Volume – 11, Issue – 1, May 2025 https://doi.org/10.46593/ijaera.2025.v11i01.001

Development of a Strategic Framework for Reducing Project Delays in Saudi Arabia

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Abstract: This study examined delays in construction project implementation in Saudi Arabia, a chronic issue with significant economic and administrative impacts, particularly in the context of the Kingdom's Vision 2030 development plans. The researcher developed a strategic framework aimed at reducing these delays by identifying influential factors and proposing local solutions. Using a descriptive and analytical approach, an electronic questionnaire was distributed to 360 individuals from contracting and consulting firms in the Kingdom, focusing on the administrative and engineering causes of delays, the components of the strategic framework, its compatibility with reality, and employees' views on its effectiveness. Statistical analysis revealed consensus on key reasons for delay: weak coordination, delayed licenses, frequent design changes, and a shortage of skilled workers. Key components for a practical framework included having an alternative plan, defining responsibilities, and using digital tools for time monitoring. Most participants accepted the proposed framework, viewing it as a practical tool due to its organizational clarity and adaptability. The study concluded with recommendations for stakeholders to adopt the framework, enhance training programs for officials, and implement predictive digital systems to monitor schedules.

Keywords: Delays in Construction Projects - Strategic Project Management - Digital Models - Execution Efficiency - Time Management in Projects.

I. INTRODUCTION

Construction projects are vital for economic development and the strategic goals of countries, particularly in Saudi Arabia's National Vision 2030. Despite increasing investments and diverse projects, delays remain a significant challenge, leading to completion issues, high costs, and diminished stakeholder confidence. Studies show that delays stem from various factors, including weak coordination between contractors and owners, poor time management, and insufficient human resources. Moreover, the lack of strategic frameworks regulating relationships among stakeholders worsens delays. Therefore, developing an integrated strategic framework is necessary to address these issues scientifically. This research aims to create a practical framework to reduce delays in Saudi Arabian construction projects by reviewing literature, analyzing best practices, and proposing a model that incorporates local conditions. It relies on advanced project planning, risk management, and time evaluation techniques. The findings could enhance the efficiency of major national projects by improving scheduling, resource control, and institutional integration.

Study problem

Construction projects significantly contribute to the economic and social development of Saudi Arabia, particularly under Vision 2030's aim for comprehensive infrastructure and public services. However, project delays have become a major challenge, causing high costs, decreased quality, and

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disruptions to vital facilities. This issue is especially critical in precise service projects like electricity networks, on which multiple sectors rely (Almalki, 2021). Literature suggests that these delays stem from weak administrative coordination, poor time management, inadequate planning, design changes, delayed contracting, and a lack of specialized human resources. Although many studies address the causes, few present a comprehensive strategic model for mitigating delays suitable for local contexts, particularly in complex electricity projects demanding high technical and organizational readiness. Thus, this research aims to develop an integrated strategic framework to reduce construction project delays in Saudi Arabia, addressing the unique time risks of critical projects like electrical infrastructure. This framework seeks to provide organizational and planning solutions based on a scientific methodology, enhancing implementation efficiency and assisting relevant authorities in minimising time gaps and optimising performance from planning through delivery quest.

Study questions

1. What are the administrative and engineering reasons for delays in construction projects in the Kingdom of Saudi Arabia?
2. What are the most prominent institutional and technical factors that an effective strategic framework should be built upon to reduce delays in construction projects within the Kingdom?
3. How can the components of the proposed strategic framework be aligned with the nature of construction projects in the Kingdom of Saudi Arabia?
4. To what extent do workers in the construction sector accept the proposed strategic framework, and what are their possible perceptions about its implementation mechanisms and effectiveness in reducing delays?

This research focuses on enhancing project management knowledge by addressing delay factors in construction, particularly in Saudi Arabia's complex environment. It proposes a comprehensive framework that integrates modern concepts of risk management, resource planning, and contractual governance, aiming to improve project performance indicators and develop new evaluation models. The framework assists decision-makers—such as project managers and planners—in forecasting delays and creating proactive management plans, ultimately boosting the likelihood of timely and budget-compliant project completions. Additionally, the study emphasizes the need for integrated project management policies in both the government and private sectors, as current standards often lack strategic dimensions. The findings are based on a sample of construction professionals in Saudi Arabia and are focused on projects within the country, set for analysis in 2025.

