

Cost Performance in Construction Industry of Pakistan

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Abstract:

Construction industry is notorious and infamous as far as cost base lines and project budgets are concerned. More than 90 percent of projects delay gets over budgeted or completely abandoned due to either paucity of funds or mismanagement at different levels. Despite a major contributor in the Gross Domestic Product of a country, its full potential has never been exploited. Perhaps this retrogressive atmosphere has been cultivated by callous, careless and unprofessional attitudes of all stakeholders of construction industry. The primary stakeholders which affect the projects positively or negatively in cost dimension are; the government, the contractors, the consultants and the clients or owners. The authors conducted interviews as well as surveys with construction professionals, contractors, architects, design engineers, suppliers and sub contractors in order identify the most occurring causes of cost overruns in construction projects. In addition to this contemporary literature was studied and reviewed with a purpose to assess the current and ongoing issues in the construction industry. A questionnaire was distributed among respondents on cost performance of various completed and under construction projects, with a view to highlight the concrete reasons which push the projects out of approved budgets. The major conclusions from this research paper which have been drawn are; corruption and bribery, political interests, poor site management, delay in site mobilization, rigid attitude by consultants, extra work without approvals, frequent changes during execution, gold plating, safety and health and limited access to job sites. In order to avoid, eliminate or mitigate effects of these causes viable recommendations have been recommended.

Keywords: Cost Performance, Construction Industry, Pakistan

1. Introduction

It is very unfortunate that the construction industry does not enjoy good reputation despite the fact it is one of the largest sector of Pakistan. It provides wide job opportunities and holds contributors substantially towards growth of GDP [1-2]. Though it possesses a very significant potential but unfortunately that has not been address and exploited holistically. The situation has further been aggravated and defamed by hijacking of this industry by unethical and unprofessional individuals and organizations. Majority of the contractors and the design professionals do not hold proper professional experience as well as licenses. Due to these factors the industry has virtually become infamous and notorious.

1.1. It is not easy to handle construction projects because there are variety of actors and factors which lay critical role in the performance of construction contractors and projects. The industry has diversified stakeholders like; design professionals, contractors, suppliers, government regulatory agencies, clients and external factors. The

external factors or causes can be safety and health, law and order, natural disasters, extreme weather conditions, public non cooperation and limited site access. [5]

1.2. Cost overruns are in high frequency in developing countries but developed and advanced economies are not even exception to this issue. [3-4]. As defined by Project Management Institute, USA every project three constraints which are Time, Cost and Scope. Delay or disruption in any one constraint, will have serious repercussions over rest of the two. Any slag in cost dimension will slip the project out of approved schedule, baselines.

1.3. In order to increase the performance and the productivity of the projects, it is very much essential to lay special emphasis on planning and other issues which have been identified in the findings. In this paper a sincere effort has been made to rate and rank the most probable causes which result into cost overruns in construction projects.

2. Research Objectives

The research objectives are:

2.1. To identify the causes of cost overruns which affect the cost performance in construction projects.

2.2. To recommend suitable measures in order to exploit the full potential of the construction industry.

3. Literature Review:

3.1. Construction industry is well known for its wide employment opportunities and a significant contributors for development and economic growth of any country. Today the one of the major challenges which this industry facing is, cost overruns of projects schedule baselines. This phenomenon taxes the sponsors or clients more heavily due to poor productivity and loss of revenue [1]. It is also an established fact that major of cost overruns arise out of client's actions; such as poor financial arrangement, slow in decision making, and lack of intimate involvement in planning [2]. Lack of state-of-the-art methodology and technology as well as modern tools and techniques impedes the progress of the project drastically. It also entails reworks, scrap, change orders, design errors and constructability issues [3]. Out of Triple Constraints of Time, Cost and Scope; performance of time and cost for a construction project are directly linked together. Slip in cost baseline will directly influence cost overruns. Normally five major causes of cost overruns are; scope revisions, delay in progress payments, exchange rate fluctuations, poor site management and dearth of resources [4].

3.2. Researchers also suggest that lack of communication among primary stakeholders results into conflicts in project methodologies, designs, integration of subsidiary management plans, and constructability issues during execution phase. When such environment prevails then design engineers architects and the contractor cannot synchronize their efforts for a common project goals [5]. This problem / situation gets compounded when the designer or architect are egoistic and rigid in their approach towards dealing with contractors. They try to enforce their own verdict may it be on fault lines.

3.3. Sometimes consultants become so rigid that either they do not give approvals of shop drawings or try to delay as much as they can. Instances have also been reported when consultants added additional scope in order to pad up project cost without formal approval of the client [6]. This unprofessional attitude have resulted into 29% of cost overruns [7]. Once the project is formally kicked off for execution of works, the contractor and consultant get involved in fire fighting because they had not spent enough time for detailed planning of the project. Similarly poor alignment of goals between contractor and the client intensifies cost performance of the project. [8]

3.4. FIFA World Cup Stadium 2010 project which was very meticulously planned and executed in South Africa, was not exception to cost overruns. In that project client; designers, and the contractors were equally responsible for contributing factors which affected the project. The main factors remained; inaccurate quantity surveying, change orders, design errors and omissions, slowness in decision making by client, lack of communication management, delay in work approval and incomplete drawings. [9]

