

Final Project 2

PMG 497

Project Report

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The Impact of Optimization on Reducing Construction Costs in the Oil and Gas Sector in Dhahran, Saudi Arabia:

A Case Research of Saudi Aramco's Projects

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Acknowledgment

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Dedication

I dedicate this research to my late father, my mother, my family, and my true friends.

Abstract

Purpose:

Completion of well technology is one of the most important steps in oil and gas well production. Saudi Aramco has given significant attention to this field development scheme (Radhwi et al., 2013).

Initially, directional drilling tools are used to drill the well and build the necessary curve to land on the right reservoir, where oil or gas is the main production component. During this process, while running the completion assembly, an additional step is taken to check that the tubular is free of damage to avoid any issues, which could fail the whole project and result in paying additional tangible and intangible costs, which could be avoided.

Table of Contents

Acknowledgment.....	2
Dedication.....	3
Abstract	4
1. Chapter 1: Introduction	16
1.1. Research Background	17
1.2. Research Problem.....	19
1.2.1. Theoretical Gaps	19
1.2.2. Practical Gaps.....	19
1.3. Research Significance.....	20
1.3.1. At the theoretical level	20
1.3.2. At the practical level	20
1.4. Research Questions	21
1.4.1. Research Sub-Questions.....	21
1.5. Research Objectives	22
1.6. Research Hypotheses.....	22
1.6.1. Main Research Hypotheses H1.....	22
1.6.2. The First Research Sub-Hypothesis Ha.....	22
1.6.3. The Second Research Sub-Hypothesis Ha.....	22
1.6.4. The Third Research Sub-Hypothesis Ha.....	22
1.7. Research Model	23
1.8. Scope of The Research	24
1.9. The Project Structure.....	24
2. Chapter 2: Literature Review.....	25
2.1. Introduction	26
2.2. The Independent Variable	26
2.2.1. Literature Review- Independent Variable: Optimization Process.....	26
2.2.1.1. Introduction	26
2.2.1.2. Definition.....	26
2.2.1.3. Development	27
2.2.1.4. Explanations	27

2.3.	The Dependent Variables.....	28
2.3.1.	Literature Review-First Variable: Efficiency of Operations.....	28
2.3.1.1.	Introduction	28
2.3.1.2.	Definition.....	28
2.3.1.3.	Development	28
2.3.1.4.	Theories.....	29
2.3.1.5.	Dimensions	29
2.3.1.6.	Explanations	29
2.3.2.	Literature Review-Second Variable: Budget and Economy of Operations	34
2.3.2.1.	Introduction	34
2.3.2.2.	Definition.....	34
2.3.2.3.	Development	34
2.3.2.4.	Theories.....	34
2.3.2.5.	Dimensions	35
2.3.2.6.	Explanations	35
2.3.3.	Literature Review-Third Variable: Cost-Consciousness	37
2.3.3.1.	Introduction	37
2.3.3.2.	Definition.....	37
2.3.3.3.	Development	37
2.3.3.4.	Theories.....	37
2.3.3.5.	Dimensions	38
2.3.3.6.	Explanations	38
2.4.	The relationship between the independent and the dependent variables.....	39
2.4.1.	Literature Review-First Variable: Efficiency of Operations.....	39
2.4.2.	Patterns.....	39
2.4.3.	Conflicts.....	40
2.4.4.	Gaps	40
2.5.	Conclusion	41
3.	Chapter 3: Research Methodology.....	42
3.1.	Introduction	43
3.2.	Operational definitions for research variables	43
3.2.1	The Independent Variable.....	43
3.2.2	The Dependent Variable.....	43

3.3.	Research Design (Research Onion).....	44
3.4.	Research Population & Sampling Methods & Technique	46
3.4.1	Research Population.....	46
3.4.2	Research Sample.....	46
3.4.3	Sampling Method & Techniques.....	46
3.5.	Data collection method.....	47
3.5.1	The independent variable.....	47
3.5.2	The Dependent Variable.....	48
3.6.	Types Of Data	48
3.6.1	Primary Data	48
3.6.2	Secondary Data	49
3.7.	Data Analysis Methods & Procedures.....	49
3.8.	Conclusion	49
4.	Chapter 4: Statistical Analysis & Findings Discussion.....	51
4.1.	Introduction	52
4.2.	Sample profile (descriptive statistics for research sample).....	52
4.3.	Validity & reliability tests for the questionnaires.....	98
4.3.1	Validity of the measures used in the research	98
4.3.2	Reliability of the research tool	104
4.4.	Descriptive Statistics for Research Variables	108
4.5.	Testing Hypotheses & Findings Discussion.....	111
4.6.	Conclusion	143
5.	Chapter 5: Research limitations, Recommendations & Conclusion	144
5.1.	Research Limitations & Future Research.....	145
5.2.	Theoretical Contribution	145
5.3.	Practical Applications	145
5.4.	Research Recommendations.....	146
5.5	Research's limitations	146
5.5.1	Objective Boundaries:	146
5.5.2	Human Boundaries:.....	146
5.5.3	Spatial Boundaries:.....	146
5.5.4	Temporal Boundaries:.....	147

