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Causes of Delays in Construction Projects of Quetta City

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Abstract

Construction projects face several challenges in Quetta. To trace those challenges, this study investigated the leading causes of these delays in construction projects. The study used a quantitative research method to gather data from the relevant stakeholders, mainly clients, contractors, and consultants, using a standardized questionnaire. Similarly, each component's relative importance index (RII) was used to scale the data's significance on a scale of 1 to 4. The paper assesses the leading causes of delays and offers solutions to prevent construction delays using the statistical analysis approach. The study's findings presented several factors related to the delay in construction projects. These factors were related to management, client, consultant, financial, labor and equipment, and external factors. As a consequence of this research, effective tactics could be used to encourage the timely and efficient completion of construction projects, which could exert immense support to the development of Pakistan's economy and infrastructure in general and infrastructural progress of Quetta City in particular.

Keywords: construction projects, delays, Quetta construction industry, statistical analysis

Introduction

The construction industry plays a vital role in a country's economy (Khan, 2008). Many countries, such as the United Arab Emirates and Qatar, spend heavily on their infrastructure by converting the Desert into world-class cities (Zaneldin, 2006). The construction industry contributes 14% to the world GDP by giving employment to 100 million people around the globe and it is predicted that till 2030 it will reach to the value 15.5 trillion dollars (World Metrics, 2024). Pakistan is the 5th most populous country in the world with 241.49 million people (Pakistan Bureau of Statistics, 2023) and, according to the Pakistan Credit Rating Agency (PACRA, 2021), that country has a labor of 76 million in which the construction industry absorbs 7.6% of labor. Similarly, it is greatly contributing to the national economy of Pakistan, the Pakistan Credit Rating Agency (PACRA, 2021) reports that the construction sector is contributing 794 billion rupees to the GDP of Pakistan which accounts for 2.04% of the total GDP. The growth in this sector is quite impressive, as Zakaria (2008) reports that the industry will have a value of 2705.5 billion in 2028.

The purpose of this research is to investigate and identify the factors that are contributing to delays in construction projects in Quetta city. Delay in construction is a very serious and chronic problem (Bhatti et al., 2025) that is responsible for cost overrun, dispute (Shah et al., 2023b) and results in loss of revenue of the client as contractor charges more due to inflation (Shahsavand et

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al., 2018; Long et al., 2004; Mohd Noor & Hasbullah, 2010; Doloi et al., 2012; Fakunle & Fashina, 2020; Naimi & Alobadi, 2023; Kamandang & Casita, 2018; Keane & Caletka, 2015; Pickavance, 2008; Arditi & Robinson, 1995; Hughes & Ulwelling, 1992; AACE International, 1995). The Research hopes to identify the factors that are contributing to delays in construction projects in Quetta city, as previously no research work has been done on this. This research aims to study the factors that are causing delays in the construction projects of Quetta by collecting data from different professionals (Contractors, Consultants, and Clients) and using statistical tools to do analysis on data and generate findings. Out of 17 global sustainable development goals (United Nations, 2015) the Aim and objectives of the research can be linked to two goals, which are Goal 8 (Decent Work and Economic Growth) and Goal 9 (Industry, Innovation, and Infrastructure).

This research paper has utilized questionnaires derived from two studies (Hossain et al., 2022), as they primarily focus on the factors contributing to delays in Quetta (Shah et al., 2023a). The research paper adapts a questionnaire, building insights from two prior studies to ensure its reliability (Hossain et al., 2022). Following the approval of the questionnaire by both the supervisor and co-supervisor, it was disseminated against all relevant stakeholders. These included representatives from the Irrigation, C&W, BANDAR, WASA, QDA, and the P&D department, as well as representatives of PHE and Cameos consultants, and representatives of various contractors.

Methodology

This paper is based on the quantitative research method (Kandel, 2020)– (Creswell, 2014). The questionnaires are built on insights from two prior studies to ensure its reliability (Hossain et al., 2022). To enhance the authenticity of the questionnaire, it was carefully reviewed and validated by officials from the civil department, whose expertise significantly increased the instrument's credibility (Roopa & Rani, 2012). Then the questionnaire passed through an extensive evaluation process and obtained full approval from both the supervisor and co-supervisor, who offered crucial guidance and oversight throughout the research. This comprehensive validation process positions the questionnaire to generate precise and meaningful data, serving as the foundation for an impactful study.