II. LITERATURE REVIEW

Construction projects are vital to Saudi Arabia's development, significantly growing due to the ambitious Vision 2030 transformations. These projects encompass infrastructure, public facilities, residential complexes, and commercial and industrial facilities, making construction a key driver of the national economy and impacting employment and investment. This sector enhances quality of life in urban and rural areas, reflecting urban progress and institutional capacity to execute major strategic plans. Despite its importance, construction in the Kingdom faces technical and administrative challenges, complicating implementation and causing delays. These challenges stem from the multidimensional nature of projects, requiring high coordination among stakeholders such as owners, contractors, suppliers, and consultants, alongside regulatory and environmental considerations. Reliance on advanced technology and complex processes from design to delivery further complicate scheduling and resource management, necessitating effective organizational and strategic frameworks to mitigate delays and inefficiencies. These issues highlight the need for in-depth studies addressing

local construction contexts, exploring organizational shortcomings and bottlenecks. Developing analytical tools and strategic models could enhance project performance, providing practical solutions while supporting academic efforts to build applied knowledge that meets the sector's evolving needs and challenges.

Delays in construction projects

Delays in construction projects are a prevalent issue globally, defined as any unintended time deviation from the approved schedule due to various factors such as contractual failures, unforeseen circumstances, and resource complications. These delays can be classified into compensable, non-compensable, or force majeure events, each carrying distinct legal and financial implications that affect stakeholder relationships and project delivery. Their impacts are multifaceted, affecting financial costs, administrative organization, operational readiness, and societal trust, particularly for public projects. Effective strategies to mitigate these delays involve comprehensive planning, clear governance structures, advanced technical management, proactive risk assessment, and ongoing project monitoring to ensure timely interventions and enhance overall performance in the construction sector (Bashir, 2021), (Mansour, 2023)., (Sharma P. , 2022)., (Ibrahim, 2023)., (Adeyemi A. , 2021) (Alotaibi, 2023).

Previous studies

- A study (Adeyemi A. , 2021) sought to uncover the most prominent factors that contribute to the occurrence of time delays in construction projects in developing environments, with a focus on analyzing the relationship between administrative practices and rates of progress in completion, the primary goal was to build a comprehensive vision about the sources of time delays, this aims to support decision makers in proposing organizational interventions that enable improving executive performance in construction projects The study relied on the descriptive analytical method, as it collected data through a field questionnaire distributed to a number of engineers and administrators in national contracting companies working in implementing public construction projects.
- The study (Nguyen, 2021) also aimed to test the hypothesis that disruption in the availability of basic materials is one of the most prominent factors affecting delivery delays, especially in projects with a long time frame, the study relied on a quantitative analytical approach, using a questionnaire tool directed to workers in logistics and procurement departments, in multiple contracting companies.
- A study (Macdonald, 2021) focused on analyzing the role of weak administrative skills among project managers as a major cause of delays, especially in work environments that lack strong control systems, the researcher aimed to highlight the importance of administrative efficiency in making time decisions and dealing with emergencies during implementation, the researcher followed the descriptive approach using a questionnaire directed to project managers working in private contracting companies.
- The study (Kamau, 2021) also sought to evaluate the impact of delayed payment by owners on the project schedule, considering financial liquidity as a critical element in the continuity of implementation, the study used a quantitative approach, by analyzing financial and administrative data for 40 projects that were implemented in urban areas in Africa.
- The study (Clarke, 2022) aimed to explore the impact of the multiplicity of implementing parties and overlapping responsibilities in causing time delays within construction projects, especially those characterized by complexity in the administrative structure or the multiplicity of funding and implementing agencies the primary goal is to analyze the relationship between institutional

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multiplicity in projects and weakness, the ability to adhere to established timetables, and to achieve this, the researcher used the mixed approach Data was collected through questionnaires and personal interviews with a group of project managers and consultants.

