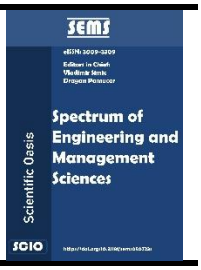
SCIENTIFIC OASIS

Spectrum of Engineering and Management Sciences

Journal homepage: www.sems-journal.org
ISSN: 3009-3309



Evaluation and Analysis of Factors Affecting Delays in Large-Scale Complex Projects: Case Study of Oil Well Drilling

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ARTICLE INFO

Article history:
Received 18 November 2024
Received in revised form 15 December 2024
Accepted 23 December 2024
Available online 24 December 2024

Keywords:
Mega-project; Oil-well drilling; Project delay; Complex projects; Oil and gas.

ABSTRACT

The expansion of project scale typically leads to increased complexity, resulting in heightened uncertainty and challenges in predicting issues, evolving conditions, and unexpected opportunities that emerge and are recognized post-initiation. Economic development programs in a country allocate substantial financial resources to oil and energy projects to enhance social welfare and quality of life. Considering the value of these resources and the investment of time, executed projects must minimize delays to avoid the wastage of national capital and allocate resources effectively to enhance the country's economic prosperity. This study examines the drilling of oil wells as a megaproject, conducting research and investigation into this large-scale complex endeavour. According to expert opinions, researcher experience, and prior studies, three hypothetical factors are identified as the most significant contributors to project delays. The sample population size was determined to be 33 individuals through a comprehensive survey, and the preliminary study results were employed using Cochran's formula and Morgan's table. A questionnaire comprising 49 questions was subsequently developed and formulated in accordance with the specified hypotheses. The questionnaire was randomly distributed and collected from the sample population following verification of its validity and reliability. Statistical inference methods were utilized to examine and evaluate the hypotheses through the application of Student's t-test. The results of the three hypotheses are presented according to their significance, ranked from the most influential factor (highest effect) to the least influential factor (lowest effect) on project duration. The three factors are summarized as follows: 1) Performance of Contractors, 2) Performance of Domestic Producers, and 3) Performance of Project Owners.

1. Introduction

Mega-projects with high costs are significant in various industries, such as oil and gas, water and energy infrastructure, healthcare, defense, mining, telecommunications, transportation, sports

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https://doi.org/10.31181/sems31202529h

events, science, and production [1]. These massive projects often constitute a significant portion of economic activities in many countries, significantly influencing productivity, social cohesion, and environmental quality [2]. Typically, many complex and large projects (megaprojects) face delays. These delays have multiple effects, including generating additional costs and damage for project stakeholders, which can lead to claims by the parties involved in the project [3]. They can also hinder achieving a project's predetermined goals, resulting in opportunity costs. Therefore, precise and clear mechanisms must be established to analyze the factors causing delays, determine their impact on various sectors and the overall project, and identify the factors and causes of delays [4].

The subject of this research project is "Identification and Analysis of Delay Factors and Consequences in Mega-Projects in Oil Well Drilling." Project delays are a significant issue affecting major contractual agreements in the oil, gas, and petrochemical industries, which impose substantial costs on a country's economy.

The importance of this research lies in predicting and solving problems that lead to project time extensions. This study is necessary to accurately predict the actual project completion time for an economic analysis. A critical issue in the economic justification of projects is the time factor, which, if not accurately evaluated, questions the return on investment. Project success is influenced by three major factors: cost, time, and quality. In other words, a project is considered successful when completed within an acceptable cost, predicted time, and with appropriate quality.

2. Literature and Research Background

2.1 Classification of Delay Analysis Methods

Delay analysis methods can be categorized from various perspectives. Yousri et al. [5] classified delay analysis methods into three main groups: additive, deductive, and analytical methods. However, the Association for the Advancement of Cost Engineering International (AACE) has provided a hierarchical tree structure for classifying delays, as shown in Figure 1. The following explanation corresponds to this classification:

