3) To analyze data using statistical tool- Annova according to size of data.
- 4) To rank the factors after analysis and suggesting recommendations.

b) Methodology:

To achieve the objectives of this study, the following methodology is adopted.

- 1) Reviewing the literature existed on time and cost over runs in road infrastructure projects to summarize the delay and cost overrun parameters for analysis.
- 2) Preparation of questionnaire survey suitable for road infrastructure projects.
- 3) Selection of competent industrial professional to answer the survey.
- 4) Collection of answers from industry professionals and for further analysis using a statistical tool- Annova.

4. CONCLUSIONS

This thesis has dealt with Factors Affecting Time and Cost Overrun – Indian Scenario. It was found in this research that Delay is one of the most general, major and serious issues affecting the time factor in construction projects in civil engineering. Time and cost over runs have limited research in view of public sector projects. So, output of this work will be useful to control the time and cost overruns in further projects.

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