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Critical Factors and Mitigating Measures of Construction Delays of Pakistani Building Construction Projects

Irfanullah[1], Muhammad Fikri Hasmori[1]*, Mujtaba Hassan Memon[1], Radzi Ismail[2]

[1]Faculty of Civil Engineering and Built Environment,
Universiti Tun Hussein Onn Malaysia, 86400 Johor, MALAYSIA

[2]School of Housing, Building & Planning,
Universiti Sains Malaysia, 11800 Pulau Pinang, MALAYSIA

*Corresponding Author

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Abstract: The construction industry is a significant contributor to a country's Gross Domestic Product (GDP). However, construction projects often face many issues especially delay. It is a key contributor to project failure, leading to cost overruns and a decline in quality standards. This study aims to identify the critical factors of delay in building construction projects in Pakistan, and its controlling measures of the critical delay factors. A literature review identified 48 common factors of delay in the construction industry worldwide. Based on a structured questionnaire and the average index method, 11 critical factors of delays in building construction projects in Pakistan were identified. Furthermore, a semi-structured questionnaire was used to determine 44 possible mitigation measures which were extracted from literature review with the 11 critical delay factors. The results of this study will be useful for stakeholders in building construction projects in Pakistan. By incorporating the recommended mitigation measures, they can identify and control the most critical factors that can cause delays in building construction projects. This study contributes to the existing literature by providing a better understanding of the factors causing delays in building construction projects in Pakistan and proposing effective measures to mitigate these factors.

Keywords: Construction delay, mitigation measures, project management, building construction, Pakistan

1. Introduction

The United Nations' Millennium Development goals targeted that, by 2050 sufficient housing units should be availed by people around the whole world (UNDP website). As per United Nations Development Program, by 2018, 4.2 billion human beings consist of fifty-five percent of the total population of the world inhabited urban areas. However, it is expected that the same will rise to 6.5 billion by 2050. This increase in population shows that the demand for housing will rise either in the government or private sector. The building construction industry is not limited to the provision of housing only, the non-residential projects are also a requirement concerning the increase in population. The largest industry in the world is the construction industry, which is engaging roughly 190 million people (Jones & Comfort, 2018). The construction industry of Asia has estimated around 4 USD trillion in the year 2017 and it is also growing by around 5% annually each year. Though China is known as the biggest construction industry in Asia and it is expected that it will grow by 5% yearly from 2020 and onward. China has launched one belt

*Corresponding author: mfikri@uthm.edu.my

road which is known as key infrastructure in the development of Asia and also contains large projects such as CEPEC (China-Pakistan Economic Corridor). This project has worth more than USD 60 billion, and the main aim of this project is to promote the development of infrastructure in Pakistan Ali et al., (2020).

Previous research have identified causes for project delay and organized them into sub-groups, analysed the factors responsible for delay (Ogunlana et al., 1996). Chan and Kumaraswamy (1998) observed and examined the factors responsible for the slowdown in project completion in Hong Kong and categorized them into 8 different groups. Odeh and Battaineh (2002), further the study and brought to attention major causes of delay and suggested them as comprising customers, project- contractors, advisors, materials, labour, contractors, external environment and contract-based relationships. Meanwhile, Assaf and AL-Heijji (2006) highlighted factors responsible for the slow work process in the building projects in Saudi Arabia and associated them with clients, contractors and consultants. Keeping in view the causes of the delay, Le-Hoai et al., (2008) used field monitoring, books, and experts' views to prepare and send a questionnaire to consultants, clients, and contractors in Vietnam. The result of research through 87 questionnaires suggested that 21 major factors were further divided into sub-groups of customers, consultants, project managers, resources and labour, and the external environment. Le-Hoai et al., (2008) contrasted the outcome of the research with those in the UAE, Malaysia, North Korea, Jordan, Kuwait, Ghana and Nigeria and discovered five major indicators which happened to same in all of these countries.

