



Most Common Factors Causing Cost Overrun with its Mitigation Measure for Pakistan Construction Industry

Samiullah Sohu^{1*}, Abdul Aziz Ansari², Ashfaque Ahmed Jhatial³

¹Department of Civil Engineering, Quaid-e-Awam University of Engineering, Science and Technology, Larkana Campus, Larkana, Sindh, PAKISTAN

²Department of Civil Engineering, Ziauddin University Faculty of Engineering, Science, Technology and Management (ZUFESTM). Karachi, PAKISTAN

³Department of Civil Engineering, Mehran University of Engineering and Technology, Shaheed Zulfiqar Ali Bhutto Campus, Khairpur Mirs', Sindh, PAKISTAN

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Abstract: Cost overrun is known as the leading challenge for stakeholders of the construction sector. Like most countries, Pakistan also facing this challenge for the last few decades. Literature review was conducted and managed to identify 34 factors which contributed to cost overrun in the construction industry. These factors were used as the main content in designing the questionnaire. Respondents were required to rate these factors based on 4-points Likert scale on the degree of commonly occurred. Survey was carried out involved 130 stakeholders of the construction sector to determine main factors of the overrun. Data was collected, analysed statistically using the average index method and found 10 most commonly occurred of cost overrun factors for Pakistan construction industry are *financial crisis faced by the client; mistakes in making proper estimation; faults in drawing; delay in getting approval from the client; poor planning by client; incompetency of contractor; poor supervision of the consultant; delay in payment to the contractor; communication gap between parties and natural disaster*. These factors were further explained together with its mitigation measure. The findings of this study can help to Pakistani construction community in controlling the cost overrun for their construction projects.

Keywords: Main Causes, Cost Overrun, Construction sector of Pakistan

1. Introduction

The construction industry contributes a significant role in the economic growth and development of any country (Jhatial *et al.*, 2018). The construction industry not only provides essential infrastructures such as residential buildings, industrial buildings, educational buildings, hospitals, roads, recreational centres, airports, ports, highways, and railways for improving the quality of lifestyle but it also generates a large number of employment opportunities (Jones *et al.*, 2014). A construction project is considered successful when the project is completed on schedule time, within the planned budget and satisfying quality standards (Sohu *et al.*, 2018; Chan *et al.*, 2002). However, despite its proven importance, the construction industry faces severe problems like excessive resource consumption, environmental threats, poor quality, low productivity, low skilled workers, time extension and budget extension (Siemiatycki, 2018, Jusoh & Kasim, 2017). According to Alzebedeh *et al.* (2019) study, budget overrun was identified as a significant issue in the construction project. Furthermore, Creedy *et al.* (2010) study found that budget overrun is the variance amongst the initial budget and the final budget of the project after a construction project.

2. Literature Review

Many researches have been conducted for identification of factors leading to budget overrun in the construction industry. Like Asiedu & Alfen study, it identified causes instigating cost overrun in public buildings schemes in Ghana (Asiedu & Alfen, 2016). The research was conducted through a questionnaire survey, with 240 respondents involved public clients, consultants, and contractors. The study found that major factors affecting construction project cost were *delay in payment for progress work, deficiency of implementation of contract terms by stakeholders, errors within public procurement law (PPL), extra works as results of changes in site situations, cost variation of materials and labour, poor competency of contractors, poor budget estimation of project cost, and irregularities in awarding contacts*. Subramani et al. (2014) examined cost overruns factors in construction projects in India, and the results listed the main causative factors of cost overrun were *slow speed of decision making, poor design, delay in preparing the design, poor schedule management, non-performance of sub-contractors, and increase in material/machine prices*. Gurgun & Koc (2020) surveyed residential construction projects in Turkey and determined 7 crucial causative factors namely *unsuitable project planning, underestimate project cost, high cost of materials, expensive machinery, shortage of skilled labours, fluctuation in the cost of materials and high cost of land*. A survey by Ramabodu & Verster (2013) among stakeholders to determine the budget overrun factors in South Africa, found critical factors for cost overrun were *incomplete design and drawing at tendering, modification in the scope of work, improper planning, lack of project monitoring, and additional work*. Ting et al. (2019) investigated the increased budget in the Cambodia construction industry and found the contributing factors as the *wrong estimation, lack of communication among project stakeholders on site, shortage of skilled workers, inadequate project management, and inappropriate construction method*. The common factors causing cost overrun are listed in table 1.