3.5. Now the question arises, how to address this gap so that projects can be completed on budget. There are three types of project controls i.e. pushing project teams to work faster, having staff work over time and adding up additional staff. This methodology relies upon resource management for increasing the productivity or reducing

reworks. For the purpose of monitoring the cost performance index (SPI), a proper system of feedback is tied with this system of Dynamics model [10-11]. Construction industry is a competitive high-risk business in the world. Countries have adopted numerous project delivery system or methods in order to averse the risks; such as fixed price or lump sum, design build, partnering and joint ventures. Malaysian construction industry has successfully reaped the benefits of partnering in construction projects. Through this arrangement, the industry achieved high customer satisfaction, enhanced communications, reduced reworks, superior quality, improved time control and lesser disputes [12].

3.6 Most of the reworks in construction projects arise out of lack of budget. This trend can only be eliminated or mitigated if client and design team coordinate at each phase, managing site effectively, improving project communications and modern procurements like JIT are adopted in a holistic manner. Further to this, government should adopt conducive taxation and public procurement policy through which hegemony of market forces and price escalations can be controlled [13-14].

4. Research Methodology

4.1 This research was spanned over two phases i.e.; data collection and data analysis. For the purpose of data pertaining to the causes which slip the schedule baselines of projects. The questionnaire was divided into two parts. In part A, general information about respondents was asked so that reliability and validity of the data can be ensured. Moreover in case of missing data or untrue information, outliers can be eliminated. In part B, specific questions were asked. These questions were grouped into five domains, and each domain depicted a particular stakeholder of projects. These were; the government, contractor, consultant, owner/client and other factors. Each domain had one major question having ten options (causes). There were total five major questions and fifty causes of cost overruns.

4.2 First the authors discussed about the questionnaire with industry related contractors, construction managers, architects, design professionals, suppliers, sub contractors and supervisors for ascertaining and confirming whether this questionnaire was enough for data collection. After through discussions with renowned and well reputed industry professionals like M/S Ahmad Zaka & Associate, M/S Amin Tariq & Associate, M/S Suhail Ahmad & Associate, M/S Shami Associates, M/S Tijaarat Developers and M/S Adeel Associate, to questionnaire was approval with minor modifications.

4.3 In the next step, the authors carried out random sampling for the solution of the respondents. A total of 150 questionnaires were distributed among the respondents from government departments, contractors, consultants, clients, professional civil engineers and project managers. A part from this the authors interviewed the skilled and unskilled labors who are working in different construction projects. The panel of authors received 83 completed questionnaires which come to about 55.33 percent of response. Once the major milestone was achieved, the authors analyzed the data by using statpro software. The breakdown of the respondents is as under:-

5. Results and Discussions

This research has divided into five domains, the detail of results is described in the succeeding paragraphs:-

5.1 Cost Overruns Due to Government.

Government has a concrete role to play for the construction industry. Its policies and regulation have direct bearing over the performance of the construction projects. If a market which is controlled and dominated by flow big suppliers or manufacturers, it will exert devastating effects on construction industry; because they will monopolize and enforce their own selling prices and rates. This trend and practice best flourishes under fragile economic environments as they prevail today.

Weak economy is a hurdle towards timely completion of projects because of insufficient funds necessary for making progress payments maintenance of cash flows. This problem is escalated exponentially when taxes are high for procurement of construction materials.

In developing economies the involvement of politicians in the development works and infrastructure projects is enormous. They try to steer these projects according to their vested interests. Similarly political uncertainty and favouritism add fuel to this situation.

In the backdrop of these circumstances, though government has adopted stringent measures like establishment of Planning Commission of Pakistan and Public Procurement Regulatory Agency (PPRA) but still there is a lot needs to be done. In this domain of questionnaire, the majority of respondents indicated top two causes i.e; corruption and bribery and political interests with a average ratings of 1.28 and 2.72 respectively. The other causes alongwith ratings are described in table 1 and figure 1 below:

