

(RESEARCH ARTICLE)



Comprehensive investigation into contractors' challenges leading to project delays in Rabigh, Saudi Arabia

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World Journal of Advanced Engineering Technology and Sciences, 2024, 11(02), 608–623

Publication history: Received on 15 March 2024; revised on 25 April 2024; accepted on 27 April 2024

Article DOI: <https://doi.org/10.30574/wjaets.2024.11.2.0151>

Abstract

The construction industry has experienced significant fluctuations due to delays that change with each generation. Contractors, owners, consultants, and workers are involved in these delays, which have many causes. However, this research focuses on contractor barriers, which delay projects and sometimes disrupt them. To fully address this issue, a rigorous scientific research paper was carefully created. This paper sought to identify project delays' root causes. The process involved a thorough review of prior research, the collection of a lot of data on the main causes of delays, and the creation of a comprehensive table that lists 17 common factors. Then, consultants and engineers from various contractors who oversaw multiple Rabigh governorate projects were interviewed. The eleven interviews in this study were unique and comprehensive in investigating contractor delays. Thus, 17 key factors that cause contractors to miss project deadlines were identified. These factors were used to analyze and compare data from other research studies. These challenges and obstacles were carefully considered after analyzing engineer and consultant interviews. A comparative analysis was carried out in order to contrast the various points of view that were expressed by interviewees, the research that was already done, and the perspectives that were observed. The ultimate objective of this analysis was to determine the fundamental factors that contribute to delays in project delivery that are caused by contractors. The dissemination of these deliberations and results concluded this research endeavor as this matter deteriorated. The main goal was to reveal the fundamental principles that underlie this major construction and building industry challenge, enabling more effective solutions.

Keywords: Contractor barriers; Project delays identification; Interviews with consultants; Project delivery efficiency

1. Introduction

Construction delays represent a ubiquitous challenge encountered across global projects, resulting in prolonged task completion durations. Sweis et al. delineated these delays as instances characterized by either additional workdays or deferred initiation of activities [1, 2]. Further expound upon this definition, framing construction delays as instances where the project surpasses either the stipulated completion date outlined in the contract or the mutually agreed delivery deadline, consequently leading to deviations from the intended project schedules [3]. Such delays pose a significant hurdle within the construction sector, manifesting as a prevalent issue that demands attention and resolution.

This research endeavor aims to address this gap in the existing literature by undertaking a comprehensive examination of delay analysis within the realm of infrastructure and construction projects. The primary objective is to meticulously scrutinize the factors contributing to delays and elucidate their ramifications on project duration, financial outlay, and

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overall quality. The collaboration with engineers employed by contractor firms, recognizing their pivotal roles in the execution and management of construction endeavors [4].

By delving into the intricacies of delay analysis, this research endeavors to offer invaluable insights into the underlying causes of delays within construction projects. Through a meticulous exploration of contributing factors, ranging from logistical challenges to regulatory hurdles, the paper aims to provide a nuanced understanding of the multifaceted nature of construction delays. Furthermore, by assessing the impact of these delays on project timelines, costs, and quality standards [5]. The research endeavors to furnish stakeholders with actionable intelligence aimed at mitigating delays and enhancing project efficiency and efficacy. Through shed light on a critical aspect of construction project management, offering both theoretical insights and practical recommendations aimed at addressing and alleviating the pervasive issue of construction delays [6]. Through collaboration with industry professionals and meticulous analysis of real-world case studies, the study endeavors to contribute to the body of knowledge in the field, ultimately fostering more efficient and effective project delivery within the construction domain.

1.1. The role of contractors in project execution

The success of construction projects is contingent upon a delicate balance between several critical factors, including time, cost, quality, safety, and environmental considerations [7]. Among these, time and cost are intricately linked, often sharing a proportional relationship, where prolonged project durations typically result in increased expenses. Therefore, the effective management of project schedules holds paramount importance for contractors, as it is instrumental in averting financial setbacks and ensuring project viability.

Within the construction industry, productivity loss represents a significant challenge, stemming from a multitude of factors. One of the most pervasive sources of productivity loss is project delays, which manifest in various forms and originate from diverse stakeholders involved in the project lifecycle [8]. These delays occur when the scheduled completion date of a project is extended due to factors related to clients, consultants, contractors, and other project participants. Additionally, delays encompass situations where events occur later than anticipated, leading to the postponement of project milestones, or when planned actions are not executed promptly according to the predefined schedule. The impact of project delays reverberates across the entire construction ecosystem, disrupting workflow efficiency, impeding project progress, and elevating costs. Contractors often grapple with the ripple effects of delays, as they struggle to realign resources, manage subcontractor schedules, and navigate contractual obligations amidst shifting project timelines [9]. Furthermore, delays can strain client-contractor relationships, erode trust, and tarnish reputations within the industry.