- The study (Kovacs, 2022) was based on the researcher's desire to analyze the time problems that construction projects suffer from, while trying to formulate a conceptual framework that explains the relationship between administrative challenges and field delay incidents the study focused on understanding how the internal work environment on construction sites affects the regularity of schedules, project timelines The researcher mainly aimed to develop a viable organizational vision by extrapolating the recurring obstacles that appear in the implementation stages, and linking them to the accompanying administrative procedures. A quantitative approach was adopted, through the distribution of an electronic questionnaire to a group of people with experience in the field of public and private construction.
- The study (Santiag, 2022) also analyzed the problems related to issuing official licenses and approvals, and their role in disrupting the start or continuation of the implementation of construction projects the goal of the study was to identify the extent to which government measures contribute to causing delays, and to attempt to formulate a proposal to reduce the time impact of these stages regulatory, the study adopted a qualitative approach by conducting in-depth interviews with project officials and representatives of regulatory bodies in the urban construction sector.
- The study (Lorentz, 2022) addressed the issue of the impact of repeated design changes during the implementation stages of projects on the time performance of the project, and sought to provide a clear vision of the extent to which these amendments contribute to disrupting the approved timetable the researcher focused on analyzing the nature of the relationship between late engineering decisions and the emergence of delays sequential in the implementation stages, the study adopted the descriptive analytical approach, using a detailed questionnaire distributed to architects, project managers, and technical supervisors.
- The study (Yousef, 2022) also aimed to study the relationship between the size of the project and the extent of its exposure to time delays, while trying to explain the reason for the increase in time risks in projects of a large nature compared to small and medium projects the study relied on the quantitative analytical approach, where quantitative data was collected from Records of a number of projects implemented in the Middle East region.
- The study (Singh, 2023) also aimed to evaluate the effectiveness of using smart software in reducing delay rates in large projects, by analyzing the ability of these tools to predict time problems and address them before they escalate. The objective of the research has been centered on testing the feasibility of integrating project management software such as Primavera and BIM 4 D in the adjustment of the project schedule. The researcher used a quasi-experimental approach, where projects that used, digital systems were compared to projects managed using traditional methods.

III. RESEARCH METHODOLOGY

The descriptive approach will be used in its survey form to achieve the study's goal of developing a strategic framework to reduce delays in construction projects in the Kingdom of Saudi Arabia, this approach was chosen to understand the complexities and nuances of the various reasons that lead to delays in construction projects in the Kingdom of Saudi Arabia.

Data type

The study will utilize primary data collected via an electronic questionnaire distributed to the members of the study sample. Additionally, secondary data will be gathered from previous scientific references

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such as books, studies, and working papers, as well as from the official websites of contracting companies and consulting engineering offices in the Kingdom of Saudi Arabia.

Study population and sample

The study population consists of all employees from contracting companies and consulting engineering offices in the Kingdom of Saudi Arabia, totaling 2.74 million, as reported by the Saudi Contractors Authority. A sample of 360 employees was selected based on the Morgan table for sample size determination, ensuring diversity and inclusiveness across several dimensions: gender, with employees of both sexes; age, encompassing various age groups; educational qualifications, including those with differing levels of education; work experience, represented by a range of years in their careers; and job titles, reflecting a variety of roles.

Study tool

A questionnaire will be prepared and distributed to the study sample of workers in contracting companies and consulting offices in the Kingdom of Saudi Arabia. In designing the questionnaire to achieve the study's objectives, the researcher followed the following steps. The researcher will use a five-point Likert scale to refine the research tool. Theoretical readers in scientific references related to the variables of the study, how to build and design the questionnaire, and the scientific foundations that must be taken into account in this regard, the questionnaire will be built and divided according to the following axes:

- The first axis: Administrative and engineering reasons for delaying construction projects in the Kingdom of Saudi Arabia.
- The second axis: Formulating a strategic framework based on the factors that most influence time delays, and takes into account the organizational and technical specificity of construction projects in the Kingdom.
- The third axis: Aligning the elements of the strategic framework with the realistic challenges facing construction projects in the Kingdom of Saudi Arabia, with the aim of improving the effectiveness of implementation and controlling timetables.
- The fourth axis: Surveying the opinions of specialists and practitioners about the strategic framework proposal and the extent of its applicability in the field, in preparation for adopting it as a practical guiding model.

IV. RESULTS AND DISCUSSION

Descriptive analyzes of the study sample

Table 1 outlines the sample's characteristics: 27.5% are ages 40-49, 26.1% over 50, and 21.4% under 30. This diversity enhances insights on project delays and challenges. In education, 37.5% have bachelor’s degrees, 31.4% hold master’s degrees, and 31.1% have diplomas, merging academic knowledge with practical skills and increasing reliability in analyzing construction delays.