Following the approval of the questionnaire by both the supervisor and co-supervisor, it was disseminated against all relevant stakeholders. These included representatives from the Irrigation, C&W, BANDAR, WASA, QDA, the P&D department, the representatives of PHE and Cameos consultants, and representatives of various contractors. The stakeholders are classified into three main categories: contractors, clients, and consultants.

The questionnaire was based on two sections. Section A provided essential demographic information about the participants, including their names, ages, qualifications, departments or workplaces, designations, years of experience, and the types of projects they are involved in. while Section B is crucial for identifying the factors contributing to delays in construction projects within Quetta City. It encompasses various categories, including client-related, management-related, contractor-related, consultant-related, financial-related, labor and equipment-related, as well as external factors that contribute to these delays (Hossain et al., 2022).

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For this research, the method of purposive sampling was used. Purposive sampling is a type of non-probability sampling method suitable for qualitative research that targets respondents with specific characteristics related to the research question (Palinkas et al., 2015). Hence, through the method of purposive sampling, the characteristics of those people and engineers who were working on construction projects in Quetta were taken surveys from. In total, around 50 surveys were conducted at the general construction sites that are operating in Quetta, including both public and private sites (Krejcie & Morgan, 1970; Bryman, 2016).

The responses were recorded on a five-point frequency scale and analyzed using the Relative Importance Index (RII) together with frequency distribution, which provides a systematic basis for ordering the factors according to their relative importance (Field, 2018; Hair et al., 2019). The computational expressions applied to the response data are summarized in Table 1.

Table 1: Computation formulae used in the analysis

S. No	To be found	Formula
1	Never	=COUNTIF(A1:A2,1)
2	Rarely	=COUNTIF(B1:B2,2)
3	Sometimes	=COUNTIF(C1:C2,3)
4	Most of the Time	=COUNTIF(D1:D2,4)
5	Always	=COUNTIF(E1:E2,5)
6	Total	=SUM(A1:A2)
7	W	=1*(A)+2*(B)+3*(C)+4*(D)+5*(E)
8	RII	=(Total) / (5*W)
9	Rank	=SUMPRODUCT((A1<=$A$1:$E$7)/COUNTIF($A$1:$E$2,$A$1:$E$2))

Discussion & Analysis

The participants' backgrounds in the construction sector were surveyed to gain insights into their roles and perspectives toward this specific research, as illustrated in Figure 1. It was confirmed that 19 individuals, representing 35.85% of the respondents, were employed in the consultancy sector. Consultants primarily oversee projects and interact with both clients and contractors. Additionally, 12 participants, constituting 22.64%, were identified as contractors or affiliated with contracting organizations, while 22 participants, accounting for 41.51%, were directly engaged with clients.

Table 2: Data collection from number of departments

Respondents	Frequency	%
Contractor	9	18.00%
Consultant	14	28.00%
C&W Department	5	10.00%
Agriculture Department	3	6.00%

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Irrigation Department	7	14.00%
QDA	3	6.00%
DHA	2	4.00%
PHA	2	4.00%
CMPQD	3	6.00%
Ministry Planning	1	2.00%
P&D	1	2.00%