In response to these challenges, contractors employ various strategies to mitigate the risk of project delays and safeguard project schedules. This includes proactive planning, robust risk management practices, effective communication channels, and the adoption of technology-driven project management solutions. By prioritizing schedule adherence and fostering collaboration among project stakeholders, contractors can enhance project resilience, minimize productivity loss, and optimize project outcomes [10].

1.2. Factors that cause project delays

Delays in construction projects pose significant financial burdens due to various factors [11]. Firstly, they result in additional costs related to the financing of the project. Construction loans typically incur interest charges, which accumulate over time as the project extends beyond the initially planned completion date. Additionally, delays lead to increased expenses in terms of remuneration for managerial staff, as project managers and other personnel involved in overseeing the construction process are often compensated based on time spent on the project. Moreover, delays can exacerbate wage and material price inflation, further driving up project costs.

In severe cases, prolonged delays may even result in project abandonment, leading to substantial financial losses for both owners and contractors. Owners face the loss of potential revenue streams as the project remains incomplete, preventing them from realizing returns on their investment [7]. Furthermore, heightened project management expenses accrue as a result of the extended project duration, requiring additional resources to manage and oversee the ongoing construction activities. Additionally, owners incur contract supervision overhead costs, which encompass expenses associated with monitoring and enforcing contractual obligations throughout the prolonged project timeline. Contractors are also adversely affected by delays, experiencing increased expenditures across multiple fronts. Material costs escalate as the extended project duration necessitates the procurement of additional supplies to sustain ongoing construction activities. Similarly, labor expenses rise as workers are required to remain engaged on the project for

longer periods than originally anticipated. Furthermore, contractors bear overhead expenses, including administrative costs and equipment maintenance fees, which escalate with the prolonged project duration [1].

By organizing these complexities systematically, Table 1 serves as a valuable reference tool for stakeholders, aiding in understanding the underlying causes of project delays and guiding decision-making processes. Furthermore, these insights from research studies inform targeted interventions to alleviate delays and improve project delivery efficiency.

Table 1 Barriers facing contractors that cause project delays.

No.	Factors	References
1	Administrative difficulties	[3] [4] [5] [6] [12] [13]
2	Alternative suppliers	[5] [12] [14] [15] [16] [17]
3	Contract design precision	[5] [6] [12] [14] [16] [17]
4	Contractor procrastination	[6] [7] [11] [18]
5	Cost estimation errors	[5] [19] [20]
6	Geological site conditions	[12] [15] [16] [20] [21]
7	Government procedures	[3] [5] [14] [16] [17] [22]

8	Insufficient experience	[5] [6] [12] [14] [21]
9	Issues with financial resource	[12] [15] [21] [23]
10	Labour availability	[13] [15] [17] [21]
11	Project progress monitoring	[5] [6] [16] [17] [20] [21]
12	Project requirements changes	[6] [7] [12] [15] [17] [24]
13	Project schedule accuracy	[4] [6] [7] [15] [25]
14	Quality and detail neglect	[3] [5] [7] [12] [22] [26]
15	Specialized project experience	[4] [6] [16] [26]
16	Strategic planning weakness	[5] [21] [25]
17	Unexpected circumstances	[12]

		[13]
		[15]
		[21]

1.2.1. Prior research on barriers faced by contractors and project delays

Through conducted a fresh survey within the Kingdom of Saudi Arabia by Al-Kharashi & Skitmore, incorporating variables from prior research [27]. The survey aimed to assess the current impact of various delay factors and the potential for practical improvements. These factors were organized into seven categories: client-related, contractor-related, consultant-related, materials-related, labor-related, contract-related, and relationship-related causes. The survey sample consisted of 86 participants including clients, contractors, and consultants engaged in the Saudi construction sector. The analysis highlighted that the prevailing and most influential cause of delays was the scarcity of qualified and experienced personnel. This shortage was attributed to the substantial number of sizable and innovative construction projects, coupled with an insufficient supply of skilled manpower in the industry.

A research conducted through AlSehaimi et al. with the objective of unveiling the fundamental reasons behind construction delays [28]. Their approach leaned toward a descriptive and explanatory methodology, which, though informative, exhibited limitations in effectively resolving enduring managerial issues within the construction domain. The contention arises that numerous challenges within construction have the potential to be alleviated through the utilization of different research approaches. Adopting prescriptive research techniques offers the prospect of creating and implementing inventive tools aimed at addressing construction's managerial predicaments, delay-related matters being a prominent example.

From a case study examined by Orangi et al. 15 delay causes specific to pipeline projects in the Victoria region of Australia [29]. They employed a comprehensive approach comprising an in-depth literature review, targeted interviews with multiple project managers, and knowledge extraction from case studies involving pipeline projects. Their research led to the identification of a set of foundational reasons behind delays in pipeline infrastructure endeavors. These reasons encompassed factors such as modifications in design, design errors, delays in design submissions, inadequate communication between designers and contractors, insufficient communication within the client and project team, challenges related to end-users, inadequate geotechnical investigations, issues surrounding client approvals and permissions, adverse weather conditions, delays from material suppliers, suboptimal site management practices, errors in planning and scheduling, instances of construction rework, and cultural influences.