Table 1 - list of factors causing cost overrun from the literature review

No	Factors causing cost overrun	No	Factors causing cost overrun
1	Delay in making design	18	Delay in getting approval from the client
2	The poor selection process of contractor	19	Delay in taking a decision
3	Poor supervision of the consultant	20	Client mismanagement
4	Inadequate design	21	Poor planning by client
5	Mistakes in making proper estimation	22	The communication gap between parties
6	Design faults	23	Poor site management
7	Natural disaster	24	Delay in payment to the contractor
8	Incompetency of contractor	25	Delay in payment by the client
9	Change in scope	26	Poor inspection
10	No proper planning	27	Conflict between parties
11	Mistakes in construction	28	Delay in payment
12	Inflation	29	Inexperienced staff
13	Additional work	30	Inaccurate time estimation
14	Shortage of labour	31	Poor monitoring
15	Problems at site	32	Poor project management
16	Unforeseen conditions	33	Faults in drawing
17	Client interfere	34	Financial crisis faced by the client

These 34 causing cost overrun factors were used as the main content of the questionnaire of this study. The respondents were requested to rate these factors based on Likert scale on the degree of most commonly occurred.

3. Research Methodology

This study adopted a quantitative approach where the data was collected through a structured questionnaire survey. Two surveys were conducted where the first survey was to find the important, and the main root causes budget and cost overrun, and the second survey was to control the important causes of budget and cost overrun. An in-depth literature review was carried out, and a total of 34 common causes/factors that affect the cost of construction engineering projects. In the first survey, a questionnaire was designed based on these factors and distributed among 130 targeted respondents of highway projects from the client, consultant, and contractors. The developed questionnaire was distributed among respondents from five provinces of Pakistan. Four points Likert scale was used in the questionnaire which state (1) = Strongly Not agree (SNA); (2) = Disagree (D); (3) = Slightly agree (SA) and (4) = Strongly agree (SA) that is commonly occurred in handling construction projects in Pakistan. Average index (AI) was used to calculate the weight of responses of each factor (Adeyemi, Martin & Kasim, 2017). Then the weight of responses was used to rank most commonly occurred factors.

4. Analysis and Findings

A total of 130 questionnaires were distributed to the selected respondent randomly, and only 97 responses were received, and this indicates a response rate of 75%. However, after the analysis, only 89 answers were found valid meaning representing only 68%. The percentage composition of the respondents is as figure 1.

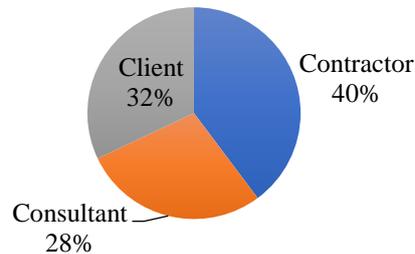


Fig. 1 - Composition percentage of respondents

Collected data were analysed using the average or mean method. This method generated mean value or score, which was used to rank the factors. Table 2 shows the ten (10) most commonly causes or factors that occurred in Pakistan construction industry.

Table 2 - most commonly occurred causes of cost overrun

Factors	Rank	Mean Value Score
Financial crisis faced by the client	01	4.631
Mistakes in making proper estimation	02	4.475
Faults in drawing	03	4.319
Delay in getting approval from the client	04	4.197
Poor planning by client	05	3.914
Incompetency of contractor	06	3.674
Poor supervision of the consultant	07	3.557
Delay in payment to the contractor	08	3.410
Communication Gap between parties	09	3.317
Natural Disaster	10	3.192

The elaborations of the ten (10) most commonly occurred factors or cause of cost overrun together with its mitigation measure are as follow:

4.1 Financial crisis faced by the client

Financial crisis faced by the client should be considered before contract can be considered as the most appropriate mitigation measure for the financial crisis faced by the client. Before any contract agreement, it is very much important for the client to show the funding for the project clearly. According to Sekar *et al.* (2018) that Malaysian construction projects have faced cost overrun in many projects due to the financial crisis faced by the client.