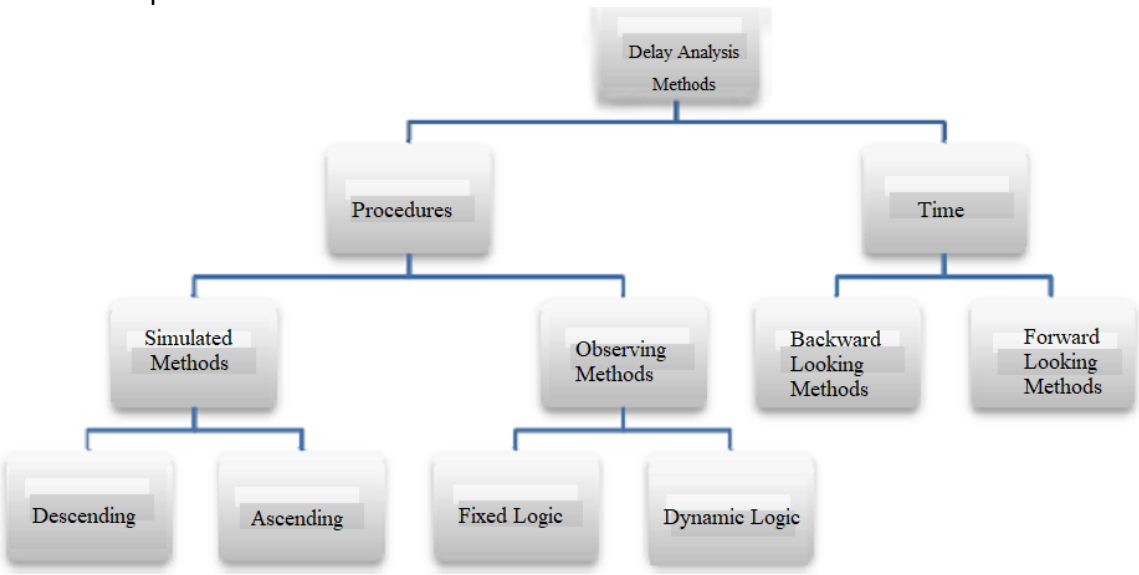

Fig. 1. Classification of delay analysis methods

2.2 Types of Delays

Project delays can generally be categorized into the following types:

i. Excusable Delays: Delays caused by factors beyond the control of the employer and contractor.
ii. Inexcusable Delays: Delays caused by mistakes and performance of parties involved in the project. Each of these delays can result in the following outcomes:
    a. Compensable Delay: Delays that can be rectified by timely error correction or by providing resources as planned in the project schedule.
    b. Non-Compensable Delay: Delays that not only increase costs and reduce project revenue, but also render the project's technology outdated beyond what can be compensated according to the schedule.

Common Causes of Delays, Bottlenecks, and Issues: The factors affecting project delays can be classified into two categories: uncontrollable (non-programmable) and controllable (programmable) (technical). It is natural that understanding the controllable technical factors is important.

Recent Research Overview: Considerable efforts have been made internationally in this field with a predominant focus on the construction industry.

For instance, there are existing methods for analyzing delay effects on increasing the duration of large projects, highlighting deficiencies in existing delay analysis methods [6].

Another study investigated the root causes of delays in the construction industry in Malaysia, examining the importance and impact of each cause and identifying causal relationships among them [7]. There is a method for categorizing the financial problems of project delays in PERT networks.

Extensive efforts have been made in the Middle East to analyze delays. In a study conducted in Jordan, 130 public sector projects were examined, and the causes of their delays were identified. Another study in the same country focused on identifying the causes of delays in construction projects [8].

In a study conducted in Saudi Arabia, the frequency, extent, and causes of delays in oil projects were analyzed. In another study, the causes of delays were examined from the perspectives of three groups: the employer, contractor, and consultant, along with their impact on project duration [9].

The article investigating delay factors in oil projects and providing a model for reducing delay time emphasizes the need to identify and analyze the causes of delays in drilling and national oil projects. They identified funding as the most common cause of delays and used regression analysis to establish the relationship between predicted physical progress, achieved progress, and all delays caused by the number of delayed projects [10].

Sherrif et al. [11], emphasizing the influence of geographical variables on project implementation duration, and collected opinions from stakeholders involved in oil and gas projects in Vietnam. They identified the following as the most important causes of delays in oil and gas projects: a) the incompetence of designers and contractors, b) social and technical issues, and c) inappropriate techniques and tools.

In investigating the factors causing delays in national oil projects in Saudi Arabia, a positive correlation was proven between the contractor's technical ranking and the frequency of delayed projects [12]. Research has also been conducted in Iran to identify factors that cause delays in oil and gas projects. For example, in a study conducted to identify the factors causing delays in drilling projects, the following were identified as the most important based on the opinions of employers, consultants, and contractors (Rezazadeh, 2023): payment for completed projects, project execution management, approval of workshop drawings, unforeseen ground conditions, insufficient contractor

experience, the inadequacy of cost estimates, and shortage of skilled labor. The results obtained from previous studies are summarized in Table 1 [13].