Table 1: Rating of Causes Overruns due to Government

	1	2	3	4	5	6	7	8	9	10	Rating Average	Response Count
Lack of Funds	1.2% (1)	3.6% (3)	2.4% (2)	14.5% (12)	78.3% (65)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	4.65	83
Lack of control overprices	2.4% (2)	3.6% (3)	10.8% (9)	79.5% (66)	1.2% (1)	0.0% (0)	1.2% (1)	0.0% (0)	1.2% (1)	0.0% (0)	3.86	83
Weak Economy	0.0% (0)	0.0% (0)	1.2% (1)	1.2% (1)	2.4% (2)	7.2% (6)	4.8% (4)	81.9% (68)	1.2% (1)	0.0% (0)	7.64	83
Change of Management	0.0% (0)	0.0% (0)	2.4% (2)	0.0% (0)	3.6% (3)	12.0% (10)	75.9% (63)	4.8% (4)	1.2% (1)	0.0% (0)	6.78	83
Unrealistic Schedule	0.0% (0)	0.0% (0)	2.4% (2)	1.2% (1)	1.2% (1)	3.6% (3)	2.4% (2)	2.4% (2)	85.5% (71)	1.2% (1)	8.58	83
Political uncertainty	1.2% (1)	1.2% (1)	80.7% (67)	0.0% (0)	10.8% (9)	0.0% (0)	2.4% (2)	3.6% (3)	0.0% (0)	0.0% (0)	3.46	83
Delay in progress payments	1.2% (1)	1.2% (1)	0.0% (0)	1.2% (1)	1.2% (1)	72.3% (60)	12.0% (10)	6.0% (5)	3.6% (3)	1.2% (1)	6.25	83
Favouritism	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	1.2% (1)	2.4% (2)	0.0% (0)	1.2% (1)	3.6% (3)	91.6% (76)	9.78	83
Corruption and Bribery	94.0% (78)	1.2% (1)	0.0% (0)	1.2% (1)	0.0% (0)	1.2% (1)	1.2% (1)	0.0% (0)	1.2% (1)	0.0% (0)	1.28	83
Political Interests	0.0% (0)	89.2% (74)	0.0% (0)	1.2% (1)	0.0% (0)	1.2% (1)	0.0% (0)	0.0% (0)	2.4% (2)	6.0% (5)	2.72	83

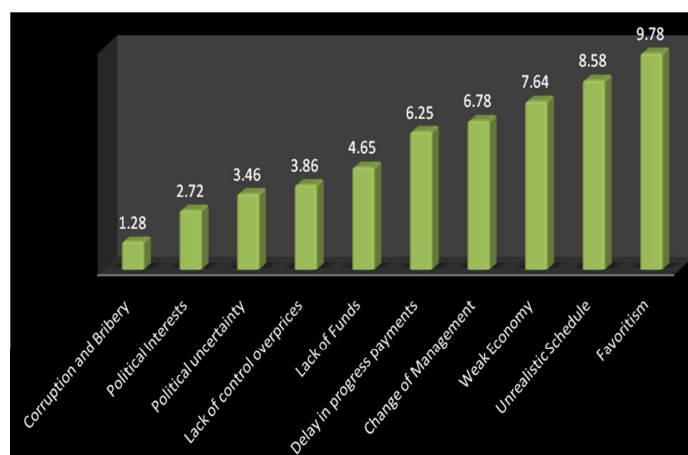


Figure 1 (a): Rating of Causes due to Government

5.2 *Cost overrun due to contractor.*

This is the prime stakeholders of any construction project who is the actual doer or executioner entity. This is the vision of owner on ground. Instances have been seen and various publications data reveals that most of the contractors, do not get mobilized immediately after award of the contracts. This is definitely an unnecessary and unwanted delay which shows a callous attitude towards performance of contract and the project and incurs extra cost. The other connected to this issue is site management after getting mobilized; which includes establishment of access, routes, offices, material laboratories, PMIS office, warehouse or storage, labor accommodation and supply chain for men, machines and materials. Those contractors who are weak in planning at detailed level, exhibit such type of response at job site. The issue gets aggravated when, the contractor does not possess good financial health, and capacity to manage complete range of construction activities on the project. So eventually the quality of the project gets compromised which results into disputes with suppliers and subcontractors.

It has been observed that lack of Project Management Information System (PMIS) and modern construction technology like batch plants, tower cranes, cargo lifts, concrete pumps and transit mixers etc escalates the situation to a drastic level.

All of these causes were made part of this survey and were annexed to this domain. Ten most accruing reasons were identified for soliciting the ranking and severity from respondents. After a thorough analysis of the data, the response count was 83. The respondents rated Poor Site Management and delay in site mobilization as the top two significant causes with a response route of 1.02 and 2.47 respectively. These results have been tabulated in Table 2 and plotted on figure 2 and 3 respectively.

Table 2: Rating Cost overrun due to contractor

	1	2	3	4	5	6	7	8	9	10	Rating Average	Response Count
Poor Site Management	97.6% (81)	2.4% (2)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	1.02	83
Lack of Construction Technology	1.2% (1)	8.4% (7)	2.4% (2)	88.0% (73)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	3.77	83
Re-works	0.0% (0)	1.2% (1)	6.0% (5)	3.6% (3)	89.2% (74)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	4.81	83
Wastage and Scrap	0.0% (0)	0.0% (0)	0.0% (0)	2.4% (2)	4.8% (4)	91.6% (76)	0.0% (0)	0.0% (0)	0.0% (0)	1.2% (1)	5.95	83
Poor Estimation	0.0% (0)	1.2% (1)	3.6% (3)	0.0% (0)	1.2% (1)	6.0% (5)	85.5% (71)	1.2% (1)	1.2% (1)	0.0% (0)	6.75	83
Delay in Site Mobilization	0.0% (0)	86.7% (72)	0.0% (0)	3.6% (3)	3.6% (3)	1.2% (1)	4.8% (4)	0.0% (0)	0.0% (0)	0.0% (0)	2.47	83
Poor Financial Health	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	1.2% (1)	1.2% (1)	4.8% (4)	22.9% (19)	69.9% (58)	0.0% (0)	8.59	83
Disputes with Sub-Contractors	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	1.2% (1)	3.6% (3)	8.4% (7)	86.7% (72)	9.81	83
Lack of PMIS	0.0% (0)	0.0% (0)	88.0% (73)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	1.2% (1)	7.2% (6)	3.6% (3)	3.75	83
Poor Communications	1.2% (1)	0.0% (0)	0.0% (0)	2.4% (2)	0.0% (0)	0.0% (0)	3.6% (3)	71.1% (59)	13.3% (11)	8.4% (7)	8.08	83