Additionally, Doloi et al..(2012) analysed the factors responsible for the slow process of building projects in India and revealed that the commitment issue was the major factor of delay. Senouci et al,. (2016) observed 122 projects in Qatar from 2000 to 2013 for drainage, road, and erection of buildings. Employing statistical data, they discovered that additional cost was a highlighted factor in the erection of buildings than in roads and drainage projects. Projects with additional costs were enlisted with a time duration of 1 to 2 years. The researcher studied 15 projects and highlighted association exists between the original speculation of the project value cost and the additional value only due to the slow process. While, Al-Hazim et al,. (2017) examined written reports of 40 building works in Jordan from the year 2000 to 2008. It based its findings on the discovery of the repetition of each item used. Discovered 20 important determinants responsible for delays in work, after careful analysis of 14 out of the 40 projects suggested that the additional amount was 101 percent to 600% of the first speculation with an average extra amount of 214% per working project. The delay factor was determined as 125% to 455% of the first speculation expected poor time management of 226% per project. El Sayed et al,. (2021) further categorized factors responsible for delay into predictable and unpredictable and suggested that poor time management and planning were the main causes of delay. However, some cases were hard to be identified and thus were shown in a study in Ghana where bad time management was observed as a factor that brought payment problems with the client Adom (2004). All these factors can be used as a guide for managing financial programs at the government level.

Pakistan is a financially unstable country and the construction industry of Pakistan plays a key role in its up-gradation and economic development Khan & Umer (2020). Challenges are faced by the construction sector of Pakistan like shortage of funds, delay in approval, improper management, poor planning, and client interest in the project (Sohu et al., 2016). In Pakistan, Projects are also facing cost overruns, time delays, and critical issues related to project management (Haseeb et al., 2011). Due to the variety of challenges faced by the construction industry, more than 85% of the construction projects are delayed which gives a negative perception among the stakeholders of this industry (Rashid et al., 2020).

Pakistan is also affected by delays and the short-sightedness of investors and their lack of proper time management has put almost many construction projects at risk (Choudhry,. et al., 2014). Statistical analysis results of the questionnaire survey conducted by (Akhund et al,. 2018), financial difficulties faced by the constructor, inadequate planning and scheduling, financial difficulties faced by the client and delays in payment by the client, as the most significant factors of time overrun. Identified factors will help stakeholders to plan accordingly in order to avoid the issue of time overrun.

The critical factors which were identified by (Sohu et al,. 2017) during study of highway projects of Pakistan were poor planning, cash flow problem faced by the contractor, rapid design changes, late delivery of materials, political influence, and financial difficulties by owner, inexperienced staff and poor site management. Moreover, it is expected that if proper managerial skills are employed, it can bring significant growth to the economy of Pakistan. Highlighting major factors responsible for delay in projects are viewed as important and lack of research and proper methodology are believed to be the main problems in many projects.A study performed by (Shahid et al., 2015) concluded that delays observed in the residential building construction projects are due to corruption, non-availability of funds, Price increase in materials, and improper planning. These are some causes that affect the project's delivery time.

As reported by the Pakistan Credit Rating Agency Limited (PCRA) in 2022, it was highlighted that the construction sector is expected to grow by 92% in the coming seven years. The construction industry has contributed almost PKR 1,409 billion (US$7.8 million) to the Gross Domestic Product (GDP) of Pakistan in 2021. The majority of construction revenue, says the PCRA, is from government contracts, such as the building of infrastructure,

highways, offices, and airports. The report anticipates Pakistan to further expand its ranking with the construction of mega projects under the China-Pakistan economic corridor. Pakistan's public sector continues to invest heavily into infrastructure projects with the largest apportionment being given for the development of national highways and railways, and residential communities, Under Public Private Partnership (PPP) nine construction and rehabilitation of road and transit projects, are in the pipeline. The industry also has a major economic significance on gross domestic profit (GDP) with a contribution of 14.3% in 2021 and is expected to contribute 14.8% in 2022. An increase in costs saw the prices of primary construction materials rocket in 2021. Bitumen, primarily used in road infrastructure, was reported to have gone up 48.6% whilst timber and softwood prices saw increases between 7% and 11%. This study have identified 48 delay factors from the literature review of previous studies as depicted in Table 1.