Table 1
Summary of studies conducted

Year- Country	Identified Factors Causing Delay in Oil and Gas Projects
[14]	Contractor's technical capability
[15]	Employer interference - Inexperienced contractors - Financing difficulties - Limited workforce productivity - Slow decision-making - Poor planning - Contractors as part of the problem
[16]	Organizational weaknesses - Shortage of material suppliers - Government regulations - Delay in transportation system
[17]	Problems with monthly payments by organizations - Contractor management weaknesses - Supply of raw materials - Poor technical performance - Continuous increase in initial costs
[18]	Incompetence of designers and contractors - Managerial changes and poor forecasts - Social and technical issues - Inappropriate techniques and tools
[19]	Inadequate contractor planning - Contractor management weaknesses at the project site - Insufficient contractor experience - Customer credit weakness and delayed payments - Contractors as part of the problem - Shortage of raw materials - Workforce availability - Equipment unavailability - Weak communication among project stakeholders - Operational errors in drilling
[20]	Payment for completed projects - Project site management - Approval of work plans - Unforeseen ground conditions - Insufficient contractor experience - Inefficiency in cost estimates - Shortage of skilled labor

3. Research Methodology

The proposed research, titled "Investigating the Causes and Factors of Delay in Mega Projects of Oil Wells," is generally applied research aimed at developing practical knowledge in the specific field mentioned above, guiding the researcher towards the scientific and practical application of knowledge. Additionally, this research is specifically an inferential and exploratory study, where after formulating hypotheses and identifying research variables, a self-designed questionnaire was prepared, distributed among the sample population, collected, and analyzed. Subsequently, using inferential statistical techniques, the desired parameters were measured within the population. Based on this analysis, the research hypotheses were tested, and the findings were examined and interpreted systematically.

3.1 Research Objectives

i. To investigate the project owner's role in delaying mega drilling projects.
ii. To examine the main contractor's role in delaying mega drilling projects.
iii. To explore the impact of internal stakeholders on delays in drilling projects.

3.2 Research Hypotheses

i. It is hypothesized that there is a significant relationship between the project owner's performance and delay in mega-drilling projects.

ii. It is hypothesized that there is a significant relationship between the performance of the main contractor and delays in mega-drilling projects.
iii. It is hypothesized that a significant relationship exists between the performance of internal stakeholders and delays in mega drilling projects.

The statistical population of this study includes all experts, managers, executives, and consultants involved in current and previous oil-well projects, both in the strategic and operational sectors. Using a statistical population reduces research time and ensures accuracy and relevance. For these reasons, a sampling method was employed in this study, and the sample size was determined using Cochran's formula or table.

$$n = \frac{N.t_{\frac{\alpha}{2}}^2.\sigma^2}{Nd^2 + t_{\frac{\alpha}{2}}^2 \cdot \sigma^2} \quad (1)$$

To determine the sample size, the following formula is used: n = (Z^2 * σ^2) / (d^2), where n is the sample size, Z is the value obtained from the standard tables of the student's t-distribution based on the desired level of confidence, and degrees of freedom σ^2 = total variance obtained from the preliminary analysis of the population d = maximum measurement error.

Using the above formula and considering d = 5% (0.05), the required sample size was determined as 33.

An initial questionnaire with 49 questions was prepared to assess reliability. The questionnaire was administered to 17 randomly selected individuals from the statistical population using simple random sampling and a random number distribution. The collected results were entered into a computer using the SPSS software.

The Cronbach's alpha coefficient was calculated to analyze the questionnaire's reliability, resulting in a value of 0.720. Considering that a reliable questionnaire should have a Cronbach's alpha of at least 0.70, it can be concluded that the reliability of the research hypotheses meets standard requirements.

Cronbach's alpha was calculated using the following formula.

$$\alpha = \frac{j}{j-1}(1 - \frac{\sum_j S_j^2}{S^2}) \quad (2)$$

where k = number of subsets or subgroups of questionnaire items or test items, s_j^2 = variance of the j^{th} subset or subgroup s^2 = total variance of the test or questionnaire.

Reliability

N of cases = 17 N of Items = 84 Alpha =0.720

Research Variables

In study, the duration of project execution was considered the dependent variable, and the following variables were considered as independent variables:

i. Project owner's performance
ii. Contractors' performance
iii. Internal builders' performance

4. Data Analysis

As previously mentioned, the study population consisted of 35 individuals, and a sample of 33 individuals was selected using the aforementioned sampling methods. After assessing the validity and reliability of the prepared questionnaires, they were distributed to the sample population, and all 33 questionnaires were collected, with a 100% response rate. The data collected were entered

into a computer using SPSS software. The main hypotheses of this research were tested using the Student's t-test to test the three hypotheses of this research. The researcher's claim and its null hypothesis are stated for each hypothesis, and the test statistic and its value are determined from the Student's t-distribution tables. Finally, a decision was made based on these results. Considering these points, each hypothesis was tested separately. The results of the seven hypotheses are presented in Table 2, and they were analyzed and interpreted separately.