26.4% of professionals have less than five years of experience, indicating varying views on delays. Experience percentages drop with tenure: 25.6% for 5-10 years, 24.7% for 10-15 years, and 23.3% for over 15 years. This range is vital for analyzing delay causes and solutions. Executive engineers and technicians each comprise 34.4% of job distribution, enhancing the credibility of data on

implementation challenges and site delays, while consultant engineers represent 31.1%. This diversity aids in comparing opinions by role and improving planning and control.

Table 1: Characterisation of the study sample

Age		
	Count	**percentage**
Under 30 years old	77	21.4
From 30 to less than 40 years	90	25
From 40 to less than 50 years	99	27.5
50 years and over	94	26.1
Academic Qualification		
Master's degree and above	113	31.4
Bachelor's degree	135	37.5
Diploma	112	31.1
Years of Experience		
Less than 5 years	95	26.4
From 5 to less than 10 years	92	25.6
From 10 to less than 15 years	89	24.7
15 years and over	84	23.3
Job Title		
Consulting Engineer	112	31.1
Implementation engineer	124	34.4
Technician	124	34.4

Testing the validity and reliability of the study tool

Cronbach's alpha measured the questionnaire's reliability, yielding scores from 0.928 to 0.940 for the axes and an overall score of 0.857, indicating good reliability. After feedback, some phrases were deleted and merged for the final version.

Presentation and discussion of the results of the study questions

The text discusses causes of construction delays in Saudi Arabia, highlighting significant obstacles such as poor agency coordination, licensing delays, and design changes, with a 95% consensus. A skilled labor shortage and inadequate logistical planning further hinder progress. All identified issues reflect planning deficiencies and management challenges, underscoring the need for improved communication and project management to reduce delays.

The second question evaluates essential factors for a strategic framework to reduce construction delays in the Kingdom. The researcher computed averages and standard deviations for the second study axis (components of a strategic framework), showing strong consensus on the importance of organizational and technical aspects, with an average of 461 and a standard deviation of 452 (refer to Table 3). The highest average, "existence of an alternative time plan" (M = 4.48), underscores the need for backup plans to manage disruptions. Averages between 45 and 47 for defining responsibilities, using standard models, and involving all parties indicate the need for role clarity to minimize conflicts. Participants stressed the significance of digital control systems, with high scores on "Employing digital models in scheduling" (M = 458) and "Relying on previous project data" (M = 4.461). These findings support the notion that smart software technologies (e.g., Primavera, BIM 4d) reduce delays by aligning plans with execution. The role of "existence of higher governance committees" (M = 45) in dispute resolution is notable, along with the item "Revise the executive schedule periodically" (M = 461), which indicates

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that planning should adapt dynamically to changes, as experts suggest. In summary, tackling delays necessitates a strategy that integrates planning, clear responsibilities, and modern monitoring technologies.

Question Three: How can the strategic framework align with construction projects in Saudi Arabia? The researcher calculated averages and standard deviations for the second study axis (aligning the framework with real challenges), as shown in Table 4. Success hinges on adaptability (M = 4.46, SD = 0.466). Participants assert the necessity of aligning theoretical planning with practice. The item "Multiple implementing agencies increase the importance of interim evaluation" (M = 4.488) highlights the need for regular monitoring, supporting Clarke (2022) on intertwined powers and evaluation tools. Items like "the planning framework should adapt to the project's nature and location" (M = 4.477) and "major projects need implementation flexibility" (M = 4.447) emphasize context. Generalizing time models without considering size and complexity creates imbalances. The item "The effectiveness of the strategic framework depends on its flexibility to change" (M = 4.461) shows agreement on needed adaptable strategies. Regarding "Some projects require continuous review of time performance" (M = 4.469), planning must be dynamic. Findings show a preference for smart technologies like performance tracking systems (M = 4.462), endorsing digitization in project management. A clear procedural guide (M = 4.466) is valued, indicating documentation promotes team commitment, essential for minimizing delays. Ignoring project realities in a strategic framework is ineffective; harmonizing theory and implementation is key to reducing delays and stresses this axis's significance in successful models.