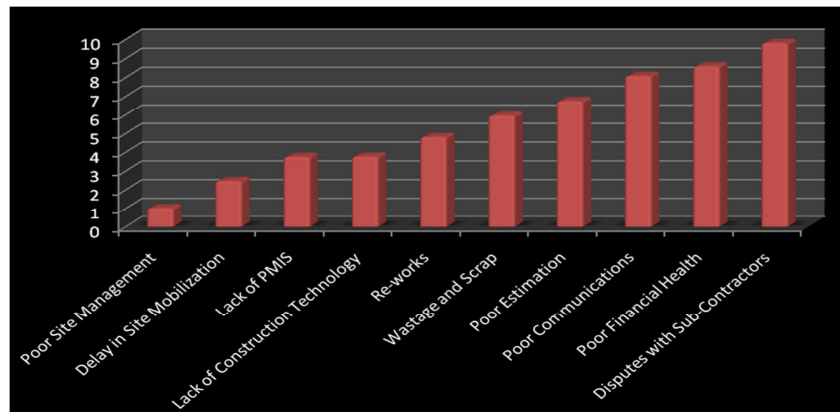


Figure 2 (a): Ranking of Cost overrun due to contractor

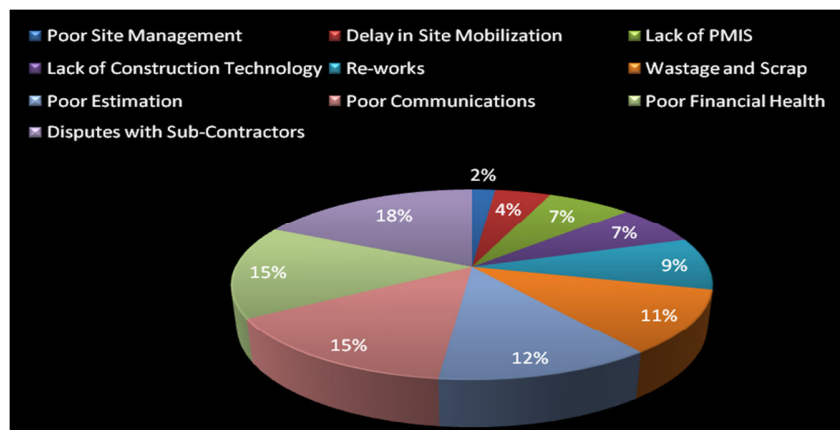


Figure 2 (b): Ranking of Cost overrun due to contractor

5.3 Cost Overrun due to Consultants. In the construction industry of Pakistan, there is a general perception that consultants (both the design professionals and the architects) enjoy ultimate verdict and decision power for constructability issues on projects. It is unwise to say that contractors are the sole entities who are to be blamed for delay, failure or abandonment of construction projects.

If objectively analyzed, consultants have direct influence and affect over success or failure of construction projects. Their professional or unprofessional actions do lay good or bad repercussions on to contractors and the projects alike. For instance, when their will be clash and conflict among structural, public health works, electric and water supply drawings with architectural drawings, the ultimate problem will be shifted to the contractor. He may not be able to execute the drawings due design errors, missing or insufficient data, and lack integration of subsidiary plans.

This situation is further exploited when the consultants either do not get approval of shop drawings prepared by the contractors or altogether reject it.

Similarly there is a common trend of hiring few Auto CAD operators for preparing drawings and their supporting sections and elevations. They are neither engineers or architects nor they are authorized to prepare drawing on their

own. They are infact, helpers for the design professionals and the architects. Hence total reliance on CAD operators will lead to constructability issues on jobsites and additional cost of clash detection will be incurred.

Being professionals, it becomes imperative to implement on open door policy so that every stakeholder can access for seeking guidance and consultations pertaining to the projects. Unfortunately there is a huge communication among primary stakeholders. That is why certain consultants add extra work at their will, just to pad up engineer estimates without approval of the client or owner. This practice culminates into conflicts among contractors, sub contractors, clients and the consultant themselves.

The causes as highlighted above, were grouped into this bracket of the questionnaire and according respondents were requested for furnishing their expert opinion on each cause. Overall, the response rate in this bracket was 83 percent which is a very healthy response. The results indicate that rigid attitude and extra work without approval are the top two significant causes with an average rating of 1.11 and 2.40 respectively. Results of all ten causes of this category have been compiled in table 3 and plotted on pie chart and frequency tale no. 3 respectively.