Table 2
Statistics of Three-Part Hypothesis Testing

Subject	The index of the first hypothesis of the research	The index of the second hypothesis of the research	The index of the third hypothesis of the research
Number of data	33	32	32
Average	3.787	3.772	4.02
Standard Deviation	0.374	0.602	0.644
Crookedness	0.029	0.038	-1.584
Minimum	3.111	2.8	1.812
The Maximum	4.518	5	5

4.1 Hypothesis Number One of the Study

According to this hypothesis, there is a significant relationship between the performance of the project contractor and the duration of execution of mega-oil drilling projects.

H_0: There is no relationship between the project contractor's performance and the execution duration of mega-oil drilling projects.

H_1: There is a relationship between a project contractor's performance and the duration of execution of mega-oil drilling projects.

In other words, based on the hypothesis: $\boldsymbol{H_0}$: $\mu_x \langle \mu_0$

And based on the hypothesis: H_1 :$\mu_x \geq \mu_0$

As shown in Table 4, the average score is 3.787, with a standard deviation of 0.374. The t-statistic based on these calculations was 19.775. With a significance level of 0.05 and 32 degrees of freedom, the critical t-value from the t-table is zero. Therefore, the hypothesis stating the absence of a relationship between the performance of the project contractor and the execution duration of mega-oil drilling projects was rejected with 95% confidence. The researcher's claim regarding the existence of a relationship between the performance of the project contractor and the duration of execution of mega oil-drilling projects was confirmed. The results are presented in Table 3.

$$t = \frac{\overline{x} - \mu}{S/\sqrt{N}}$$

μ =2/5

S = 0/374 $\bar{x}$ =3/787

$n-1$=32 n =33

$$t = \frac{3.787 - 2.5}{0.374/\sqrt{33}} = 19.775$$

Using the t table, for the degrees of freedom, the value of t = 1/960, considering that the value of t obtained from the formula is equal to 19/775 and is not in the area, the assumption is rejected at the 95% confidence level, and the assumption is confirmed.

Table 3
Hypotheses One Test Results.

Average	Standard Deviation	Number of Data	T -Statistics	Freedom Level	Meaningful Level
3/787	0.374	33	19/775	32	0/000

According to Figure 2 and based on the results extracted from Table 3, where the skewness of the first hypothesis of the research is estimated as 0.029, it is clear that the tendency of the data is towards lower values. The community is similar to a normal society. According to the average obtained, the tested statistical population was among the eight hypotheses proposed in the third level of influence.

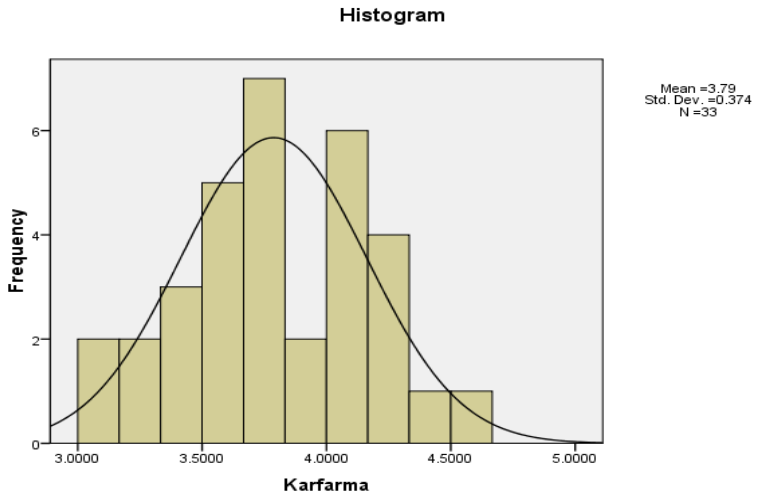

Fig. 2. Index of the first Research Hypothesis

Accepting the researcher's claim regarding this hypothesis leads to the conclusion that the performance of the project contractor affects the execution duration of mega-oil drilling projects. Based on the relevant questions in the questionnaire, which include questions 1 to 27, it is necessary to enhance the managerial capabilities and experience of project executives (project managers) in decision-making processes to ensure timely and accurate decisions by the project contractor. Additionally, the lack of alignment with the country's banking laws and regulations in project financing, as well as effective communication and follow-up by the project contractor in securing the necessary funds, are considered influential factors affecting the project duration.

Table 4 presents the frequency distribution and magnitude of the impact of the project contractor's influencing factors on project duration.