A study undertaken by Ezeldin & Abdel-Ghany, aimed to identify the causes of building delays in the Egyptian construction sector [30]. The primary objectives were twofold: firstly, to pinpoint and rank the significant contributors to delays in engineering projects, and secondly, to determine the accountable party for these primary causes. The research unfolded in three phases. In the initial phase, unstructured interviews were conducted with practitioners deeply engaged in the Egyptian construction industry. The second phase involved surveying a select group of 35 professional experts using a tailored questionnaire. This expert panel represented diverse stakeholders in the construction domain: Contractors, Employers, and Consultants/Project Managers. The third phase encompassed analyzing the amassed data to identify the frequency and ranking of delay causes. This analysis also attributed responsibility for each cause to relevant parties. The study's findings disclosed that delay causes could be classified into five principal categories: (1) Causes related to construction; (2) Managerial causes; (3) Political factors; (4) Financial aspects; and (5) Technical issues. Among the top 12 causes identified, three pertained to construction, seven were managerial in nature, one was political, and one was financial. The study determined that both Contractors and Employers were responsible for five of the top 12 causes, while the remaining two causes were attributed to third-party entities.

An investigation conducted by Kazaz et al. examined the root causes of time extensions in the Turkish construction sector and evaluated their levels of importance [31]. The study encompassed a comprehensive examination of 34 factors that impact project duration. Employing a questionnaire survey, which encompassed these identified factors, the researchers engaged 71 construction companies in Turkey. The subsequent data was subjected to statistical analyses. The findings revealed that the factor most prominently linked to project time extensions was "design and material changes." This was closely followed by "delay of payments" and "cash flow problems." In terms of the hierarchy of importance among factor groups, financial factors emerged as the foremost category, while environmental factors carried the least influence. Notably, the study also underscored that managerial reasons for project time extensions

manifest across both developed and developing nations, whereas financial causes tend to be more prevalent in developing countries exclusively.

A research through Ul Haq, undertook an investigation into the underlying causes of delays in construction projects [32]. Their study encompassed the collection of data pertaining to study variables, achieved through a structured questionnaire administered to 37 construction firms situated within Pakistan. Employing a diverse array of statistical tools such as reliability tests, factor analysis, and regression analysis, the researchers meticulously processed the collected data to draw meaningful conclusions. The findings of their inquiry illuminated a compelling narrative: factors affiliated with contractors, clients, consultants, materials, and equipment were found to wield a significant impact on the occurrence of delays in construction projects. In contrast, factors related to labor and the general environmental context exhibited negligible influence on project delays. This study's revelations carry substantial implications for the construction industry, offering invaluable insights that can be utilized to strategize and circumvent the occurrence of delays and the ensuing ramifications.

Aims of the Research

- Identify and assess crucial factors

The principal aim of this research paper is to ascertain and examine the pivotal elements that contribute to contractor setbacks and project delays. Our research approach involves conducting comprehensive interviews with seasoned contractors, project managers, and industry experts. Additionally, we analyze relevant literature and case studies to identify the prevalent difficulties that contractors encounter while carrying out projects. Various factors have a significant impact on changing the course of projects and delaying them [33].

- Comprehensive analysis and comparison of crucial factors

The second aim of this study is to examine and contrast the hindrances and difficulties encountered by contractors, which frequently result in interruptions in the timetable, postponements in project completion, and hinder the overall achievement of the undertaking. We will conduct a thorough examination by collecting and analyzing data to identify causes and establish linkages among them. Addressing construction delays is crucial in this industry sector [7].

2. Research Methodology

2.1. Research design

The research methodology shown in Figure 1 will consist of a well designed flowchart detailing the procedural steps for performing a research study. The research specifications will be given priority in the initial phase to establish the foundation for upcoming investigations. Relevant data will be carefully gathered through expert interviews and database compilation to provide comprehensive coverage. Following data collection, a thorough analysis will be carried out by either a comprehensive inquiry or by comparing pertinent components. The program will pinpoint obstacles impeding progress by conducting expert interviews or using feedback gathering techniques. Once the obstacles have been identified, the following stage is to thoroughly evaluate their effects. This assessment can be done by comparing components or by performing thorough investigations to quantify their influence.

2.2. Selection and quantity of samples

Conducting and evaluating interviews aids in comprehending the limits and difficulties from their fundamental origins [12]. Interviews with seasoned consultants and engineers have been undertaken as an integral component of our research endeavor that is centered around Rabigh governorate. A questionnaire has been designed in order to secure participant consent and streamline the processes of preparing and disseminating the research study. The interviews encompassed a total of eleven participants, comprising engineers and consultants with a combined professional background of eight to thirty-two years, acquired from various contractors. With a particular emphasis on administering large-scale projects, these contractors specialize in a variety of engineering disciplines and are tasked with project management in Rabigh governorate.