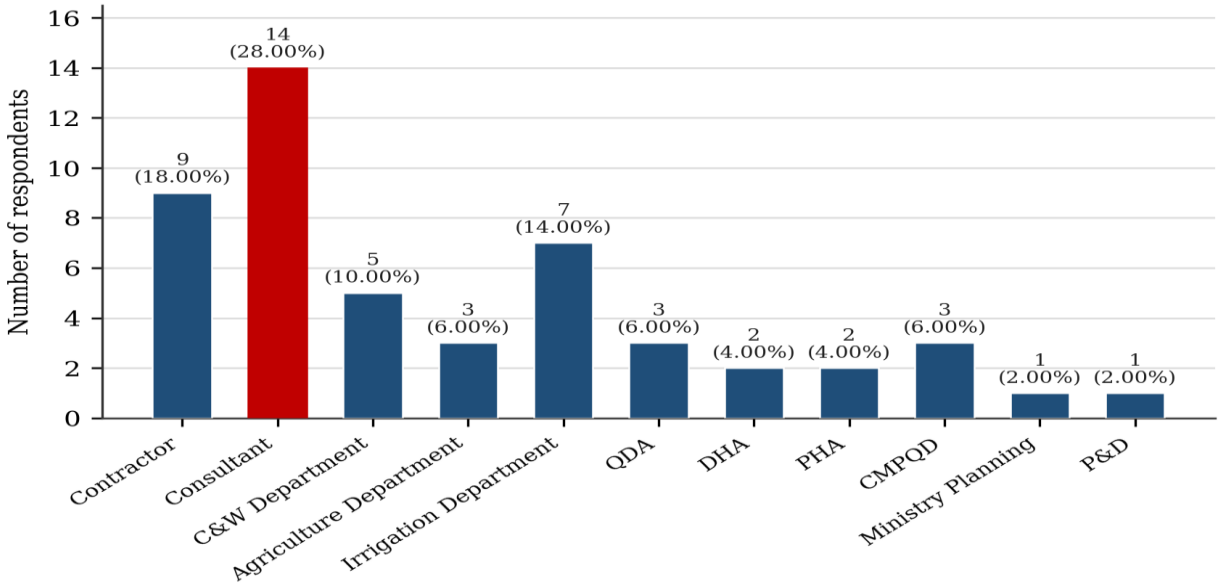

Figure 1: Percentage of respondents by department

The demographic profile of the respondents is summarised in Tables 3 to 5 and illustrated in Figure 2. The data presented indicates that 12% of respondents were aged 18–25, while 34% were aged 26–35. Similarly, 38% of respondents were aged 36–45, and lastly, 16% were aged 46 or above. The experience range indicates how familiar the participant is with the industry; besides experience, it reflects awareness of industry issues and a solid understanding of the entire process. The qualification of the respondent was important to estimate the level of knowledge and skill that the respondent has.

Table 3: Age group of respondents

Category	Frequency	%
18–25	6	12.00%
26–35	17	34.00%
36–45	19	38.00%
46 and above	8	16.00%

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Table 4: Experience range of respondents

Range of experience	Number of respondents	% of respondents
0–5 years	13	26.00%
05–10 years	11	22.00%
10–15 years	9	18.00%
Above 15 years	17	34.00%

Table 5: Qualification of respondents

Qualification	Frequencies of respondents	% of respondents
B.S	28	56.00%
M.S	15	30.00%
PhD	2	4.00%
DAE	3	6.00%
B-Tech	2	4.00%

Figure 2: Demographic profile of respondents: age, experience and qualification

To explore the causes of delays in the construction projects, the questionnaire consisted of 7 factors, each comprising six questions. The questionnaire was analyzed through the RII method (Field, 2018; Hair et al., 2019). Based on the analysis, the highest RII value was 0.8772, which was about the labor disputes and strikes and fell under the labor and equipment-related factors (Mahamid, 2013; Durdyev et al., 2017). Secondly, the highest ranking RII value was 0.84034 for the improper technical study in the bidding stage under the category of contractor-related factors (Sweis et al., 2008; Sweis et al., 2014). Further, the third highest in ranking was the 0.78125 RII value of government regulations in the external factors (Niazai & Gidado, 2012; Umar, 2018). Fourthly, the RII value of 0.7813 was the highest, indicating a failure of the equipment and falling under labor and equipment-related factors (Odeh & Battaineh, 2002). The fifth highest ranking overall was the inconvenient site access, which lay under the external factors category, with the RII value of 0.75758 (Bajjou & Chafi, 2018; Baloyi & Bekker, 2011). Moving forward, the sixth highest RII ranking was 0.74534 for the unfamiliarity with the government laws under the contractor-related factor (Ibironke et al., 2013). The seventh highest ranking RII value was 0.73529 for the rework due to unaccepted quality in the contractor-related factor (Yap et al.,

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2020). Consequently, the eighth highest ranking RII value was 0.7463 for the client-related factor, which was poor communication with the client (Faridi & El-Sayegh, 2006; Sambasivan & Soon, 2007; Alsuliman, 2019).

