

College of Management - Project Management

The Factors Impacting the Quality of Construction Projects in the Oil and Gas Sector inside Saudi Arabia

العوامل المؤثرة على جودة مشاريع البناء في قطاع النفط و الغاز بالمملكة العربية السعودية

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Year	First Trimester 2023	

Abstract

This research presents a study conducted to identify the factors that impact the Quality of Construction Projects in the Oil and Gas sectors inside Saudi Arabia during the construction and commissioning phases of the project life cycle. The Methodology followed in this research to achieve its objective is a combination of historical data gathered from literature reviews, and a survey targeting several selected Construction Project Managers, Construction Engineering Managers, and Professional Technical Construction Lead Engineers.

Introduction

Quality is one of the critical factors in the success of construction projects. Quality of construction projects, as well as project success, can be regarded as the fulfillment of expectations (i.e., the satisfaction) of the project participants (05). Quality of projects is one of the traditional and global measures of project performance. For construction projects, the goal and desire of clients, contractors, and consultants are to ensure that projects are delivered according to acceptable and agreed standards (03). The quality of construction projects is linked with proper quality management in all the phases of the project life cycle. Design and construction are the two important phases of the project life cycle that affect the quality outcome of construction projects significantly (05). Great expenditures of time, money, and resources are wasted each year due to inefficient or non-existent quality levels (01). The question is “Are those factors having impacts on the construction projects inside Saudi Arabia? Especially in Oil and Gas Sector? And What is the highest factor that results in the highest impact on the Quality? Do those factors that have been identified in the different geographical areas have the same impact inside Saudi Arabia?”

Previous Studies

Luai Jraisat, Lana Jreisat, and Christine Hattar (01) found that human resource management, customer satisfaction, and construction-specific factors are factors impacting the quality of construction projects. Albert P.C. Chan and C.M. Tam (02) also identified that the client, the project characteristics, the project environment, Project Team Leaders, project procedures, and project management actions are factors impacting the quality of the projects. Additionally, Ayodeji Oke, Clinton Aigbavboa, and Ernest Dlamini identified several factors such as Poor on-site supervision, Construction labor skills and induction, Poor planning and scheduling, Involvement of End-User clients, and Assurance with client funding.

The Purpose of the Study

The purpose of this paper is to identify the highest factors that impact the Quality of Construction from the literature review in different geographical areas. Then, ranking those factors based on the conducted survey to identify the highest factors and lowest factors impacting the Quality of construction projects inside Saudi Arabia in the Oil and Gas sector.

Research Problem and Significance of the Research

There are different and various factors identified in different geographical areas that impact the quality of the projects in general as well as Construction Projects specifically. However, the highest factors impacting the Projects quality identified in specific numbers of previous literature

studies mentioned in the reference of this paper only have been used for this research study. The research methodology selected in this research is to survey those factors inside Saudi Arabia to identify whether those factors are having an impact on Construction Projects in the Oil and Gas sector or not.

Identified factors using the literature review method are as follows:

	Potential Factors	Resources Reference Number			
		(01)	(02)	(03)	(04)
01	Human Resource Management.	X			
02	Customer Satisfaction.	X			
03	Construction specific factors such as Codes and Standards, Drawings and Specifications, and Constructability of Design.	X			
04	Project management actions of the project team (Managerial Control, level of administrative ability)		X		
05	Client's emphasis on time.		X		
06	Client's emphasis on quality.		X		
07	Effectiveness of construction team leader.		X		
08	Lack of communication among project stakeholders.			X	
09	Unskilled and inexperienced trade subcontractors, sub-suppliers, and consultants.			X	
10	Poor on-site supervision/visitation.			X	
11	Poor planning, scheduling, and monitoring.			X	X
12	Incomplete design drawings at tendering stage.				X
13	Changes in the client's requirements.				X
14	Fluctuation of material cost.				X
15	Financial difficulties faced by the contractors.				X

Research Methodology

The research methodology to obtain the above-mentioned objectives and results by following the below procedures:

- Comprehensive review of previous research to identify the factors resulting in high-quality construction project.
- Develop a questionnaire survey to collect feedback from Construction Project Managers, Engineering Managers, and Professional Technical Lead Engineers. The survey aims to collect feedback related to the identified factors in the previous steps.

- Conducting a pilot study with a couple of experts to test the effectiveness of the survey on a small scale before sending it to a larger scale.
- Distribute the survey to a larger scale consisting of Construction Engineers, Construction Managers, and Construction Engineering Managers. The Targeted Population is 50 Professionals working in the Construction Phase of the Projects related to the Oil and Gas Sector inside Saudi Arabia.
- Analyze the data received from previous steps and determine the level of impact of each factor using statistical Analysis.

1. Tabulate the responses.
2. Determining the relative importance of the identified factors using the Relative importance index (RII) method using the following equation :

$$RII = \frac{\sum SR}{W(N)}$$

Where:

SR = The scale of each factor based on the participant's judgment (1 to 5) for Relative Importance.

W = The highest Weight, equal to 5

N = The Number of participants

RII varies from 1 to 0, where a higher value means that the factor is more important.

3. Determining the impact of frequency in the equation resulted from the survey of the identified factors using the Frequency Adjusted Importance Index (FAII).

First Calculate the Frequency Index:

$$FI = \frac{\sum SF}{W(N)}$$

Where:

SF = The scale of each factor based on the participant's judgment (1 to 5) for the Frequency factor.

W = The highest Weight, equal to 5

N = The Number of participants

After Calculating the RII and FI Then the FAII can be obtained using the following equation:

$$FAII = (RII \times FI) \times 100$$

FAII varies from 1 to 0, where a higher value means that the factor is more important.

References

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