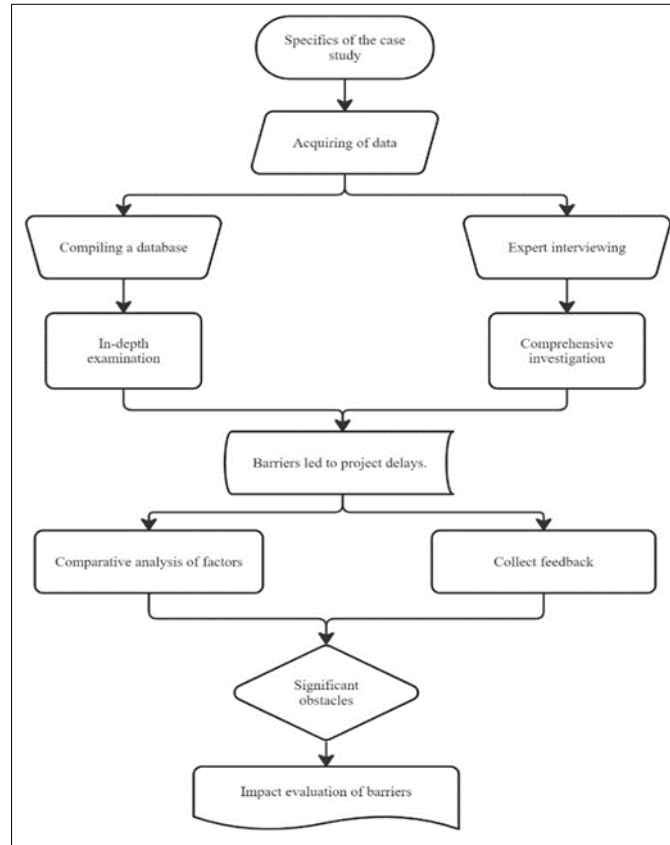


Figure 1 Data development and selection flowchart.

2.3. Expert interviews with the industry

A methodical investigation has been carefully developed to facilitate interviews with consultants and engineers. This investigation has been specifically designed to extricate valuable insights regarding the fundamental factors that contribute to project delays that are ascribed to contractors. The discourse structure has been intentionally divided into three separate portions, each serving a specific purpose. By employing strategic segmentation, the interview process is not only optimized but also allows for a concentrated analysis of particular aspects during each interview. As a result, this methodology enables us to systematically collect comprehensive and detailed data from the distinct viewpoint of every interviewee. Through the implementation of this methodical investigation, our objective is to thoroughly examine the intricate elements that contribute to project delays and acquire a sophisticated comprehension of the difficulties encountered by contractors. An accurate examinations of the factors help in accurate and detailed analysis [34].

The preliminary segment of the interview consists of demographic inquiries that revolve around four fundamental components. Commencing the interview process is an overview of the interviewee's role and status within the organization. Following this, the inquiry seeks to determine the length of time they have worked professionally, beginning from their initial employment and including the years of experience they have gained at their present organization. The subsequent section identifies the types and attributes of engineering projects that the consultant or engineer has worked on during their previous employment. In conclusion, this section ascertains the nature of the projects and delineates the industry sectors to which they pertain. The demographic information of the interviewees is succinctly summarized in Table 2, where a code (I-No) is allocated to each participant, with 'I' representing the interview and 'No' representing the participant's number. To illustrate, the initial participant is represented by I-1, and the second participant is denoted by I-2.

The primary objective of the second segment of the interview was to ascertain the factors that contribute to project delays as perceived by the contractor, encompassing both departmental and past project-related delays. This segment was intentionally crafted to be of an open-ended nature, thereby preventing the interviewee from being constrained by the absence of specific reasons or factors. Conversely, the primary objective was to acquire novel insights and afford the interviewee complete autonomy in articulating their viewpoints. The primary aim of this segment was to gather crucial data that would serve as the foundation for the examination of all potential elements that may have contributed to

contractor-caused delays in project schedules. These justifications would then be systematically arranged and contrasted. Additionally, as described in the study, a comparison would be made between these factors and those garnered from other studies and prior reviews. These comparisons are essential to understanding the relationship of factors to each other [18].

Table 2 Details regarding the demographics of the interviewees.

Interviewer Code	Demographic Information		
	Position Within the Contracting Company	Years of Experience	Types of Projects
I-1	Managing technical office activities.	21	Commercial enterprises and infrastructure advancements
I-2	Supervising the engineering aspects of healthcare	22	Healthcare, commercial, and infrastructural establishments
I-3	The project management director	32	Educational structures, hospital construction, and infrastructure
I-4	The technical office director and deputy project manager	23	Infrastructure, commercial, residential, and construction
I-5	Manager of projects.	12	Commercial, industrial, and residential structures
I-6	A supervisor of the irrigation network and afforestation	8	Maintenance, operation, and construction activities pertaining to irrigation projects.
I-7	Engineer on-site accountable	12	Infrastructure, hospitals, and building construction
I-8	In charge of cost estimation	8	Commercial, residential, and infrastructural initiatives
I-9	Medium-voltage electrical projects director	8	A multitude of electrical infrastructure initiatives
I-10	The infrastructure project's director.	15	Water infrastructure initiatives concerning water networks and stations
I-11	Manager of the project site and contractors	15	Private projects, commercial constructions, and housing