5.6	Future studies.....	147
5.7	Conclusion	147
	References.....	148
	Appendix.....	151

List of Figures:

Figure 1: Proposed Research Model (The Researcher, 2024)	23
Figure 2: Three Pillars for c (Mustafa et al., 2021)	30
Figure 3: Key Benefits of Economic Budgeting in Projects (Ahmed et al., 2007).....	36
Figure 4: Culture of Cost Consciousness (Jenkins & Crockford, 1975).....	38
Figure 5: Proposed Research Methodology (The Researcher, 2024)	45
Figure 6: Personal & Professional Information	54
Figure 7: Age Distribution on the Questionnaire.....	54
Figure 8: Marital Status Distribution on the Questionnaire.....	55
Figure 9: Qualification Distribution on the Questionnaire	55
Figure 10: Function-Distribution on the Questionnaire.....	56
Figure 11: Experience-Distribution on the Questionnaire	56
Figure 12: Questionnaire Output-Incompetent Project Team.....	57
Figure 13: Questionnaire Output-Personality clash between team members	57
Figure 14: Questionnaire Output-Poor planning & Scheduling of projects	58
Figure 15: Questionnaire Output-Design Errors.....	58
Figure 16: Questionnaire Output-Inadequate cost estimation	59
Figure 17: Questionnaire Output-Inadequate QC control & Assurance	59
Figure 18: Questionnaire Output-Inadequate management	60
Figure 19: Questionnaire Output-Unforeseen conditions	60
Figure 20: Questionnaire Output-Weak & insufficient studies	61
Figure 21: Questionnaire Output-Poor communications	61
Figure 22: Questionnaire Output-Discrepancies in contract documents	62
Figure 23: Questionnaire Output-Poorly defined payments	62
Figure 24: Questionnaire Output-Lack of communication with suppliers	63
Figure 25: Questionnaire Output-Poor project implemetations.....	63
Figure 26: Questionnaire Output-Impact of weather conditions	64
Figure 27: Questionnaire Output-Impact of formation's stability.....	64
Figure 28: Questionnaire Output-Impact of sea's condition	65

Figure 29: Questionnaire Output-Impact of project location (On/Off-Shore).....	65
Figure 30: Questionnaire Output-Deficient documentation & incomplete scope	66
Figure 31: Questionnaire Output-Changing of design and scope during project execution.....	66
Figure 32: Questionnaire Output-Long project approval procedure.....	67
Figure 33: Figure 32: Questionnaire Output-Stakeholders involvement.....	67
Figure 34: Figure 32: Questionnaire Output-Poor definition of subsurface data	68
Figure 35: Questionnaire Output-Labor's lack of skills and productivity	68
Figure 36: Questionnaire Output-Lack of equipments	69
Figure 37: Questionnaire Output-Manpower shortage	69
Figure 38: Questionnaire Output-Material procurement issues.....	70
Figure 39: Questionnaire Output-Budget & Economy-Incompetent project team	71
Figure 40: Questionnaire Output-Budget & Economy-Peronality clash between team members	71
Figure 41: Questionnaire Output-Budget & Economy-Poor planning & scheduling.....	72
Figure 42: Questionnaire Output-Budget & Economy-Design Errors	72
Figure 43: Questionnaire Output-Budget & Economy-Inadequate cost plannings	73
Figure 44: Questionnaire Output-Budget & Economy-Inadequate QC control and assurance	73
Figure 45: Questionnaire Output-Budget & Economy-Inadequate managemnts	74
Figure 46: Questionnaire Output-Budget & Economy-Unforeseen conditions.....	74
Figure 47: Questionnaire Output-Budget & Economy-weak technical studies.....	75
Figure 48: Questionnaire Output-Budget & Economy-Poor communication	75
Figure 49: Questionnaire Output-Budget & Economy-Discrepancies in contract	76
Figure 50: Questionnaire Output-Budget & Economy-Poorly defined payments.....	76
Figure 51: Questionnaire Output-Budget & Economy-Lack of communication with suppliers ...	77
Figure 52: Questionnaire Output-Budget & Economy-Poor project implementations	77
Figure 53: Questionnaire Output-Budget & Economy-Impact of weather conditions	78
Figure 54: Questionnaire Output-Budget & Economy-Impact of formation's stability	78
Figure 55: Questionnaire Output-Budget & Economy-Impact of sea's condition.....	79
Figure 56: Questionnaire Output-Budget & Economy-Impact of On/Offshore location	79
Figure 57: Questionnaire Output-Budget & Economy-Impact of incompltet scope definistions	80
Figure 58: Questionnaire Output-Budget & Economy-Impact of changing of design and scope during exectutions	80