Question Four: To what extent do construction workers accept the strategic framework, and what are their perceptions of its implementation mechanisms and effectiveness in reducing delays? The researcher calculated averages and standard deviations for employee perceptions of the framework's effectiveness, shown in Table 5. Overall support is strong, with an average of 4.444 and a low standard deviation of 0.472, indicating confidence in applicability. The statement "The proposed framework reflects the needs of realistic construction projects" had a high average (M = 4.452), aligning well with practitioners' experiences and enhancing model reliability. The statement "The elements of the proposed model are implementable without complexity" (M = 4.475) highlights the model's simplicity. The item "The existence of a control system within the framework promotes transparency" (M = 4.45) underscores a monitoring mechanism with performance indicators. Support is also shown in "The model contributes to improving the contractual relationship" (M = 4.452), indicating value through governance. The indicator "Institutional support is necessary for the model's successful application" (M = 4.438) emphasizes the need for supportive environments. Regarding "Integrating the framework into contracts enhances executive commitment" (M = 4.425), it's clear that success depends on integration. Lastly, the clause "The framework provides practical solutions to the delay problems we face" (M = 4.438) links analysis to practical challenges, increasing its value in construction projects.

ANOVA test

One-way ANOVA shows that construction professionals' opinions on the delay mitigation framework differ by experience. Less experienced individuals preferred modern solutions, whereas seasoned professionals rated it lower due to skepticism. Tools must adapt to varying expertise for wider acceptance. Job title differences were notable: implementation engineers rated the framework highest, favoring hands-on experience; consultants leaned towards conservative, design-focused approaches; and technicians often lacked the analytical perspective to fully understand the model's value. Tailored communication and application strategies per role are needed for effective understanding of the framework's benefits (refer to Tables 6).

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Table 2: Administrative and engineering reasons for delayed construction projects

The first axis: Administrative and engineering reasons for project delays	Measure	strongly agree	Agree	Neutral	Disagree with	Strongly Disagree with	Average	Standard Deviation	Value
The lack of effective coordination between the implementing agencies significantly affects the progress of work	Repetition	193	152	15	0	0	4.494	0.57	strongly agree
	Percentage %	53.6	42.2	4.2	0	0			
Poor time planning in the early stages of the project leads to stalled completion	Repetition	183	165	12	0	0	4.475	0.56	strongly agree
	Percentage %	50.8	45.8	3.3	0	0			
The delay in issuing licenses from official authorities has a negative impact on the progress of work	Repetition	192	152	16	0	0	4.488	0.58	strongly agree
	Percentage %	53.3	42.2	4.4	0	0			
Frequent design changes confuse the implementation schedule	Repetition	192	153	15	0	0	4.491	0.57	strongly agree
	Percentage %	53.3	42.5	4.2	0	0			
Weak management skills among some project managers exacerbate delays	Repetition	187	163	10	0	0	4.491	0.55	strongly agree
	Percentage %	51.9	45.3	2.8	0	0			
The absence of clear mechanisms for communication between contracting parties leads to conflicting decisions	Repetition	192	151	17	0	0	4.486	0.58	strongly agree
	Percentage %	53.3	41.9	4.7	0	0			
Delayed supply operations cause sudden interruptions during implementation	Repetition	181	168	11	0	0	4.472	0.55	strongly agree
	Percentage %	50.3	46.7	3.1	0	0			
The shortage of skilled workers represents a major challenge in achieving time commitment	Repetition	185	157	18	0	0	4.463	0.59	strongly agree
	Percentage %	51.4	43.6	5	0	0			
Multiple unplanned modifications lead to the	Repetition	189	158	13	0	0	4.488	0.56	strongly agree
	Percentage %	52.2	43.9	3.6	0	0			

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repetition of some stages of work									
Lack of clarity of tasks among the project team causes confusion in implementing timelines	Repetition	186	154	20	0	0	4.461	0.6	strongly agree
	Percentage %	51.7	42.8	5.6	0	0			
The result of the first axis: administrative and engineering reasons for delaying projects							4.481	0.46	strongly agree