During the previous segment, we addressed two discrete subjects. The first segment of the interview entailed inquiring about impending obstacles and challenges that were expected to arise in the context of engineering projects and have the potential to impact project schedules. The objective of this segment was to assess the importance of the aforementioned concerns. The subsequent segment focused on engaging in a dialogue with the interviewee regarding the strategies and plans they have previously implemented, as they perceive it. These approaches and plans have been effective in minimizing losses and mitigating the effects of factors that cause delays [7]. The primary aim is to mitigate project and contractor setbacks to the maximum degree feasible.

2.4. Examination of data

2.4.1. Data analysis methodology

During the interview phase, we had the privilege of speaking with critical personnel responsible for supervising initiatives in Rabigh governorate. In addition, interviews were conducted with members of the engineering team responsible for these initiatives. The interviews covered every aspect and question that was previously referenced. As a result of our consultations with engineers and consultants, we have compiled a list of 17 distinct factors. The aforementioned elements collectively impact the project delays that are encountered in relation to their specified deadlines. The provided data will be crucial for conducting comprehensive analyses and conducting comparisons in

order to determine the primary factors contributing to contractor delays and obstacles in the completion of projects. This analysis is a key part of understanding the nature of the various factors [22].

2.4.2. Factor analysis to identify significant barriers

Table 3 Descriptions of barriers and difficulties.

No.	Factors	Descriptions
1	Administrative difficulties	Administrative hurdles can delay project approvals, decision-making processes, and communication, affecting project progress and coordination [5].
2	Alternative suppliers	Switching to alternative suppliers can lead to delays during onboarding, quality checks, and supply chain disruptions, impacting project continuity [12].
3	Contract design precision	Inaccurate or imprecise contract designs can lead to disputes, misunderstandings, and legal processes, causing delays in project execution [14].
4	Contractor procrastination	Contractor procrastination can lead to missed deadlines, inefficient resource allocation, and delayed project phases, impacting overall timelines [7].
5	Cost estimation errors	Errors in cost estimation can result in budget overruns, resource shortages, and financial constraints, impacting project planning and execution [19].
6	Geological site conditions	Challenging geological conditions can require additional time and resources for engineering solutions, impacting project schedules [15].
7	Government procedures	Complex government procedures can introduce delays due to lengthy approval processes, permits, and compliance checks, requiring time and effort to navigate [3].
8	Insufficient experience	Lack of experience among project team members or leadership can result in poor decision-making, mismanagement, and errors, requiring extra time for learning and adjustments [5].
9	Issues with financial resource	Inadequate financial resources can lead to disruptions in material procurement, labor hiring, and contractor payments, causing work stoppages and delays [21].
10	Labour availability	Labour shortages can lead to work slowdowns, work stoppages, and extended timelines, impacting project efficiency and progress [13].
11	Project progress monitoring	Inadequate progress monitoring can result in late issue detection and resolution, leading to delays as problems are identified and addressed [6].
12	Project requirements changes	Frequent project requirements changes can disrupt project schedules and necessitate adjustments, affecting project planning and resource allocation [24].
13	Project schedule accuracy	Inaccurate project schedules can result in unrealistic timelines and inefficient resource allocation, impacting project progress and efficiency [25].
14	Quality and detail neglect	Neglecting quality and critical project details can result in errors, defects, and the need for rework, impacting project quality and schedules [22].
15	Specialized project experience	Lack of specialized experience can lead to errors in specialized projects, requiring extra time for teams to gain expertise and deliver accurate work [16].
16	Strategic planning weakness	Weak strategic planning can lead to unclear project objectives, inadequate timelines, and insufficient risk management, causing confusion and mismanagement [21].
17	Unexpected circumstances	Unanticipated occurrences such as natural calamities or worldwide emergencies have the potential to disturb project timelines and the accessibility of resources [13].

After conducting interviews, conducting a comprehensive examination, and engaging in extensive discussions, an analysis has been undertaken to elucidate the factors that contribute to project timeline delays caused by contractors. The challenges and obstacles that emerged from discussions with engineers and consultants are detailed in Table 3.

After providing an in-depth analysis of the foundational elements, we have compiled a list of the most influential factors that cause substantial project delays. The respondents' identification of these critical influencing factors has been methodically organized and presented in Table 4 for the purposes of reference and clarity.

Table 4 Key Factors Leading to Delay from Interview.