Table 1 - Delay factors extracted from literature review

Factors of Delay	Factors of Delay
1. Design changes in documents	25. Lowest tender
2. Labor low productivity	26. Delay in approving by client
3. Shortage of skilled labor	27. Clients interfere
4. Shortage of funds from client	28. Delay in consultant decision
5. Poor contract management	29. Claims of Variations order
6. Improper Management by the contractor	30. Poor communication between parties
7. Mistakes in drawing	31. Changes in specification of material during construction
8. Improper survey before construction	32. Complexity design of project
9. Late procurement process	33. Process in decision making at site
10. Delay in approving the design	34. Poor site supervision
11. poor teamwork	35. Ineffective performance by the contractor
12. Poor qualification of consultant's Staff	36. Delay in supply of equipment (Imported)
13. Ineffective planning of before starting of project	37. Inadequate scheduling
14. Delay in preparation of submission	38. Inexperienced staff appointed by contractor
15. Inadequate details in tender document	39. Delay in approving shop drawing
16. Slow owner's decision-making	40. Rework
17. Improper site supervision by client	41. No proper management
18. Ineffective controlling by the contractor	42. Weather effects
19. Delay in the supply of equipment (Local)	43. Fault in Contract documents
20. Poor qualification of contractor's staff	44. Suspension of construction work
21. Inexperienced subcontractors	45. land acquisition problem
22. Delay in making drawings	46. Technical issues in the drawing
23. Changes in client management	47. Clients interest in the project
24. Delay in decision at site	48. Unskilled labour appointment by contractor

2. Methodology

This study adopted quantitative approach using questionnaire survey in two stages. In the first stage, it used structured questionnaire. The questionnaire was developed consisting of two parts, namely Part A and Part B. Part A was designed to obtain the personal information of the respondents. Part B comprised the identified factors of delays extracted from literature review. A five-point Likert scale was used, its numeric values ranged from 5 for "extremely significant to 1 for "not significant". Respondents were required to rate each of the factors based on the scale according to their experiences in encountering construction project delay. Before the survey was conducted, the questionnaire was validated through a pilot study. A total of 140 sets of questionnaires were distributed using simple random sampling technique to the targeted respondents who are working in building construction project in Pakistan. However, only 96 valid responses are considered to the analysis. Data was complied from these responses and analysed descriptively to determine which of these factors are considered very significant contribution to the delay of the project. These very significant delay factors were ranked and further compared with the previous researches.

While in the second stage, the study used semi structured questionnaire interview to discover the mitigation measure of the very significant delay factors that was identified from the first stage. A total of 30 experts of building construction practitioners having working experienced for not less than 15 years were approached and involved in these interview sessions. After the interview sessions, the mitigation measured were extracted from the semi structured questionnaire and matched with the very significant delay factors.