Table 3: Rating of Cost Overrun due to Consultants

	1	2	3	4	5	6	7	8	9	10	Rating Average	Response Count
Unqualified Staff	3.6% (3)	0.0% (0)	2.4% (2)	1.2% (1)	2.4% (2)	1.2% (1)	1.2% (1)	2.4% (2)	0.0% (0)	85.5% (71)	9.18	83
Delay in Approvals	2.4% (2)	3.6% (3)	0.0% (0)	0.0% (0)	2.4% (2)	0.0% (0)	10.8% (9)	73.5% (61)	7.2% (6)	0.0% (0)	7.51	83
Rigid Attitude	92.8% (77)	3.6% (3)	3.6% (3)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	1.11	83
Design Errors	0.0% (0)	1.2% (1)	1.2% (1)	3.6% (3)	6.0% (5)	18.1% (15)	60.2% (50)	8.4% (7)	1.2% (1)	0.0% (0)	6.59	83
Lack of Modern Design Technology	0.0% (0)	0.0% (0)	0.0% (0)	4.8% (4)	6.0% (5)	6.0% (5)	1.2% (1)	2.4% (2)	75.9% (63)	3.6% (3)	8.33	83
Poor Communications	1.2% (1)	0.0% (0)	2.4% (2)	10.8% (9)	68.7% (57)	13.3% (11)	2.4% (2)	1.2% (1)	0.0% (0)	0.0% (0)	5.01	83
Extra Work without Approval	0.0% (0)	91.6% (76)	0.0% (0)	1.2% (1)	1.2% (1)	0.0% (0)	3.6% (3)	1.2% (1)	1.2% (1)	0.0% (0)	2.40	83
Insufficient Data	0.0% (0)	0.0% (0)	0.0% (0)	1.2% (1)	12.0% (10)	57.8% (48)	18.1% (15)	6.0% (5)	1.2% (1)	3.6% (3)	6.34	83
Inflated Engineer Estimate	0.0% (0)	0.0% (0)	86.7% (72)	2.4% (2)	0.0% (0)	1.2% (1)	2.4% (2)	0.0% (0)	6.0% (5)	1.2% (1)	3.60	83
Lack of Project Integration	0.0% (0)	0.0% (0)	3.6% (3)	74.7% (62)	1.2% (1)	2.4% (2)	0.0% (0)	4.8% (4)	7.2% (6)	6.0% (5)	4.94	83

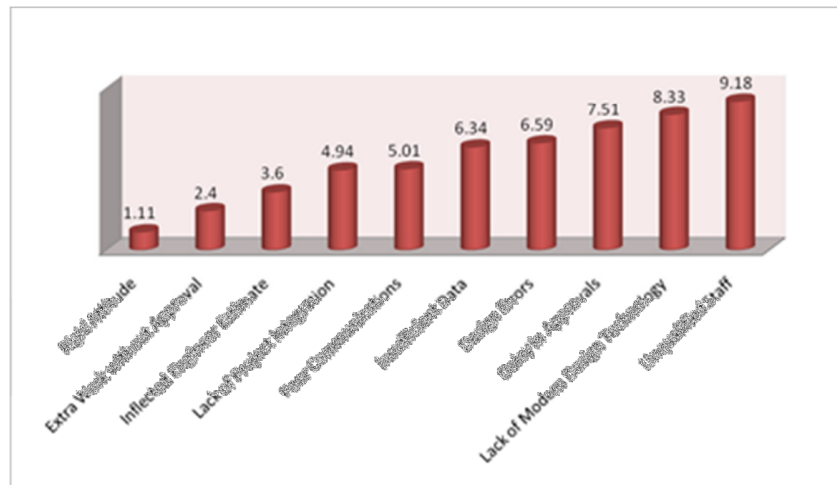


Figure 3 (a): Ranking Cost Overrun due to Consultants

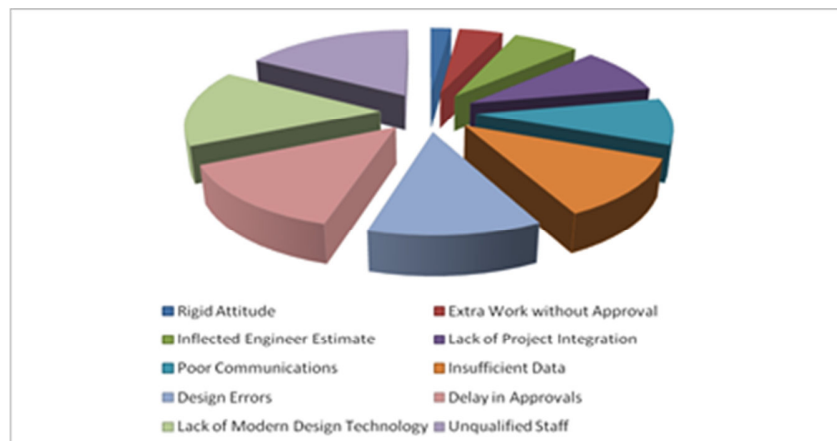


Figure 3 (b): Ranking Cost Overrun due to Consultants

5.4 Cost Overrun due to Clients / Owners.

This is the main and very important project stakeholder who conceives the project, approves the Project Charter and subsequently accords approvals and disburses the progress payment to contractors.

The involvement of the client in all phases of the project i.e. entire project life cycle is mandatory in order to make the project a complete success. Unfortunately there are member of causes and reasons, clients do not play their due role and input into the development and growth of the project. In the succeeding paragraphs, the authors have described the run down of such factors.