No	Key Factors contribute to	Interviewer Code										
		I-1	I-2	I-3	I-4	I-5	I-6	I-7	I-8	I-9	I-10	I-11
1	Administrative difficulties			✓	✓			✓	✓	✓		✓
2	Alternative suppliers						✓	✓				
3	Contract design precision		✓	✓				✓			✓	
4	Contractor procrastination			✓								
5	Cost estimation errors	✓			✓							
6	Geological site conditions						✓					
7	Government procedures			✓		✓				✓	✓	
8	Insufficient experience	✓	✓								✓	✓
9	Issues with financial resource		✓	✓		✓			✓	✓		✓
10	Labour availability								✓		✓	✓
11	Project progress monitoring			✓					✓	✓	✓	
12	Project requirements changes					✓		✓				
13	Project schedule accuracy					✓					✓	
14	Quality and detail neglect		✓	✓	✓				✓			
15	Specialized project experience	✓	✓		✓							
16	Strategic planning weakness	✓		✓	✓						✓	✓
17	Unexpected circumstances	✓	✓				✓	✓				

2.4.3. Comparison of the effects of various factors on delays

The investigation of the variables that contribute to project delays in comparison unveils a complex and varied terrain. Labor availability emerges as a critical factor, as project timelines often hinge on the availability and skill levels of workers. Project progress monitoring plays an equally pivotal role, necessitating efficient tracking mechanisms to identify and address potential delays in real-time. Changes in project requirements pose significant challenges, often leading to rework and schedule disruptions [33]. Accurate project scheduling is crucial for timely completion, highlighting the importance of meticulous planning and foresight. Neglecting quality and detail can result in setbacks, underscoring the need for stringent quality control measures. Specialized project experience can mitigate delays by leveraging expertise and streamlining processes. Weaknesses in strategic planning may lead to inefficiencies and unforeseen obstacles, emphasizing the importance of robust planning. Finally, unexpected circumstances such as natural disasters or supply chain disruptions can significantly impact project timelines, necessitating contingency plans and adaptive management strategies.

3. Results and Discussion

3.1. A review of the respondents and sample

We have identified and documented 17 critical factors that influence project delays, as perceived by each participant, following an exhaustive analysis of the multifaceted factors and causes and eleven in-depth interviews with consultants and engineers, as well as a thorough inspection of project sites. These components effectively symbolize the

complexities and difficulties that are intrinsic to contractor collaboration in the ever-changing setting of construction projects [5].

Subsequent to this research undertaking, a thorough and methodical analysis will be conducted on the identified factors. The objective of this examination is to thoroughly analyze each factor, providing detailed explanations of their importance and consequences. In addition, a comparative analysis will be conducted, incorporating perspectives from multiple sources such as the interviewees, prior research, and our own observations. This investigation gives an accurate indicator to better understand the factors [3].

The primary aim of this comprehensive analysis is to acquire more profound insights into the fundamental factors that contribute to project delays and to furnish a comprehensive comprehension of the obstacles that contractors commonly confront throughout the duration of their endeavors. This study not only illuminates the intricacies inherent in the construction sector but also seeks to provide significant insights that can inform improvements in project management methodologies and expedite the expeditious completion of projects. Providing insights into problems and obstacles is a major part of solving the problem [8].

3.2. Presentation of significant barriers via investigation of factors

3.2.1. Administrative difficulties.

Administrative difficulties, such as bureaucratic obstacles and communication breakdowns, can slow down decision-making processes [13]. Delays in approvals and miscommunication can cause project setbacks and extensions of timelines [4]. The interviewees from I-3, I-7, and I-9 highlighted that administrative challenges, particularly delays in securing permits and approvals, had a notable impact on the project schedule. These delays could manifest even before the construction phase, leading to higher overhead expenses. It is obvious that bureaucratic challenges within an organization that involve delays in obtaining permits, approvals, or other administrative hurdles that slow down project progress.

3.2.2. Alternative suppliers.

Switching to alternative suppliers can introduce delays when new suppliers require onboarding, quality assurance checks, or production process adjustments [5]. Disruptions in the supply chain can extend project timelines, especially when the transition isn't seamless [14]. Additionally, it was noted during the interviews with I-6 and I-7 that the reliance on alternative suppliers can introduce complexities into construction projects, potentially resulting in significant delays. This situation often arises when the primary suppliers encounter unforeseen issues or disruptions in their production processes. When contractors are forced to seek alternative suppliers, several factors come into play, extending the project timeline. It is evident that alternative suppliers are seen as crucial backup options in case the primary suppliers face disruptions, ensuring a smoother supply chain management.

3.2.3. Contract design precision.

Inaccurate or imprecise contract designs can contribute to project delays by introducing ambiguity or disputes [6]. Unclear contract terms and conditions can result in disagreements, renegotiations, and contract-related delays [16]. The insights provided by interviewees I-2, I-3, and I-10 shed light on the critical issue of contract design precision and its substantial impact on construction projects. When contract designs lack completeness or accuracy, a cascade of challenges can arise, culminating in project delays and cost overruns. It becomes apparent this factor emphasizes the importance of meticulous contract design to clearly define project expectations and avoid disputes or ambiguities during construction.