3. Results and Discussion

3.1 Structured Questionnaire Survey Results

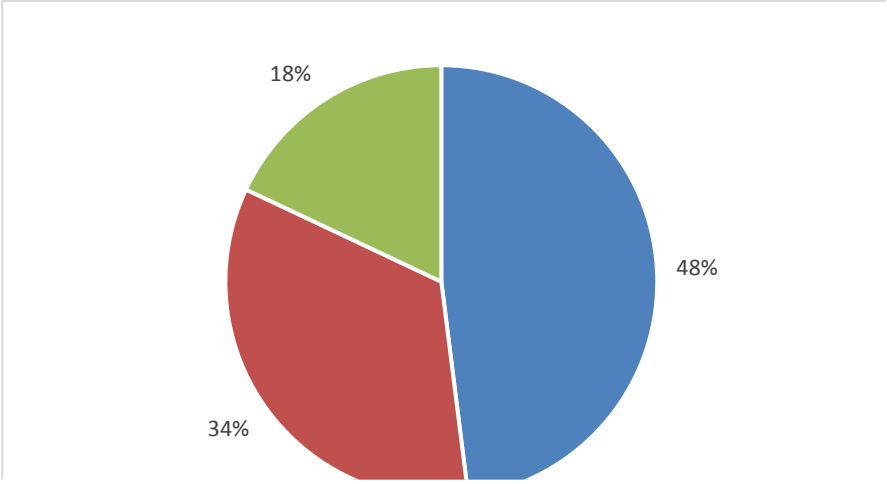

Fig. 1 - Respondents' types of organization

As depicted in Figure 1, it has been recorded that 48% of the respondents belong to Contractors, 34% were from Clients and 18% of respondents recorded from consultant. Major contributors in this study were from Contractors. There were 11 critical factors identified from the most common factors of delay in construction projects through a structured survey. Factors having an average index value of more than 4 were considered critical factors. As per study conducted by Vuong and Nguyen (2021), a commonly used cut off point for average index analysis is 4.0. They explain that this is because a score of 4.0 or higher indicates a moderate to high level of agreement among respondents, while a score below 4.0 suggests a low level of agreement. This threshold has been used in various studies, including those analysing factors contributing to construction delays (e.g., Kaming et al., 1997; Chan and Kumaraswamy, 1997; Odeyinka and Yusif, 1997).

Table 2 - Results of the actual study

Critical Factors of delay	Average index	Ranking	Compared with previous study
Poor contract management	4.894	1	Frimpong et al., 2003
Shortage of funds from client	4.754	2	Islam et al., 2014
Delay in making drawings	4.657	3	Emam et al., 2015
land acquisition problem	4.451	4	Elawi et al. , 2016
Improper survey before construction	4.409	5	Alsuliman , 2019
Suspension of construction work	4.367	6	Marzouk et al. 2014
Inexperienced subcontractors	4.308	7	Al-Harbi et al. 2021
Poor communication between parties	4.208	8	Rahman and Gamil 2019
Poor site supervision	4.191	9	Kumaraswamy and Chan, 1998
Delay in decision at site	4.098	10	Ghosh et al., 2018
Inadequate scheduling	4.002	11	Pati and Kumar, 2015

Based on survey results, contract management was identified as the most critical factor affecting project schedules, with a score of 4.894. The findings are consistent with a case study conducted in Ghana by Frimpong et al.

in 2003, where poor contract management was ranked as the top factor contributing to construction delays from the client's perspective. The results emphasize the importance of having a comprehensive understanding of contract management for successful project execution, as contractual issues can lead to significant construction delays. Therefore, effective contract management practices should be implemented to minimize the risk of project delays caused by contractual issues that may arise at different stages of the project.

A shortage of funds from the client was ranked as the second most critical factor that could lead to project delays, with an AI score of 4.754. This finding is supported by a study conducted in Bangladesh by Islam et al. in 2014, where a shortage of funds was identified as the top-ranked critical factor contributing to delays in building construction projects. A shortage of funds can significantly hamper the project timeline by delaying the completion of critical tasks, causing a cascade effect on subsequent project activities. Thus, having sufficient funds is essential for the successful completion of a project. To ensure adequate funding, proper budgeting and financial management practices should be implemented throughout the project's lifecycle. Additionally, stakeholders should collaborate and communicate effectively to address any potential funding issues before they adversely impact the project's timeline.

Delay in making drawings was ranked as the third most critical factor with an AI score of 4.657. This finding aligns with the critical delay factor identified by Emam et al. in 2015, highlighting the importance of timely availability of drawings in executing a project as per approved details. Delay in making drawings can lead to a backlog of work, causing subsequent activities to be delayed, ultimately resulting in project delays. To avoid such delays, proper planning and scheduling of drawings should be conducted, and a system for timely review and approval of drawings should be established.

The survey results indicate that the land acquisition problem is the fourth most critical factor, with an AI score of 4.451. The importance of timely acquisition of land for the project is emphasized by the critical delay factor identified by Elawi et al. in 2016, which states that land acquisition problems are the most severe cause of construction delay. Delayed land acquisition can adversely affect project timelines by halting construction activities until the proposed land is acquired. Additionally, it can cause cost overruns due to increased expenses incurred from the delay.