Table 4
Distribution of frequency and impact of influential components of employer factors

Row	Factors affecting the	Very little	Little	Medium	High	Very high	Percentage of impact
1	The relationship between the performance of the employer and the duration of the project						
1-1	How to choose the main contractors in the consortium and assign the work to them	0	1	4	10	16	4.04 %
2-1	The number and composition of consortium members.	0	1	7	12	11	3.8 %
3-1	Sufficient past performance and experience in the senior management's resume of the project owner.	1	2	6	14	10	3.89 %
4-1	The managerial capabilities and experience of project executives (project managers) within the project owner's organization.	0	1	6	10	16	4.22 %
5-1	Adequacy of authority granted to project executives for timely decision-making.	0	3	6	12	12	3.98 %
6-1	Concerns of the project owner about potential scrutiny by supervisory authorities due to accepting certain responsibilities outside contractual regulations.	1	2	6	12	11	3.8 %
7-1	Bureaucracy within the administrative system of the project owner.	0	1	12	12	7	3.65 %
8-1	Organizational communications and coordination within the project owner's entity.	0	3	9	16	5	3.68 %
9-1	Performance of the matrix structure within the project owner's organization.	0	6	10	13	3	3.29 %
10-1	Effective communication and follow-up by the project owner regarding securing the required funding.	0	2	6	12	13	4.07 %
11-1	Stringent technical specifications in contracts.	3	5	12	10	3	3.14 %
12-1	Emphasis on execution quality compared to project completion time.	3	6	14	9	1	2.96 %
13-1	Limited list of approved contractors acceptable to the project owner.	0	2	10	16	5	3.71 %
14-1	Lengthy process for the project owner to approve new contractors.	0	2	14	11	6	3.62 %

Row	Factors affecting the	Very little	Little	Medium	High	Very high	Percentage of impact
15-1	Unrealistic contract estimation time by the project owner.	0	1	4	21	7	4.01 %
16-1	Lower organizational leverage of the project owner compared to contractors due to the government nature of contractors.	3	7	4	10	7	3.14 %
17-1	Management structure governing projects in the country and its direct and indirect impact on all project aspects.	0	1	9	11	12	4.01 %
18-1	Close and strong supervision by the project owner over contractors, especially in EPC (Engineering, Procurement, and Construction) contracts.	2	5	10	11	5	3.35 %
19-1	Weak integrated management of the project owner in procuring and directing the supply of goods and equipment.	2	6	12	8	5	3.23 %
20-1	Accurate prioritization by the project owner in effectively managing project finances.	1	0	9	17	6	3.8 %
21-1	Thorough assessment of contractors' execution capabilities by the project owner during project assignment.	0	2	6	12	12	3.92 %
22-1	Incompetence of project-appointed managers by the project owner and their lower leverage compared to contractors.	2	1	10	11	9	3.71 %
23-1	Management capability of the project owner in simultaneously executing various projects.	1	3	5	14	10	3.86 %
24-1	Unrealistic estimation of the country's capacities in different areas.	1	2	5	12	10	3.56 %
25-1	Government affiliation of contractor phases and the presence of management systems and bureaucracy that may not align with success parameters of private companies, such as lack of participation in profit and loss sharing.	0	2	4	17	10	4.04 %
26-1	Lack of alignment between the country's banking laws and regulations and project financing.	0	1	2	12	16	4.1 %

Row	Factors affecting the	Very little	Little	Medium	High	Very high	Percentage of impact
27-1	Unrealistic estimation of the contract amount by the project owner.	1	4	10	12	5	3.38 %

4.2 Hypothesis Number Two of the research

According to this hypothesis, there is a significant relationship between the performance of the main contractor and the duration of mega drilling projects for oil wells.

There was no relationship between the performance of the main contractor and the duration of mega-drilling projects for oil wells.

A relationship exists between the performance of the main contractor and the duration of mega-drilling projects for oil wells.

Based on Table 5, the average score is 4.02, with a standard deviation of 0.644. The t-statistic, calculated as 13.374, is insignificant at the 95% confidence level, considering that the t-table and degrees of freedom are rounded to three decimal places equal to zero. Therefore, the hypothesis that there is no relationship between the performance of the main contractor and the duration of mega-drilling projects for oil wells is rejected with 95% confidence, and the researcher's claim that there is a relationship between the performance of the main contractor and the duration of mega-drilling projects for oil wells is supported. Table 5 presents the results.

$$t = \frac{\bar{x} - \mu}{S/\sqrt{N}}$$

$n-1$=31 n =32 S = 0/644 $\bar{x}$ =4/02 μ =2/5

$$t = \frac{4.02 - 2.5}{0.644/\sqrt{32}} = 13.374$$

Table 5
Hypothesis Two Test Results

Average	Standard Deviation	Number of Data	T -Statistics	Freedom Level	Meaningful Level
4/02	0/644	32	13/374	31	0/000

According to Figure 3 and the skewness extracted from Table 2, which is equal to 1.584, the population has a significant deviation from normality, and negative skewness indicates a tendency by the respondents towards larger numbers.