The ninth highest ranking RII value was 0.70922 for political situation or the weather conditions, which was under the external factors related category (Laryea & Hughes, 2008; Nepal et al., 2006). Further, the tenth highest ranking was two, where the RII value was 0.6993 for the equipment, machinery, and tool shortage in the labor and equipment-related factor, and the delay in approving the site to the contractor related to the client-related factor, with the same RII of 0.6993 (Odeh & Battaineh, 2002). To add more, the eleventh highest RII value was 0.69444 which was owned by two factors, the first one was by the inadequate modern machinery under the labor and equipment related factors, and the second one was for the lack of contractor's admin personal under the contractor-related factor (Sweis et al., 2014). The twelfth highest value was 0.68966 of the cultural and social effects under the external factors category (Niazai & Gidado, 2012). Moreover, the thirteenth highest value was 0.6849 for the shortage of manpower under the labor and equipment-related factor (Mahamid, 2013). The fourteenth highest RII value was 0.68493 for the contractor's technical incompetency under the contractor-related factor (Sweis et al., 2014). Similarly, the fifteenth highest RII value was 0.6803 for the poor labor and equipment productivity under the labor and equipment-related factors (Mahamid, 2013). The sixteenth highest RII value was 0.6757 for the change orders during construction under the client-related factors (Odeh & Battaineh, 2002). In addition, the seventeenth highest RII value was 0.67568 for the ineffective project planning for the contractor-related factor (Odeh & Battaineh, 2002; Alaghbari et al., 2007). The eighteenth highest RII value was 0.6692 for the project permits or excessive bureaucracy under the external factors category (Umar, 2018). The nineteenth highest RII value was 0.6667 for the late approval of sample materials under the client-related factors (Faridi & El-Sayegh, 2006). The twentieth highest ranking value was 0.6494, which was for late decision making under the client-related factors (Sambasivan & Soon, 2007). The twenty-first highest ranking value was 0.6623 for difficulty in financing by contractor under the finance-related factors (Bajjou & Chafi, 2018). The twenty-second highest ranking value was 0.6411 for the cost underestimation under the finance-related factors (Roumeissa et al., 2018). Moreover, the twenty-third highest value was 0.6201 for the financial difficulties of the client under the finance-related factors (Rachid et al., 2019; Hussain et al., 2018). Subsequently, the twenty-fourth highest ranking RII value was 0.61728 for the security situation under the external factors category. The twenty-fifth highest ranking value was 0.6108 for the client interference under the client-related factors. The twenty-sixth highest ranking value was 0.6024 for the delay in the payments under the finance-related factors. Furthermore, the twenty-seventh highest value was 0.596 for the delays in drawings and approvals under the consultant-related factors (Aibinu & Odeyinka, 2006). Similarly, the twenty-eighth highest ranking RII value was 0.5952 for inflation under the finance-related factor. The twenty-ninth highest ranking factor was price escalations or fluctuations, with the RII value of 0.5882 under the finance-related factor. The thirtieth highest ranking RII value was 0.584 for the insufficient design team involvement under the consultant-related factors (Kumar, 2016). To carry on, the thirty-first highest ranking factor was delay in approval of major changes, with the RII value of 0.572 under the consultant-related factor. Similarly, the thirty-second highest value was again related to the consultant-related factors, which was the incomplete or improper design with the RII value of 0.564. The thirty-third highest RII value was 0.548 for the consultant's technical staff incompetence, which was under the consultant-related factors (Kumar, 2016). The thirty-fourth

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highest RII value was 0.508 for the unrealistic contract duration and requirements under the management-related factors (Kazaz et al., 2012; Jarkas & Younes, 2014). The thirty-fifth highest ranking RII value was 0.067114 for the conflict between contractor and consultant under the contractor-related factor. Lastly, the lowest ranking value was subcontractor-related problems under the contractor-related factors with the RII value of 0.0625. In a nutshell, the analysis through RII provides a clear and comprehensive analysis of the significant factors regarding the delays in the construction projects (Lo et al., 2006; Shebob et al., 2011; Ayvaz et al., 2017; Culfik et al., 2014). Based on the above analysis, it becomes evident that the first and foremost cause and factor regarding the delays in the construction is related to the labor and equipment-related factors named as the labor disputes and strikes, with its RII value of 0.8772. In contrast, the least valued factor was the contractor-related factors, named as the subcontractor-related problems, with the RII value of 0.0625. In between these highest and least ranked RII values, several other values were analyzed which showed the position and importance of all the mentioned factors for the delays in the construction projects.