Timely funding on the project is very important in order to expedite the progress as per approved construction schedule and schedule baseline. Failure to ensure a smooth cash flow without any plausible reasons will halt and disrupt the project momentum. Most of the projects fail due to disruption in cash flows.

The projects curve takes off very rapidly during execution phase and efforts should be made to maintain, this uplift trend. Unfortunately majority of the clients, ask for major changes during this phase. This speaks of their level of involvement during planning stage. Planning is such a stage where there is a lot of room for major modifications,

variations, deviations or addition in scope but not in execution phase. These changes entail heavy expenditures and claims by contractor which over budget the cost baselines.

Similarly, clients also demand extra works, specifications and features in the project design without incurring additional costs. This behaviour is known as “Gold Plating” in the language of Project Management. When this occurs, the contractor compromises the quality in other field just to please the client.

Like consultants, clients also do not adhere to the approved timelines and do not approve the change orders timely. A slow decision in one activity pushes the next activity and subsequently it becomes a chain reaction for the project as a whole.

It is very important for the benefits of the project that there must be adequate funds for maintenance of cash flows as well as approvals of necessary change orders. Moreover during planning, all requirements should be well briefed without leaving any ambiguity, for later phases.

Establishment of proper communication management and mechanism eradicates most of the problems and issues related to the project. This aspect then finally helps in smooth user acceptance at the completion of the project.

Under this segment, a total of ten causes were tabulated as described above for soliciting input from respondents. The response rate in this domain was 83 percent, which speaks of the validity of these most occurring causes. The most significant cause which received highest rating (2.19) was gold plating. The next cause with a rating of 3.07 was, slowness in decision making. It is true that without detailed planning and uninterrupted cash flow, no project can complete success. Neither it can be completed on time nor on budget.

The data on remaining causes with remaining causes is appended in table 4 which has been represented in the form of graphical from in described in figure 4 (a) and figure 4 (b).

Table 3: Rating of Cost Overrun due to Clients / Owners

	1	2	3	4	5	6	7	8	9	10	Rating Average	Response Count
Frequent Changes during Execution	95.2% (79)	3.6% (3)	0.0% (0)	0.0% (0)	1.2% (1)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	1.08	83
Lack of Involvement in Planning stage	1.2% (1)	3.6% (3)	2.4% (2)	1.2% (1)	3.6% (3)	6.0% (5)	79.5% (66)	2.4% (2)	0.0% (0)	0.0% (0)	6.51	83
Gold plating from Contractor	1.2% (1)	90.4% (75)	4.8% (4)	1.2% (1)	1.2% (1)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	1.2% (1)	2.19	83
Slowness in Decision Making	1.2% (1)	1.2% (1)	90.4% (75)	4.8% (4)	1.2% (1)	1.2% (1)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	3.07	83
Change of Design	0.0% (0)	0.0% (0)	1.2% (1)	3.6% (3)	16.9% (14)	72.3% (60)	6.0% (5)	0.0% (0)	0.0% (0)	0.0% (0)	5.78	83
Disruption in Cash-flows	0.0% (0)	0.0% (0)	0.0% (0)	6.0% (5)	73.5% (61)	14.5% (12)	6.0% (5)	0.0% (0)	0.0% (0)	0.0% (0)	5.20	83
Poor Communications	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	1.2% (1)	3.6% (3)	8.4% (7)	86.7% (72)	0.0% (0)	0.0% (0)	7.81	83
Insufficient Funds	0.0% (0)	1.2% (1)	1.2% (1)	83.1% (69)	1.2% (1)	2.4% (2)	0.0% (0)	10.8% (9)	0.0% (0)	0.0% (0)	4.46	83
Insufficient Requirements	1.2% (1)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	98.8% (82)	0.0% (0)	8.90	83
Handing Taking Charge	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	1.2% (1)	98.8% (82)	9.99	83

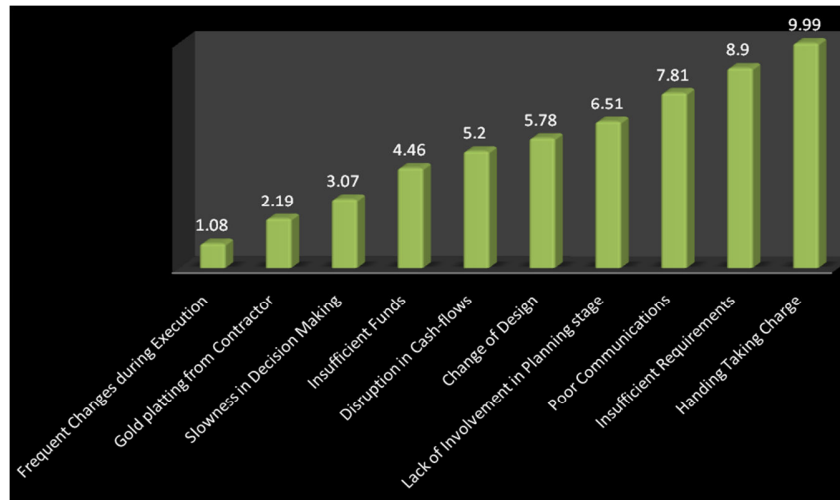


Table 3 (a): Ranking of Cost Overrun due to Clients / Owners

5.5 Cost Overrun due to Other Factors.

Project external environment also occupies a significant space in the project cost baseline. The schedule baseline or commonly known as project budget is affected by numerous external factors.