It should be noted that among the eight hypotheses presented, this one obtained the highest average and had the greatest impact on the project duration.

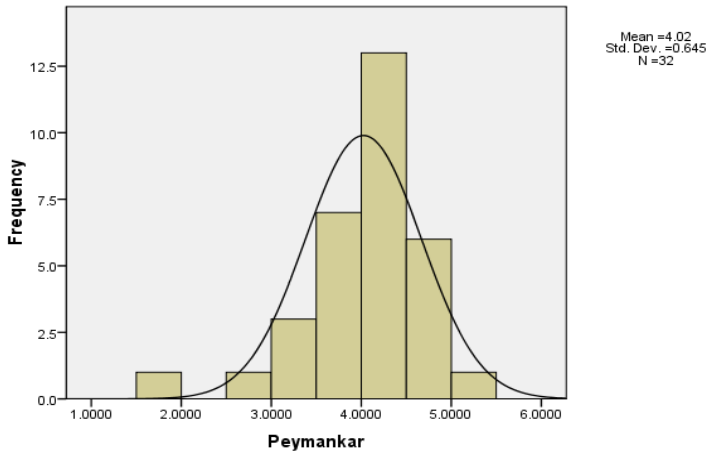

Fig. 3. Index of the Second Research Hypothesis

Based on the acceptance of the researcher's claim regarding the existence of a relationship and the impact of the performance of the leading contractors on project duration, which was tested through questions 28 to 43, it is evident that previous records and the experience of the main contractors are among the factors influencing project duration. Furthermore, this hypothesis confirms that proper contractor planning in terms of cost allocation based on priorities and critical path scheduling should be a concern for the main contractors. Additionally, the lack of sufficient financial capacity among consortium members is an essential factor in the duration of the project. Confirming this hypothesis, it is evident that the absence of capable project managers among contractors significantly impacts project duration.

The distribution of frequency and level of influence of the contractor's influential factors are shown in Table 6.

Table 6
Distribution of frequency and the level of influence of influential factors of the main contractor

Row	Factors affecting the	Very little	Little	Medium	High	Very high	Percentage of impact
2	The Relationship between the performance of the main contractor and the duration of the project						
2-1	Previous records and experience of the main contractor	1	1	1	11	18	6.87%
2-2	The status of the contractor's shares, whether they are government-owned or affiliated with non-governmental public entities	0	3	6	9	14	6.38%
2-3	Authorities delegated to the main contractor by the company's assembly	1	5	4	11	9	5.50%
2-4	Capability of the project manager of the contractor	0	1	4	16	11	6.53%
2-5	Capability of the contractor's human resources	0	1	9	17	5	5.99%
2-6	Financial capacity of the consortium members	0	1	2	14	14	6.58%
2-7	Existence of a competent project management group within the consortium	0	3	4	10	15	6.53%

Row	Factors affecting the	Very little	Little	Medium	High	Very high	Percentage of impact
2-8	Adequacy of infrastructure, facilities, and machinery of the contractor	2	3	8	10	9	5.74%
2-9	Compatibility of the contractor's organization compared to the executed contract	0	4	3	11	14	6.43%
2-10	Commitment and adherence of the contractor to contractual obligations	1	2	0	15	14	6.62%
2-11	Selection of qualified and efficient subcontractors	0	2	6	18	6	6.08%
2-12	Selection of qualified and efficient builders	0	2	6	17	7	6.13%
2-13	Compliance with issues related to minimizing the risks resulting from sanctions in order to secure equipment	0	2	4	13	12	6.28%
2-14	The method of contractor's expenses aligned with project goals and prevention of financial resource waste	0	2	5	10	15	6.58%
2-15	Proper planning by the contractor in terms of cost allocation based on priorities and critical path scheduling of the project	1	2	3	9	17	6.62%
2-16	Continuous presence of the project manager at various project sites, including the engineering consultant's office, construction plants, drilling rig, nearshore yard, and dry dock workshop	1	4	12	10	4	5.15%

4.3 Hypothesis Number Three of the Research

This hypothesis examines the role of internal performers on the delay in mega oil drilling projects, in which:

i. There is no relationship between the role of internal performers and the execution duration of mega-oil drilling projects.
ii. There is a relationship between the role of internal performers and the execution duration of mega-oil drilling projects.