Table 3: Ingredients for building an effective strategic framework

The second axis: The elements of building an effective strategic framework	Measure	strongly agree	Agree	Neutral	Disagree with	Strongly Disagree with	Average	Standard Deviation	Value
Having an alternative time plan contributes to reducing disruption when an emergency arises	Repetition	187	161	12	0	0	4.48	0.56	Strongly Agree
	Percentage %	51.9	44.7	3.3	0	0			
Involving all parties in preparing the implementation plan improves time commitment	Repetition	182	158	20	0	0	4.45	0.59	Strongly Agree
	Percentage %	50.6	43.9	5.6	0	0			
Relying on clear control systems reduces deviations in achievement	Repetition	178	168	14	0	0	4.45	0.57	Strongly Agree
	Percentage %	49.4	46.7	3.9	0	0			
Accurately defining responsibilities in contracts enhances the speed of decision-making	Repetition	187	158	15	0	0	4.47	0.577	Strongly Agree
	Percentage %	51.9	43.9	4.2	0	0			
Using standard implementation models increases the efficiency of project progress	Repetition	185	158	17	0	0	4.466	0.586	Strongly Agree
	Percentage %	51.4	43.9	4.7	0	0			
Relying on data from previous projects enriches the risk forecasting process	Repetition	187	152	21	0	0	4.461	0.601	Strongly Agree
	Percentage %	51.9	42.2	5.8	0	0			
Employing digital models in scheduling enhances planning accuracy	Repetition	181	163	16	0	0	4.458	0.581	Strongly Agree
	Percentage %	50.3	45.3	4.4	0	0			
Codifying design modifications reduces disruption in the implementation sequence	Repetition	180	163	17	0	0	4.452	0.585	Strongly Agree
	Percentage %	50	45.3	4.7	0	0			
The presence of higher governance committees speeds up the resolution of time conflicts	Repetition	176	170	14	0	0	4.45	0.571	Strongly Agree
	Percentage %	48.9	47.2	3.9	0	0			
Reviewing the executive schedule periodically reduces surprises during work	Repetition	181	164	15	0	0	4.461	0.576	Strongly Agree
	Percentage %	50.3	45.6	4.2	0	0			

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The result of the second axis: the components of building an effective strategic framework	4.461	0.452	Strongly Agree

Table 4: Aligning the strategic framework with the challenges of reality

The third axis: Aligning the strategic framework with the challenges of reality	Measure	Strongly agree	Agree	Neutral	Disagree with	Strongly Disagree with	Average	Standard Deviation	Value
The planning framework should be adapted to the nature and location of the project	Repetition	191	150	19	0	0	4.477	0.596	Strongly Agree
	Percentage %	53.1	41.7	5.3	0	0			
The specificity of major projects calls for flexibility in the implementation plan	Repetition	181	159	20	0	0	4.447	0.599	Strongly Agree
	Percentage %	50.3	44.2	5.6	0	0			
Some projects require continuous review of the level of time performance	Repetition	190	149	21	0	0	4.469	0.605	Strongly Agree
	Percentage %	52.8	41.4	5.8	0	0			
The multiplicity of implementing agencies increases the importance of interim evaluation	Repetition	193	150	17	0	0	4.488	0.587	Strongly Agree
	Percentage %	53.6	41.7	4.7	0	0			
Different experiences within the team require precise coordination strategies	Repetition	181	159	20	0	0	4.447	0.599	Strongly Agree
	Percentage %	50.3	44.2	5.6	0	0			
Projects of a specialized nature need special field control models	Repetition	171	172	17	0	0	4.427	0.583	Strongly Agree
	Percentage %	47.5	47.8	4.7	0	0			
The effectiveness of the strategic framework depends on its flexibility in the face of changes	Repetition	175	176	9	0	0	4.461	0.547	Strongly Agree
	Percentage %	48.6	48.9	2.5	0	0			
Smart technologies allow schedules to be linked to actual performance	Repetition	185	156	19	0	0	4.462	0.595	Strongly Agree
	Percentage %	51.4	43.3	5.3	0	0			
Focusing on early risk prediction reduces sudden stops	Repetition	183	159	18	0	0	4.458	0.59	Strongly Agree
	Percentage %	508	44.2	5	0	0			
The existence of a procedural guide for implementing the framework increases its applicability	Repetition	184	160	16	0	0	4.466	0.582	Strongly Agree
	Percentage %	51.1	44.4	4.4	0	0			
The result of the third axis: Aligning the strategic framework with the challenges of reality							4.46	0.466	Strongly Agree

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Table 5: Employees' perceptions of the effectiveness of the proposed framework