After thorough analysis of completed projects and the literature review, ten most occurring causes were segregated and made part of this survey under this domain.

Globalization has not early brought glad for the world, but sads also. With the advent of soft borders, easy training and elimination of unnecessary barriers in the visa policies and immigration, the world is now-a-days, is witnessing the worst menace of global terrorism. Pakistan is the frontline in the war on terror and the country has suffered gigantically in economy as well as developmental projects. Today Law and Order is a big issue which has rippled the country's economy and infrastructure development.

This situation is even worsening because of natural calamities like earth quakes, floods and weather modifications. All these factors have deep influence over construction projects.

If it is seen at micro level, there are certain issues which also contribute towards dip in the cost baselines. There are; limited access to the site, shallow water table, and safety and health etc.

The survey questionnaire was made comprehensive that is why these causes have also been incorporated for evaluation purposes.

The overall response in this domain was 83 percent which depicts the interest of the respondents in these causes. Safety and Health received highest rating of 1.40 while limited excess to the site was second highest with a rating score of 2.34. Table 5 and figure 5 (a) and figure 5 (b) show the complete responses and ratings.

Table 4: Rating of Cost Overrun due to Other Factors

	1	2	3	4	5	6	7	8	9	10	Rating Average	Response Count
Extreme Weather Conditions	3.6% (3)	1.2% (1)	0.0% (0)	8.4% (7)	6.0% (5)	6.0% (5)	72.3% (60)	0.0% (0)	1.2% (1)	1.2% (1)	6.35	83
Law and Order	1.2% (1)	12.0% (10)	80.7% (67)	2.4% (2)	2.4% (2)	0.0% (0)	0.0% (0)	1.2% (1)	0.0% (0)	0.0% (0)	2.99	83
Natural Disaster	0.0% (0)	4.8% (4)	1.2% (1)	1.2% (1)	0.0% (0)	2.4% (2)	2.4% (2)	88.0% (73)	0.0% (0)	0.0% (0)	7.53	83
Public Non-cooperation	0.0% (0)	0.0% (0)	3.6% (3)	1.2% (1)	1.2% (1)	0.0% (0)	2.4% (2)	1.2% (1)	89.2% (74)	1.2% (1)	8.63	83
Shallow Water table	0.0% (0)	0.0% (0)	0.0% (0)	1.2% (1)	2.4% (2)	2.4% (2)	0.0% (0)	2.4% (2)	1.2% (1)	90.4% (75)	9.65	83
Limited Access to Site	0.0% (0)	81.9% (68)	13.3% (11)	0.0% (0)	0.0% (0)	3.6% (3)	1.2% (1)	0.0% (0)	0.0% (0)	0.0% (0)	2.34	83
Availability of Services	0.0% (0)	0.0% (0)	0.0% (0)	83.1% (69)	8.4% (7)	1.2% (1)	2.4% (2)	1.2% (1)	2.4% (2)	1.2% (1)	4.42	83
Effect of Social Factors	0.0% (0)	0.0% (0)	0.0% (0)	1.2% (1)	75.9% (63)	14.5% (12)	2.4% (2)	2.4% (2)	1.2% (1)	2.4% (2)	5.42	83
Poor Soil Conditions	0.0% (0)	0.0% (0)	1.2% (1)	1.2% (1)	3.6% (3)	69.9% (58)	16.9% (14)	2.4% (2)	3.6% (3)	1.2% (1)	6.28	83
Safety and Health	95.2% (79)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	1.2% (1)	1.2% (1)	2.4% (2)	1.40	83