Table 6: Relative importance index and ranking of all delay factors

Factors	Category	RII	Rank within category	Overall rank
Improper study of design affects estimated quantity.	Consultant	0.6160	1	1
Design and material changes.	Management	0.6082	1	2
Poor planning and scheduling of project.	Management	0.6082	2	2
Delays during preparation and approval of drawings and submissions.	Consultant	0.5960	2	3
Lack of involvement of the design team during the construction stage.	Consultant	0.5840	3	4
Contract related disputes.	Management	0.5796	3	5
Delay in materials' delivery.	Management	0.5755	4	6
Delay in approving major changes in the project.	Consultant	0.5720	4	7
Incomplete / improper design by consultant.	Consultant	0.5640	5	8
Unrealistic contract duration and requirement imposed.	Management	0.5510	5	9
Incompetency of consultant's technical personnel.	Consultant	0.5480	6	10
Delays for approval of testing and inspections.	Consultant	0.5440	7	11
Insufficient inspectors.	Consultant	0.5320	8	12
Inflexibility of consultant.	Consultant	0.5320	9	12
Inadequate penalties for delays / poor incentives.	Management	0.5080	6	13
Incompetent project manager / team leader.	Consultant	0.4920	10	14

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Discrepancies and mistakes in the contract agreement.	Management	0.4898	7	15
Labor disputes and strikes.	Labor & Equipment	0.0877	1	16
Improper technical study in the bidding stage.	Contractor	0.0840	1	17
Government regulations.	External	0.0781	1	18
Failure of equipment.	Labor & Equipment	0.0781	2	18
Inconvenient site access.	External	0.0758	2	19
Poor communication between the owner and other parties.	Client	0.0746	1	20
Unfamiliarity with governmental laws and regulations.	Contractor	0.0741	2	21
Rework because of unaccepted quality.	Contractor	0.0735	3	22
Unforeseen weather conditions.	External	0.0709	3	23
External political situation.	External	0.0709	4	23
Late in approving the site to contractor.	Client	0.0699	2	24
Shortage of equipment, machinery, and tools.	Labor & Equipment	0.0699	3	24
Lack of contractor's personnel (administrative).	Contractor	0.0694	4	25
Inadequate modern equipment.	Labor & Equipment	0.0694	4	25
Effects of cultural and social factors.	External	0.0690	5	26
Problems with obtaining permits / excessive bureaucracy.	External	0.0685	6	27
Incompetency of the contractor's technical personnel.	Contractor	0.0685	5	27
Shortage of manpower.	Labor & Equipment	0.0685	5	27
Poor labor and equipment productivity.	Labor & Equipment	0.0680	6	28
Change orders during construction by the client.	Client	0.0676	3	29
Contractor's ineffective project planning.	Contractor	0.0676	6	29
Conflict between contractor and consultant.	Contractor	0.0671	7	30
Late in approving sample materials by the client.	Client	0.0667	4	31
Difficulties in financing project by contractor.	Financial	0.0662	1	32
Late in decision-making.	Client	0.0649	5	33
Underestimation of cost of projects.	Financial	0.0645	2	34
Problems related to subcontractors.	Contractor	0.0625	8	35

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Financial difficulties of the client.	Financial	0.0621	3	36
Security factor.	External	0.0617	7	37
Client interference.	Client	0.0610	6	38
Delay of payments.	Financial	0.0602	4	39
Inflation.	Financial	0.0595	5	40
Price escalation / fluctuations.	Financial	0.0588	6	41