3.2.4. Contractor procrastination.

Contractor procrastination can be a significant cause of project delays when contractors fail to meet deadlines or allocate insufficient resources [6]. Factors such as lack of motivation, unclear contract terms, or resource constraints can contribute to this issue [16]. The insights shared by Interviewer I-3 concerning contractor procrastination provide valuable perspective on the critical issue of project delays and their potential consequences. Procrastination within the contractor's team can have far-reaching effects, necessitating a deeper exploration of its underlying causes and the various ways it impacts construction projects. Contractor procrastination is seen as a consequence of poor project management, indicating the need for better motivation, resource allocation, and time management.

3.2.5. Cost estimation errors.

Errors in cost estimation can lead to project delays due to budget overruns and resource shortages [20]. Accurate cost estimation is critical for proper project planning and execution, and without it, projects may face financial setbacks [19]. The information shared by Interviewees I-1 and I-4 highlight the critical role of accurate cost estimation in construction projects and underscore the ripple effects that inaccuracies can have on the project's financial health, timelines, and overall success. And it's essential to explore the multifaceted dimensions of how inaccurate cost estimates can disrupt construction efforts. It is discernible this perspective highlights the significance of accurate cost estimation in preventing budget overruns and financial challenges during construction.

3.2.6. Geological site conditions.

Challenging geological site conditions, such as unstable soil, unexpected rock formations, or groundwater issues, can lead to project delays [15]. These conditions may require additional engineering solutions, resources, or time to address properly [12]. The insights shared by Interviewee I-6 regarding unexpected geological challenges in construction projects provide a crucial perspective on the potential hurdles that can arise due to geological site conditions. These challenges can have far-reaching impacts on project timelines, budgets, and safety, and a more in-depth exploration of these issues helps shed light on their multifaceted nature. It is obvious that geological site conditions are considered potential challenges that require thorough site assessments and engineering solutions to mitigate delays.

3.2.7. Government procedures.

Lengthy and complex government procedures can introduce delays into a project's timeline [16]. These procedures may include permit requirements, environmental assessments, or compliance checks. Navigating these bureaucratic processes can extend project initiation and execution times significantly [22]. The knowledge shared by Interlocutors I-5 and I-9 underscore an essential aspect of construction project management: the impact of government procedures on project timelines. Delays caused by the intricate web of permits, licenses, and approvals can have multifaceted implications. It is noticeable that government procedures involve regulatory hurdles that can slow down projects due to lengthy approvals and compliance requirements.

3.2.8. Insufficient experience.

Lack of experience among project team members or leadership can lead to poor decision-making, mismanagement, and errors [4]. Teams may require extra time to learn, seek guidance, or address mistakes, affecting project efficiency [26]. The perspectives shared by Interviewees I-1 and I-11 emphasize a crucial aspect of the construction industry: the role of contractor experience in successful project execution. Contractors who lack experience in managing specific project types or complexities can indeed encounter various challenges that may impact project timelines and quality. It is perceivable this lack of experience is seen as a hindrance, necessitating the need for contractors to gain specialized knowledge or partner with experts for complex projects.

3.2.9. Issues with financial resource.

Inadequate financial resources can cause delays as they may lead to disruptions in material procurement, labor hiring, and payment delays to contractors [6]. Insufficient funds can result in work stoppages, affecting project timelines significantly [12]. The details provided by Interviewees I-3 and I-8 emphasize the significant role of financial stability in the successful execution of construction projects. Financial constraints, whether stemming from insufficient capital or cash flow problems, can indeed present formidable challenges that ripple through all aspects of project management, potentially leading to significant delays and disruptions. It is conspicuous this factor underscores the importance of adequate capital and cash flow management to ensure seamless project progress.

3.2.10. Labour availability.

Labor shortages or unavailability of skilled workers can result in project delays [17]. Without an adequate workforce, project tasks may take longer to complete, impacting overall project timelines [13]. The insights provided by Interviewees I-8, I-10, and I-11 highlight a pivotal aspect of construction project management the availability of skilled labor. This dynamic factor can significantly influence project timelines and outcomes, and its fluctuations are influenced by a range of factors. By recognizing the dynamic nature of labor availability and implementing strategies to address these challenges, contractors can better manage their workforce and reduce the risk of project delays. It is visible that Labor availability, as a factor, underscores the importance of strategic workforce planning, particularly in areas where labor markets experience fluctuations.

3.2.11. Project progress monitoring.

Inadequate project progress monitoring can lead to delays by failing to identify issues early [21]. Without real-time monitoring and corrective actions, problems may go unnoticed until they become critical, requiring more time and resources to resolve [20]. The information provided by Interviewees I-3 and I-9 underscore the critical importance of effective project progress monitoring in construction projects. Monitoring serves as a proactive tool to identify issues early, make informed decisions, and maintain project timelines and efficiency. Effective project progress monitoring is crucial for identifying issues early on and ensuring projects stay on track as observed, enhancing overall efficiency.