Improper survey before construction is the fifth most critical factor with an AI score of 4.409. To ensure successful project design within the timeline, it is essential to conduct a survey with precision and accuracy while collecting all relevant data. This finding is supported by Alsuliman (2019), who identified that lack of site surveys before construction has contributed to construction delays in public sector projects in Saudi Arabia. Improper surveying can result in inaccurate project specifications and a lack of information regarding the site's features, leading to project delays and cost overruns.

Suspension of construction work is the sixth most critical factor, with an AI score of 4.367. This factor relates to the stoppage of construction works for a variety of reasons. When construction work is suspended, it can cause significant delays in the project schedule, leading to cost overruns and a negative impact on project success. The reasons leading to the suspension of work may vary, including environmental, political, or economic factors. To avoid delays caused by the suspension of construction work, it is essential to identify and discuss the reasons leading to suspension in advance to find convenient solutions that minimize delays. Marzouk et al. (2014) highlighted that suspension of construction work contributes significantly to Egyptian construction projects, indicating the importance of proactive measures to avoid project delays caused by suspension of work.

Inexperienced subcontractors achieved the seventh most critical rank, with an AI score of 4.308. Experience in relevant construction projects is an essential factor that cannot be overlooked for the timely delivery of the construction project. The use of inexperienced subcontractors can result in lower-quality work, rework, and a lack of productivity, leading to project delays and cost overruns. The importance of experienced subcontractors and effective communication is supported by research findings. For example, Al-Harbi et al,. (2021) identified inexperienced subcontractors as a critical factor contributing to delays in Saudi Arabian construction projects.

Poor communication between parties acquired the eighth position in the ranking with AI score of 4.208, effective communication between construction stakeholders is the key to the resolution of the issues raised during the project phases. According to study conducted by (Rahman and Gamil 2019), the study elaborated poor and substandard communications is the primary contributor to project failure one third of the time, and had a negative impact on project success more than half the time. Thus, it suggested a high-level, executable communications strategy to reduce financial risks.

Poor site supervision AI 4.191 was ranked as the ninth most critical factor affecting the project schedule. Proper site supervision is crucial for the timely completion and quality of the project. A study conducted by (Kumaraswamy and Chan, 1998) concluded that poor site supervision is a major contributor to the delay in construction projects.

Delay in decision at site AI 4.098 was ranked as the tenth most critical factor affecting the project schedule. Delay in decision making can lead to the disruption of the construction process and cause delay in the project schedule. A study conducted by Ghosh et al., (2018) found that delay in decision making at the site is one of the critical factors that contribute to the delay in construction projects. It is essential to have a well-defined decision-making process and clear communication channels among the stakeholders to avoid any delays.

Lastly, inadequate scheduling AI 4.002 was ranked as the least critical factor affecting the project schedule. Adequate scheduling of the project is crucial for understanding the scope and resources required and for effectively tracking and tracing the project progress. This is supported by a study conducted by Pati and Kumar, (2015) that suggest inadequate scheduling of the project is a significant contributor to the delay in construction projects.

3.2 Semi-Structured Questionnaire Interview

The semi-structured questionnaire survey was conducted to find out the mitigation measures for critical delay factor from highly qualified stakeholders of building construction projects in Pakistan. As much as 30 respondents consist of construction experts have answered the questions and later was analysed by IBM SPSS Statistic software. They were given a list of suggested mitigation measures extracted from past studies and were asked to select which is the most suitable measures according to the specific delay factor. The outcome were presented in Table 3.