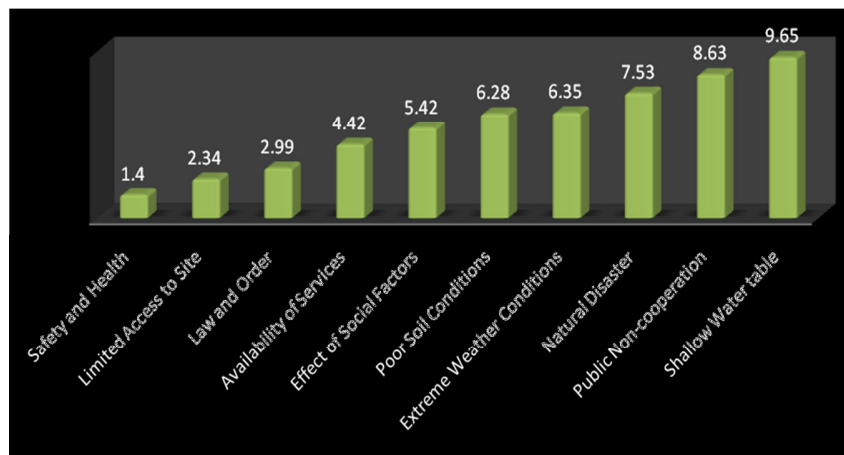


Table 4 (a): Ranking of Cost Overrun due to Other Factors

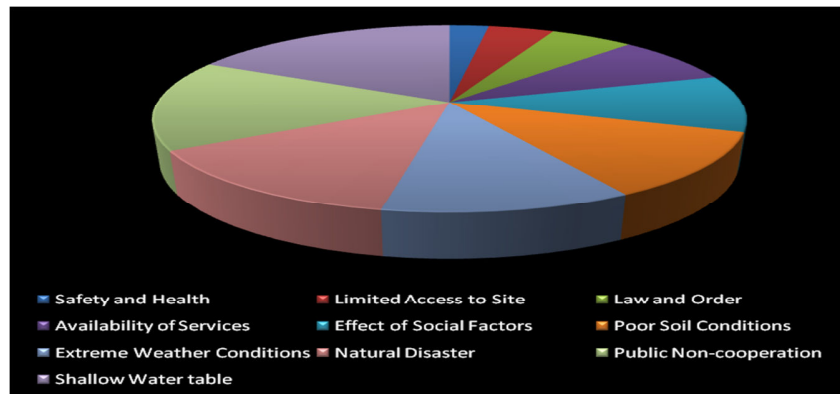


Table 4 (b): Ranking of Cost Overrun due to Other Factors

5. Findings and Conclusions

From the results and discussions, following findings and conclusions are drawn:-

- Corruption and bribery in construction industry has gained ingress till grass root level. This unethical practice is leading towards cost overruns in every construction project.
- During and after award of contracts, political figures steer the projects towards their own vested interests.
- Inefficiency and ineffectiveness of site management results in to reworks, scope creep, scrap, poor quality and frequent change orders by the contractors.
- Delay in site mobilization by contractor affects the health of the projects.
- Delay in approvals of shop drawings and Submittals by the consultants affects the Construction Schedule of the contractor.
- Rigid attitude by consultants leads to conflicts with contractors and eventually this approach taxes the project as a whole.
- Majority of the consultants are in habit of padding up engineer estimates with extra work without approval of the clients.
- Insufficient funds and frequent changes during execution, overruns the cost baseline very significantly.
- It is a general practice that the clients demand extra work without payment, from the contractor which is technically known as gold plating. This is unethical practice.
- Most of the construction managers, engineers and contractors do not pay adequate attention towards occupational health and safety of work force which leads to extra cost in case of any emergency or casualty.
- Sometimes limited access to the site becomes problematic in the smooth execution of activities.
- Rapid market fluctuations and hegemony of market players (suppliers) inflict direct negative effects on construction projects.
- Planning of judicious use of resources possesses very high significance. Absence or lack of effective planning directly delays the schedule baseline.

- Lack of the modern design software and design data results into design errors in drawings and sub detailing.
- Lack of Project interaction leads to conflicts and constructability issues during execution phase.
- All stakeholders especially the client must remain involve during planning stage of the project.
- Timely decision making is a hull mark for the success of a project and vice versa.
- Law and order plays a pivotal role under the global and regional security environments.

Recommendations

From the findings and conclusions, following viable recommendations can be drawn and suggested in order to avoid unnecessary project delays.

- **Transparent Procurement Policy.**

The government should devise an effective and transparent procurement policy through PPRA in order to dismantle the corruption and bribery as well as undue influence of notables.

- **Site Management and Site Mobilization.**

Contractors should improve their project management skills and articulate their resources in order to address there two issues for the benefits of their own as well as the projects.

- **Quick Design Approvals.**

Consultants and clients very oftenly do not offer prompt or timely approvals. Every activity in the construction management plan is harnessed with CPM. Delay in over activity jeopardizes the timelines of Succeeding activities. Eventually project slip out of approved cost baseline. In order to avoid this situation, relevant stakeholders must give timely approval of the drawings, designs or any other submittal.

- **Project Management Information System.**

PMIS serves as eyes and ears of any construction projects. All effort in terms of man, machine and materials can be used optimally by using an effective PMIS.

Adequate Planning. Lack of detailed planning leads to formation of unrealistic schedule which the contractor cannot follow. Detailed planning eliminates the chances of schedule delays.

- **Change Control Boards (CCB).**

In order to avoid cost overruns the construction companies should establish CCBs so that change orders can be evaluated and quantified before execution. This will arrest tendency of fake change orders by the contractor.

- **Open Communications.**

In order to defuse tension, conflicts, clashes and rigid attitude among primary stakeholders there is need to implement system of open door policy.

- **Availabilities of Sufficient Funds.**

Majority of the projects get delayed or abandoned due to paucity of funds. The clients must ensure and maintain supply of funds as per cash flow demands. Unnecessary disruptions of cash flows or excessive financial controls hinder the performance and the productivity.

- **Market Stability.**

Frequent market fluctuations and price hike by few market players have seriously affected the construction industry. The government should evolve stringent mechanism and policies to arrest such type of unhealthy trends.

- **Safety and Health Program.**

This is the most neglected aspect in construction projects. The projects get delayed as well as over budgeted due to heavy sick ratio in workforce. In case of any major causality at job site, the whole momentum is drastically slowed down. It is always recommended that a Health and Safety Program should be evolved so that projects can be completed on time and budget.

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