4.2 Mistakes in Making Proper Estimation

Consider the true market constraints during estimating project cost was found a suitable mitigation measure for the factor of mistakes in making a proper estimation. It is important to take suitable market rates for the proper estimation of the project. Prasad *et al.* (2019) discussed that cost overrun is increased in construction projects, more than 30% due to mistakes in making a proper estimation.

4.3 Faults in Drawing

Proper adopts design & data should be collected from site is the most suitable measure with for the faults in drawing because of faults in drawing, revision of the drawings is made which affects budget and time of the project as well. Perera *et al.* (2020) stated that mistakes and faults in design and drawing had made cost overrun in construction projects.

4.4 Delay in Approval from Client

Frequent meetings with stakeholders of the project should be arranged was found most controlling measure for the factor of delay in approval from the client. Frequently meeting with the client, contractor, and consultants can resolve the delay of approval of different items. Sambasivan *et al.* (2017) confirmed that delay in approval from client factor had increased the cost overrun ratio in construction projects.

4.5 Poor Planning by Client

Ensure proper planning at each stage of the project found as the most significant measure for the factor of Poor planning by the client with value. It should be assured that planning should be done for each activity of the project. Al-Hazim *et al.* (2017) confirmed that more than 20% of the projects had faced cost overrun due to poor planning by the client.

4.6 Incompetency of contractor

Selection of contractors of having good experience was identified as the most reliable mitigation for the factors of incompetency of contractors. An experienced contractor has skills and proper management to complete the project in each budget. A study carried by Memon *et al.* (2011) that cost overrun is found in construction projects mostly due to the incompetency of the contractor.

4.7 Poor Supervision of Consultant

Appointment of well qualified and competent staff in consultant is the most suitable measure for the factor of poor supervision of a consultant. An appointment should be made based on qualified and experienced in the consultant. Poor monitoring and supervision of the staff of the consultant caused cost overrun in mega projects of Ghana [Famiyeh *et al.*, 2017).

4.8 Delay in Payment to Contractor

Financially Strong contractor should be selected for the construction projects was found as the most controlling measure for the factor of delay in payment to the contractor. The stable financial contractor can continue the construction activities in the project if any delay of payment from the client (Sohu *et al.* 2017).

4.9 Communication gap between parties

Establishment a chain of command for communication between parties on a construction project was identified as the main measure for the factor of communication gap between parties. Ullah *et al.* (2018) reported that cost overrun had been found in building projects of Malaysia due to the communication gap between parties.

4.10 Natural Disaster

Proper arrangements should be made during the period of natural disaster as the measure for the factor of Natural disaster. Proper arrangements should be made during an earthquake, heavy rainfall, floods, etc. A research conducted by confirmed that natural disaster had played an important role in cost overrun in construction projects of Pakistan (Khan & Umer, 2020).

5. Conclusion

Cost overrun in the construction industry is not only the issue of developing countries, but it also faced by developed countries, especially Pakistan. This study has identified ten main common causes of cost overrun in the Pakistan construction sector. These factors are *financial crisis faced by the client; mistakes in making proper estimation; faults in drawing; delay in getting approval from the client; poor planning by the client; incompetency of contractor; poor supervision of the consultant; delay in payment to the contractor; communication gap between parties and natural disaster*. The problem of cost overrun can be reduced up to a certain level by controlling these identified main factors and this research can be beneficial to control budget up to a certain level. These factors were further explained together with its mitigation measure. The findings of this study can help to Pakistani construction community in handling their construction projects successfully.

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