Table 3 - Mitigation measures for identified critical factors

Critical Factor	Suggested Mitigation Measures by respondents	Frequency of respondent (%)
Poor Contract Management	Hiring experts to deal with contract management	65
	Clear and simplified contract document should be made	20
	Review of contract document before signing it	11
	Scope must be clearly defined in the contract	4
Shortage of funds from the client	Sufficient funds to be arranged by the Client before starting the project	67
	Financially sound contractor should be chosen to sustain their self during funds delay	21
	Additional financial support should be arranged within due time	8
	Shares of the project might be sold to get the financial support	4
Delay in making drawings	Conceptual design of the project should be clear from Client to avoid re making of drawings due to design change	60
	Skilled team should be appointed	27
	Requested design details should be provided by client on time.	9
	Consultant should be made bound to provide the IFC drawings within agreed timeline	4
Land acquisition problem	Early Payments for land to be released directly to the actual owners	71
	Team of experts to be involved into this task to acquire land within time frame	11
	Identification of land to be acquired should be done with perfection	10
	Provide Job offers to those affected during land acquisition	8
Improper survey before construction	Team of experts should be involved in survey	64
	Data obtained from survey should be approved from relevant Government agencies before starting construction	18
	All reference data to be used for the survey should be verified prior to perform surveys	10
	Third party agencies should be involved in this task	8
Suspension of construction work	Weekly project review meeting should be organized to avoid any concern resulting suspension of work	65
	Avoid projected payments to the contractor	20
	Payments to the vendors should be done on time	11
	All stakeholders should be responsible for identification of concerns which may result in suspension of work within their role	4
Inexperienced subcontractors	Replace the subcontractor immediately	71
	Justifiable rates should be offered to contractors to attract skilled labour	11
	Training may be provided to contractor's workers	10
	Engage specialized contractor from overseas for new and unfamiliar activities	8
Poor communication between parties	Easy and advanced channels of communication like WhatsApp, Texting and Emails should be declared official	65
	Weekly project review meeting should be organized between all	

	stockholders for effective communication	20
	Project coordinators should be appointed for raising concerns and follow up on the matters.	11
	Feedback should be taken from all stakeholders to adopt the way of convenient communication	4
Poor site supervision	Strict implementation of QA/QC procedures	64
	Experienced supervision team should be employed	18
	Avoid under hiring of supervision staff	10
	Supervision team should be facilitated/ paid well to perform better	8
Delay in decision at site	Avoid hiring of unexperienced supervision team	65
	Site issues should be highlighted as soon as possible to have sufficient time for decision making	20
	Joint visit of relevant staff from all stakeholders according to severity should be performed to make decision immediately	11
	Follow up and effective communication should be done	4
Inadequate scheduling	Experts should be engaged into the scheduling	64
	Realistic approach towards scheduling should be adopted	20
	Close monitoring using correct methodology to be adopted	13
	Latest scheduling tools should be used	3

Table 3 represent the results of possible mitigation measures for each critical delay factor in building construction projects. It was identified that Poor contract management can be controlled with mitigation measures, hiring experts to deal with contract management and it is the highest reported mitigation measure, If experts are engaged in the contract management, other mitigation measure can also be controlled by them, for example, clear and simplified contract document should be made and scope must be clearly defined in the contract are easy to be managed by hired experts.

The mitigation measure to counter the shortage of funds from the client are identified, where sufficient funds to be arranged by the Client before starting the project was ranked at the top, arrangement of fund before starting the project can make a significant impact on successful completion of construction and can avoid the impact of delay like financial impact on the project.

Delay in making drawings is the third most critical factor and conceptual design of the project should be clear from Client to avoid re making of drawings due to design change was found the highest ranked mitigation measure, delay in the provision of conceptual requirements is delayed most of the time which results in delay in making drawings. If data related to design is provided within agreed time frame, drawings can be produced accordingly.

Land acquisition problem was the fourth critical factor, for which, early payments for land to be released directly to the actual owners were reported at with the highest frequency by respondents, settlement of payment on priority and to the real owners can expedite the transfer of land ownership and will not result in and legal dispute in the future. Hiring team of experts to deal with land acquisition is also an important mitigation measure which can overcome all other mitigation measure for the said critical factor, as experts are way more experienced and familiar with issues caused during this process and can balance the social issues created at that time.

Improper survey before construction is the fifth most critical factor of delay, against which highly ranked mitigation is noted as, the team of experts should be hired for survey, specialized survey team can overcome other mitigation measure like data verification and approval of conducted survey from relevant agencies.