Fourth axis: Employees' perceptions of the effectiveness of the proposed framework	Measure	strongly agree	Agree	Neutral	Disagree with	Strongly Disagree with	Average	Standard Deviation	Value
The proposed framework reflects the needs of realistic construction projects	Repetition	183	157	20	0	0	4.452	0.59	Strongly Agree
	Percentage %	50.8	43.6	5.6	0	0			
Applying this framework helps effectively reduce delay rates	Repetition	178	163	19	0	0	4.441	0.59	Strongly Agree
	Percentage %	49.4	45.3	5.3	0	0			
The elements of the proposed model are implementable in the field without complexity	Repetition	184	163	13	0	0	4.475	0.56	Strongly Agree
	Percentage %	51.1	45.3	3.6	0	0			
The presence of a supervisory system within the framework enhances transparency between teams	Repetition	179	164	17	0	0	4.45	0.585	Strongly Agree
	Percentage %	49.7	45.6	4.7	0	0			
The model contributes to improving the contractual relationship between the parties	Repetition	183	157	20	0	0	4.452	0.599	Strongly Agree
	Percentage %	50.8	43.6	5.6	0	0			
Using the proposed framework helps speed up decision making	Repetition	176	162	22	0	0	4.427	0.606	Strongly Agree
	Percentage %	48.9	45	6.1	0	0			
Institutional support is necessary to ensure successful implementation of the model	Repetition	171	176	13	0	0	4.438	0.565	Strongly Agree
	Percentage %	47.5	49.9	3.6	0	0			
Integrating this framework into contracts enhances executive commitment	Repetition	171	171	18	0	0	4.425	0.587	Strongly Agree
	Percentage %	47.5	47.5	5	0	0			
Training on this model helps it be accepted by working teams	Repetition	175	169	16	0	0	4.441	0.58	Strongly Agree
	Percentage %	48.6	46.9	4.4	0	0			
The framework provides practical solutions to the delay problems we actually face	Repetition	173	172	15	0	0	4.438	0.574	Strongly Agree
	Percentage %	48.1	47.8	4.2	0	0			
The result of the fourth axis: employees' perceptions of the effectiveness of the proposed framework							4.444	0.472	Strongly Agree

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Table 6: ANOVA Summary Table Experience-Based Differences

Sig.	F	Mean Square	df	Sum of Squares	Source
Experience-Based Differences					
0.000005	22.533	4.2	3	12.6	Between Groups
		0.263	16	4.2	Within Groups
			19	16.8	Total
Evaluation by Job Title					
0.000374	20.46	3.15	2	6.3	Between Groups
		0.22	12	2.7	Within Groups
			14	9	Total

V. CONCLUSION AND RECOMMENDATIONS

The study reveals several critical factors contributing to project delays, identifying poor coordination among implementing parties as a primary administrative issue. It highlights that the lack of alternative time plans increases the risk of disruptions when unexpected challenges arise, while frequent design modifications during implementation hinder schedule adherence. Delays in obtaining necessary licenses from authorities and inadequate management skills among project managers further exacerbate execution issues. The research underscores the importance of clearly defined responsibilities in contracts for enhancing decision-making efficiency and reducing conflicts. Additionally, it highlights the role of numerical models in scheduling to improve planning accuracy and the need for flexibility in timelines to adapt to various field conditions. Most participants endorsed the proposed framework as reflective of real-world needs and practically applicable, while mechanisms for interim evaluation and continuous monitoring were recognized as crucial for identifying and addressing delays effectively.

The final strategic framework, developed from questionnaire data analysis, aims to address construction project realities in the Kingdom by aligning with four main axes. First, it promotes addressing delays caused by gaps in technical management through mandatory decision-making training for project managers, establishing coordination units, enforcing contractual clauses for immediate corrective reports, and creating smart tools to monitor supply chains. Second, it identifies effective elements like alternative plans and clear responsibilities by designing main and contingency timetables, activating individual accountability systems, utilizing integrated databases for risk forecasting, and employing BIM and Primavera software. The third axis focuses on simplifying the framework in response to field challenges, allowing monthly timetable adjustments, using unified electronic platforms for performance evaluation, activating rapid intervention teams, and linking the framework to government decision-making centers. Lastly, it emphasizes worker empowerment and feedback through introductory workshops, end-of-phase reviews for performance assessment, periodic satisfaction questionnaires, and a flexible remuneration system promoting time commitment and reducing deviations

DECLARATIONS

Conflict of interest: The author declares that there is no conflict of interest.

Ethical statement: The author declares that he followed the ethical responsibilities.

Volume – 11, Issue – 1, May 2025 https://doi.org/10.46593/ijaera.2025.v11i01.001

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