Based on Table 6, the average score is 89.3, with a standard deviation of 0.719. The t-value, calculated as 11.136, indicates a significance level using the t-table, considering the degrees of freedom as 32 and rounding to three decimal places equals zero. Therefore, the hypothesis that there is no relationship between the role of internal performers and the duration of executing mega-oil drilling projects is rejected with 95% confidence, and the researcher's claim asserting the existence of a relationship between the role of internal performers and the duration of executing mega-oil drilling projects is confirmed. Table 7 presents the results.

$$t = \frac{\bar{x} - \mu}{S/\sqrt{N}}$$

S = 0/719 $\bar{x}$ =3/89 μ =2/5

$n-1$=32 n =33

$$t = \frac{3.89 - 2.5}{0.719 / \sqrt{33}} = 11.136$$

Table 7
Test of the Third Research Hypothesis

Average	Standard Deviation	Number of Data	T -Statistics	Freedom Level	Meaningful Level
3/89	0/719	33	11/136	32	0/000

Based on Figure 4 and the calculated skewness in Table 7, the population is significantly different from normality. The data tend to have larger values, indicating that the sampled population strongly emphasizes the significant impact of internal performers on the duration of project execution.

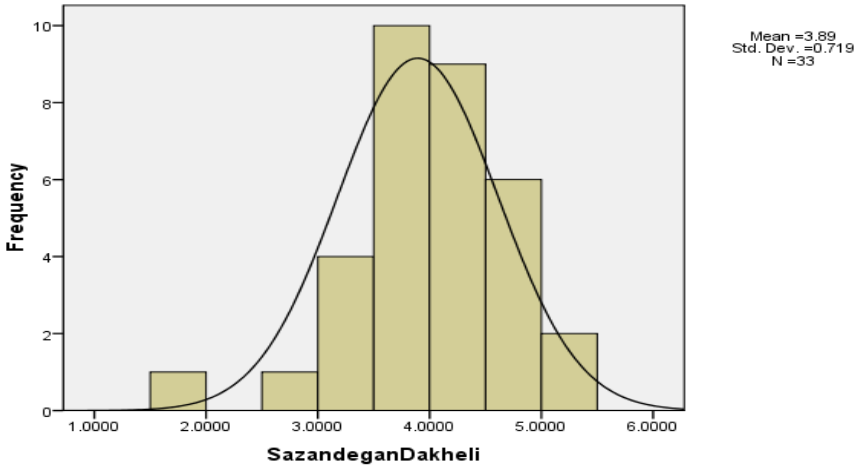

Fig. 4. Index of the Third Research Hypothesis

The above hypothesis emphasizes that adherence to contractual schedules for delivering goods and equipment is one of the most important factors that internal performers should consider. Additionally, the ability of internal performers to have sufficient financial capacity to withstand price increases and timely procurement of required raw materials are among the other influential factors on the duration of project execution.

Questions 44 to 49 of the questionnaire were raised regarding the above hypothesis, and the distribution of frequencies and the level of impact of the influential components of internal performers are shown in Table 8.

Analysis of Influential Factors of the Client Among the influential factors of the client, the management capability factor and the experience of project executives (project managers) have had the highest impact, accounting for 22.4% of the total responses. Furthermore, 10.4% of the respondents stated that the lack of alignment between the country's banking laws and regulations in financing projects had a significant impact on the duration of implementing mega-oil drilling projects. In addition, by examining the skewness of the corresponding normal distribution chart and histogram, it is evident that the recorded data tend to deviate from the normal values. The fact that contractors in project phases are government-owned and the existence of a bureaucratic management system and their non-compliance with the success parameters of private companies, such as lack of profit and loss sharing, accounted for 4.4% of the total responses to the shared questionnaire, placing them in the fourth rank in terms of importance and influence. The method of

selecting the main contractors in the consortium and assigning work to them, accounting for 4.4% of the total responses to the shared questionnaire, ranked fourth in terms of importance and influence.

Table 8
Distribution of the frequency and the degree of influence of the influential factors of domestic manufacturers

Row	Factors affecting the	Very little	Little	Medium	High	Very high	Percentage of impact
3	The relationship between the performance of internal builders and the duration of the project						
3-1	Adherence to necessary quality and specified standards stated in the contract	1	3	14	11	3	14.17%
3-2	The ability to timely procure the required raw materials for construction and production	0	2	7	13	11	17.32%
3-3	Possessing sufficient experience and technical knowledge to fulfill the commitments	1	2	8	10	12	16.93%
3-4	Adherence to contractual schedules for delivering goods and equipment	0	3	2	12	16	18.37%
3-5	Being committed to fulfilling other contractual obligations	1	4	6	13	8	15.62%
3-6	Having sufficient financial capacity for internal performers	1	1	5	14	12	17.59%

4.4 Suggestions Regarding the Impact of the Client's Performance Factor

Considering the exceptional importance of the management capability factor and the experience of the client's project executives (project managers), the client system should incorporate a mechanism that ensures the selection of more experienced managers with higher managerial capabilities for assigned projects. Proper planning, including strong agreements and sound reasoning, is one of the characteristics that a capable project manager in the client’s position should possess.