Inexperienced sub-contractors is ranked at sixth most critical factor and it is recorded from respondents that in experienced contractor should be replaced immediately, with the experienced sub-contractors, paying subcontractor justifiably with respect to market is also beneficial if the experienced sub-contractors are not attracted to work on required project. Subcontractors may be trained for improvement in their skills or they may be hired from other locations for special type of projects.

Poor communication between parties can be avoided by using easy and advanced communication channels like WhatsApp, texting, emailing as an official mode of communication, which is raked at the top in the list of mitigation measures for the said critical factor. Weekly project review meeting ranked at the second and can eliminate gap between stack holders and improve communication, furthermore, assigning a dedicated project coordinator can improve the communication between parties.

Poor site supervision can be mitigated by strict implementation of QA/QC procedures, implementing the said procedures will improve quality of works and will define the checks during execution. Hiring an experienced team is reported as the second important mitigation measure which can help to implement the first mitigation measure of implementation of QA/QC procedures by their experience. Under hiring is ranked at third, that can impact the site supervision and it should be avoided for smooth and effective supervision.

Delay in decision at site is the second last most critical factor of delay and avoiding hiring of in experienced supervision staff is reported at the top for said critical factor, highlighting site issues, joint visits for quick decision and follow up for the raised issues of site are mitigation measures respectively according to their significance.

Inadequate scheduling was recorded as the last critical factor and engaging experts to manage scheduling is the highly ranked mitigation measure, realistic approach to schedule project is second most advised mitigation measure, which can be overcome by first mitigation measure by engaging experts in this field. Close monitoring of work schedule is important mitigation measure to keep track and trace of the project, which is ranked at third place and usage of modernized scheduling tools is advised at last to mitigate inadequate scheduling.

Table 4 - Critical factors of delay and their significant mitigation measure

Ranking	Factors of delay	Mitigation measures
1	Poor contract management	Hiring experts to deal with contract management
2	Shortage of funds from client	Sufficient funds to be arranged by the Client before starting the project
3	Delay in making drawings	Conceptual design of the project should be clear from Client to avoid re making of drawings due to design change
4	Land acquisition problem	Early Payments for land to be released directly to the actual owners
5	Improper survey before construction	Team of experts should be involved in survey
6	Suspension of construction work	Weekly project review meeting should be organized to avoid any concern resulting suspension of work
7	Inexperienced subcontractors	Replace the subcontractor immediately
8	Poor communication between parties	Easy and advanced channels of communication like WhatsApp, Texting and Emails should be declared official
9	Poor site supervision	Strict implementation of QA/QC procedures
10	Delay in decision at site	Avoid hiring of unexperienced supervision team
11	Inadequate scheduling	Experts should be engaged into the scheduling

4. Conclusion

In this study, factors responsible for delays were revealed and observed that they are contributing to inefficiency and ineffectiveness in the building construction sector of Pakistan. After a comprehensive literature review, common factors were compiled by cross-examination of different countries and project management parties.

A questionnaire was framed based on literature and the questionnaire was shared among experienced professionals belonging to Contractors, Clients and Consultants to mark their input as per the severity of the factor. Based on a total of forty-eight (48) factors, the actual survey was conducted using a structured questionnaire and eleven (11) critical factors of delay in building construction projects in Pakistan were identified. Critical factors are also compared with the existing research in the construction industry in different parts of the world and it is observed that the resulting critical factors are in line with previous research up to some extent, as the rankings are different from the identified factors.

It is concluded that the factors causing the delay are related to the management of the contract, finance, human resources and coordination, which are in line with Pakistan's current situation concerning the economic downturn, impacting financial management. The lack of skilled human resources is also an issue and severely impacts the construction industry of Pakistan. Proper technical training and recruiting skilled and experienced workers will promote worker's skills. Guidelines on mitigating delays should be prepared to minimize delays in the construction industry. Critical factors can be mitigated by following the identified mitigation measure against each factor.

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