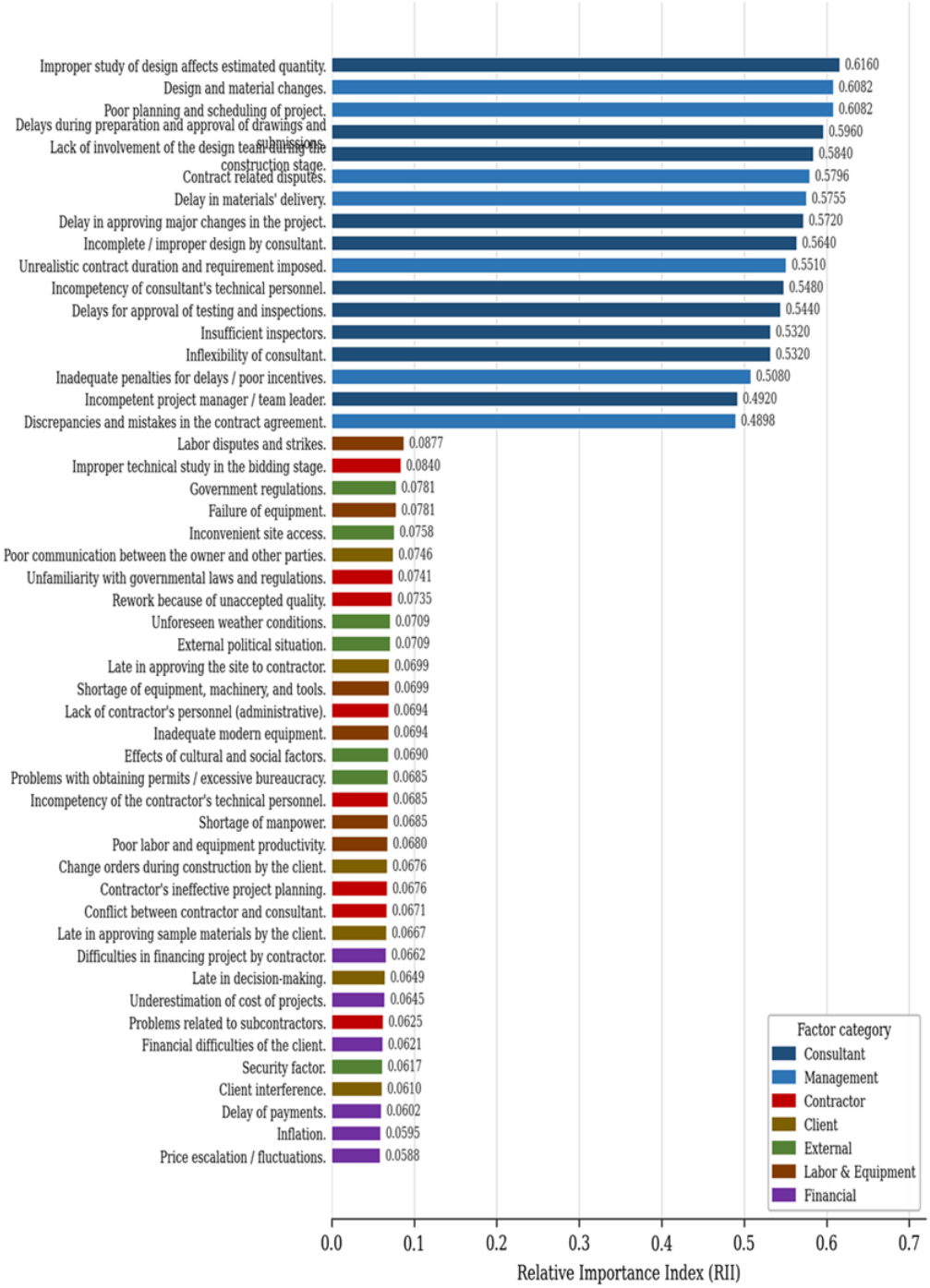

Figure 3: Relative importance index and ranking of all delay factors

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The table below outlines the delays categorized by their causes. The category that contributes the most to delays is Management-related factors, which has a mean Relative Importance Index (RII) of 0.5600. The second most significant category is Consultant-related factors, with a mean RII of 0.5580. Next, Labor and Equipment factors rank third, with a mean RII of 0.0736, followed closely by Contractor-related factors at a mean RII of 0.0708. The fifth category, External factors, has a mean RII of 0.0707. Finally, the last two categories are Client-related factors and Financial-related factors, with mean RIIs of 0.0675 and 0.0619, respectively.