Decision-making is the process or action taken on a specific path, which is chosen after careful consideration and awareness of various methods and approaches to achieve a desired goal. "Neuman" considers management quality as a function of decision-making quality and argues that decision-making is the most important task of a manager, as the quality of plans and programs, the effectiveness of strategies, and the quality of results obtained from their implementation are all dependent on the quality of the decisions made. Wrong decisions can result from errors by the decision maker or may arise from their ignorance and lack of knowledge. Undoubtedly, an organization's ability to effectively perform its tasks depends on the quality of the decisions made within the organization, and the quality of decisions is a function of the informational quality on which the decision-making is based. Therefore, project managers should be well informed about all project matters, including regulations and contracts, technical and economic issues, national policies, and current issues, and strive to consider various aspects of their decision-making process to make the best decisions at the appropriate time.

Government clients must be aware that if the selection of main contractors in the consortium and the assignment of work to them are not done properly, it will directly and indirectly cause

significant delays in project completion. Therefore, various methods should be employed to ensure that deserving contractors are selected through appropriate procedures.

4.5 Review of Influential Factors of Contractors

Among the factors listed in the table of influential components of contractor factors, previous experience and contractor project experience had the highest impact, accounting for 87.6% of the total response value. Additionally, inadequate planning by the contractor in terms of cost allocation based on priorities and critical path scheduling of the project had a significant impact, accounting for 62.6% of the value of the questionnaire responses, which greatly affected the project's implementation duration.

Furthermore, based on the frequency of responses, it is evident that respondents prefer values larger than the population's statistical normal. Approximately 76% of respondents chose values larger than the normal range.

The lack of sufficient financial capacity among consortium members, the improper expenditure of contractors in line with project goals, and the prevention of financial waste are shared factors, with a 58.6% share of the total response value, placing them in the fourth rank of importance and influence. Additionally, by examining the skewness of the normal distribution chart and the corresponding histogram, it is evident that the recorded data lean towards larger values.

Review of Influential Factors of Domestic Builders' Performance:

Among the performance factors of domestic builders, adherence to contractual schedules for the delivery of goods and equipment had the highest importance and influence, with a 37.18% share of the total responses. 36.4% of questionnaire respondents perceived a significant impact, while 48.5% considered it to have a very significant impact.

Moreover, based on the frequency of responses, it is evident that respondents prefer values larger than the statistical normal of the population. Approximately 68.9% of respondents chose values larger than the normal range.

Insufficient financial capacity among domestic builders ranked second in terms of influence, accounting for 17.6% of the total responses.

Additionally, by examining the skewness of the normal distribution chart and the corresponding histogram, it is evident that the recorded data lean towards larger values.

Suggestions Regarding the Impact of Domestic Builders' Performance:

i. Regarding the capacity constraints of domestic builders and producers, it is suggested to incentivize this category of producers through supportive policies while also setting appropriate tariffs for imported products that can be produced domestically. This would create a fairer competition environment for domestic producers, enabling them to invest more, increase their production capacities, and consider better support horizons.
ii. Many domestic builders do not adhere to contractual schedules for delivering goods and equipment, partly due to the lack of a stable structure in the raw material supply sector. Therefore, specific measures should be taken to address the factors contributing to the delayed material supply, enabling employers to follow the construction process based on the scheduled plan.

5. Conclusion

In this study, three hypotheses were confirmed to have a high confidence level (95%). The most significant factors affecting the duration of mega oil drilling projects were identified and tested.

Based on the comparison of the means obtained, the confirmed hypotheses can be ranked from the most important (with the greatest impact on project duration) to the least important, as follows:

i. The performance of contractors plays a key role in the duration of project implementation and has the highest degree of importance among the three proposed hypotheses.
ii. The performance of domestic builders has the second-highest degree of influence on a project's implementation duration.
iii. The performance of project employees ranks third in terms of importance and impact on a project's implementation duration.

As mentioned earlier, the most influential factors affecting the duration of mega oil well drilling projects, one of the country's major oil and energy projects, have been thoroughly examined and tested, and the rank of each of the desired factors on the duration of execution has been determined.

The results of this research observed that contractors' performance plays a primary and key role in the project implementation duration. Based on this observation and considering the importance of contractors' roles, it is suggested that the establishment of criteria and evaluation measures for contractors as the most influential factor on a project's duration should be considered a subject for future research.

However, it is also possible to explore the managerial capabilities and experiences of project executors (project managers) as an important topic that should be addressed in future research, and the factors that influence them should be investigated.

Funding
This study did not receive any external financial support.

Conflicts of Interest
The author declares no conflicts of interest.

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