3.2.12. Project requirements changes.

Frequent changes in project requirements can disrupt project schedules [15]. These changes may stem from evolving stakeholder needs, shifting priorities, or unforeseen circumstances. Adapting to new objectives and deliverables often requires adjustments to project plans and resources, resulting in delays [25]. The observations shared by Interviewees I-5 and I-7 underscore a common challenge faced in construction projects changes in project requirements. These changes, whether driven by client requests, evolving project needs, or unexpected circumstances, can introduce a layer of complexity that impacts construction schedules and may result in delays. It is evident this perspective recognizes that project requirements can evolve and need to be managed effectively to avoid disruptions and scope creep.

3.2.13. Project schedule accuracy.

Inaccurate project schedules can lead to delays when project timelines are not realistic or achievable [17]. Overly optimistic schedules may fail to account for potential setbacks, resulting in delays as tasks take longer to complete than originally estimated [6]. The insights provided by Interviewees I-5 and I-10 underscore the imperative importance of accurate project timelines in construction projects. The accuracy of project schedules is a cornerstone of effective project management, and any shortcomings in this aspect can have cascading effects that impact the entire construction process. It is manifestly that accurate project scheduling is seen as vital for setting realistic expectations and ensuring timely project completion.

3.2.14. Quality and detail neglect.

Neglecting quality standards or critical project details can lead to project delays due to errors and defects that require rework [7]. This not only consumes additional time but can also result in added costs and project delays [3]. The Perspectives conveyed by Interviewees I-2 and I-4 underscore a critical aspect of construction project management the intrinsic link between quality and project success. The pursuit of meeting deadlines and cost constraints at the expense of quality and attention to detail can indeed have profound consequences on construction projects, potentially leading to rework, disputes, and delays. It is readily apparent that neglecting quality and details is viewed as a risk to the overall project's success, leading to rework and delays.

3.2.15. Specialized project experience.

Lack of specialized experience relevant to the project type can cause delays [25]. In projects that require specific expertise, the absence of experienced personnel can lead to errors, inefficiencies, and the need for additional training or subcontracting [5]. The Views expressed by Interviewers I-1, I-2, and I-4 underscore the critical importance of specialized experience when dealing with unique project requirements or complexities within the construction industry. Specialized projects, whether they involve intricate architectural designs, advanced engineering solutions, or unique material specifications, often present challenges that go beyond standard construction practices. It is conspicuous that Specialized project experience highlights the need for contractors to possess specific expertise for complex or unique projects.

3.2.16. Strategic planning weakness.

Weak strategic planning can result in project delays as it often leads to unclear objectives, inadequate timelines, and ineffective risk management [21]. Projects without a clear direction and preparedness can struggle to address uncertainties and changes [5]. The observations shared by Interviewees I-3 and I-11 emphasize the pivotal role of strategic planning in construction project management. Weaknesses in strategic planning can indeed expose construction projects to a host of unexpected problems and delays. It is noticeable that Weaknesses in strategic planning are seen as a source of unforeseen problems, highlighting the importance of comprehensive planning and risk assessment.

3.2.17. Unexpected circumstances.

Unexpected circumstances, such as natural disasters, unforeseen regulatory changes, or global crises (e.g., pandemics), can disrupt project schedules [13]. These events are often beyond the control of project managers and can introduce delays through supply chain interruptions, workforce unavailability, or increased project risks [12]. The insights provided by Interviewees I-2 and I-6 underscore the vulnerability of construction projects to unforeseen circumstances that can significantly disrupt schedules and lead to delays. These unforeseen events, often beyond the control of contractors, introduce a layer of complexity and uncertainty that must be managed effectively. It is perceivable that unforeseen events, like accidents or natural disasters, can disrupt construction schedules and necessitate contingency plans.

4. Conclusion

An exhaustive and thorough examination was undertaken to investigate the elements that contribute to setbacks and delays in the delivery of projects by contractors. This process entailed an exhaustive analysis and scrutiny of prior research studies in order to extract pertinent information and insights concerning the factors that contribute to delays. A 17 factor table was assembled to represent the significant obstacles that impede contractors from adhering to project schedules. Deliberations and assessments of research samples pertaining to this topic transpired, culminating in the development of a schematic diagram that clarified the research paper, data collection methodologies, and analysis techniques. In addition, eleven specialized consultants and engineers tasked with the supervision of initiatives in Rabigh governorate participated in interviews. The purpose of these interviews was to obtain their insights and perspectives concerning the origins of delays, the obstacles they presently face, and the potential reasons that may arise in the future. The interviews conducted served as an exhaustive and distinctive inquiry into the causes of contractor delays, ultimately uncovering 17 pivotal factors that contribute to the failure of contractors to adhere to project deadlines. After conducting an analysis of the data and insights obtained from interviews with engineers and consultants, a thorough investigation was carried out into the obstacles and difficulties encountered by contractors when attempting to adhere to project timelines. By conducting a comparative analysis of interviewee perspectives, existing studies, and my own findings, I aimed to ascertain the underlying factors that contribute to project delays and provide a more comprehensive understanding of their relationship with such delays. Ultimately, my objective was to reveal the fundamental origins of this enduring problem within the construction and building sector.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed

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