Table 7: Comparative analysis of factors by category

Factors	Mean average	Rank
Management Related Factors	0.5600	1
Consultant Related Factors	0.5580	2
Labor and Equipment Factors	0.0736	3
Contractor Related Factors	0.0708	4
External Factors	0.0707	5
Client Related Factors	0.0675	6
Financial Related Factors	0.0619	7

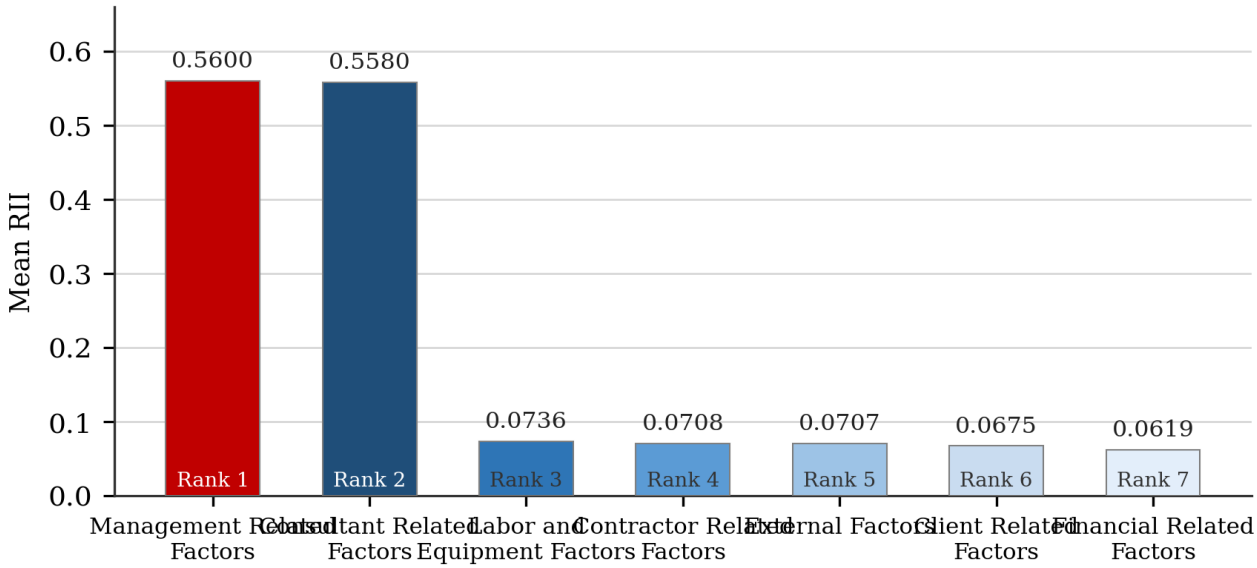

Figure 4: Comparative analysis of factors by category

Conclusion

The objective of this study was to analyze the factors related to the delay in construction projects. Several questions were categorized and addressed based on different factors. These factors included management, client, consultant, labor, equipment, contractors, external elements, and financial aspects. This study is significant because it presents the quantitative factors for various causes of delay in construction projects. As stated in the previous studies and the discussion portion, other studies on the topic were not for the city of Quetta and they were mainly for the qualitative method (Hossain et al., 2022; Niazai & Gidado, 2012; Sambasivan &

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Soon, 2007). The study possesses both practical and theoretical implications. In terms of the theoretical implications, it increases and expands the horizon of knowledge on the topic. Practically, it helps policy-makers integrate the study's recommendations into their policies, thereby improving the condition of construction projects and avoiding delays. To cap it off, the construction projects play a huge role in the world. But the delays in these projects cause them to take much longer to finish. Hence, these factors need to be understood properly. Therefore, this research aimed to understand the causes of the construction delays in Quetta. So that policymakers can overcome those causes.

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