Figure 59: Questionnaire Output-Budget & Economy-Impact of long project's approval prodecuders	81
Figure 60: Questionnaire Output-Budget & Economy-Impact of Many stakeholders	81
Figure 61: Questionnaire Output-Budget & Economy-Impact of poor definition of subsurface data	82
Figure 62: Questionnaire Output-Budget & Economy-Impact of lack's of labor	82
Figure 63: Questionnaire Output-Budget & Economy-Impact of Lack of equipments.....	83
Figure 64: Questionnaire Output-Budget & Economy-Impact of Manpower shortage	83
Figure 65: Questionnaire Output-Budget & Economy-Impact of Material procurments issues ...	84
Figure 66: Questionnaire Output-Cost Consciousness-Impact of Incompetent project team.....	85
Figure 67: Questionnaire Output-Cost Consciousness-Impact of personality clash between team members	85
Figure 68: Questionnaire Output-Cost Consciousness-Impact of poor planning and scheduling.	86
Figure 69: Questionnaire Output-Cost Consciousness-Impact of design error	86
Figure 70: Questionnaire Output-Cost Consciousness-Impact of Inadequate cost edtimation	87
Figure 71: Questionnaire Output-Cost Consciousness-Impact of Inadequate QA/QC	87
Figure 72: Questionnaire Output-Cost Consciousness-Impact of Inadequate managments and scheduling	88
Figure 73: Questionnaire Output-Cost Consciousness-Impact unforeseen conditions.....	88
Figure 74: Questionnaire Output-Cost Consciousness-Impact of weak technical studies	89
Figure 75: Questionnaire Output-Cost Consciousness-Impact of poor communications.....	89
Figure 76: Questionnaire Output-Cost Consciousness-Impact of discrepancies in the contract ...	90
Figure 77: Questionnaire Output-Cost Consciousness-Impact of poorly defined payment	90
Figure 78: Questionnaire Output-Cost Consciousness-Impact of lack of communication with suppliers	91
Figure 79: Questionnaire Output-Cost Consciousness-Impact of poor project implementation...	91
Figure 80: Questionnaire Output-Cost Consciousness-Impact of weather conditions	92
Figure 81: Questionnaire Output-Cost Consciousness-Impact of formation stability.....	92
Figure 82: Questionnaire Output-Cost Consciousness-Impact of sea condition	93
Figure 83: Questionnaire Output-Cost Consciousness-Impact of On/Offshore location	93
Figure 84: Questionnaire Output-Cost Consciousness-Impact of incomplete scope definition	94

Figure 85: Questionnaire Output-Cost Consciousness-Impact of changing design and scope during execution.....	94
Figure 86: Questionnaire Output-Cost Consciousness-Impact of long project approvals.....	95
Figure 87: Questionnaire Output-Cost Consciousness-Impact of too many stakeholders	95
Figure 88: Questionnaire Output-Cost Consciousness-Impact of poor definition of subsurface data.....	96
Figure 89: Questionnaire Output-Cost Consciousness-Impact of Labor's lack of skills and productivity	96
Figure 90: Questionnaire Output-Cost Consciousness-Impact of lack of equipments	97
Figure 91: Questionnaire Output-Cost Consciousness-Impact of manpower shortage	97
Figure 92: Questionnaire Output-Cost Consciousness-Impact of procurment issues	98
Figure 93: Testing Validity Var # One	142
Figure 94: Figure 93: Testing Validity Var # Two	142
Figure 95: Figure 93: Testing Validity Var # Three	142

List of Tables:

Table 1: Suggested Research Structure (The Researcher, 2024)	24
Table 2: 9-Steps to Improve Operational Efficiency (Brett & Millheim, 1986)	31
Table 3: CCH Tagetik Planning for Oil and Gas Projects (Alnash et al., 2020)	35
Table 4: Research Population (The Researcher, 2024)	46
Table 5: Research Sample (The Researcher, 2024)	46
Table 6: Independent variable (The Researcher, 2024)	47
Table 7: Dependent variable (The Researcher, 2024)	48
Table 8: Questionnaire output for the Personal Information	53
Table 9: Validity of the measures for Variable # One	100
Table 10: Validity of the measures for Variable # Two	101
Table 11: Validity of the measures for Variable # Three	102
Table 12: Reliability analysis for Variable # One	105
Table 13: Reliability analysis for Variable # Two	106
Table 14: Reliability analysis for Variable # Three	107
Table 15: Descriptive analysis for variable # One	108
Table 16: Descriptive analysis for variable # Two	109
Table 17: Descriptive analysis for variable # Three	110
Table 18: Correlations Analysis for variable # One	111
Table 19: Cont. Correlations Analysis for variable # One	112
Table 20: Cont. Correlations Analysis for variable # One	113
Table 21: Cont. Correlations Analysis for variable # One	114
Table 22: Cont. Correlations Analysis for variable # One	115
Table 23: Cont. Correlations Analysis for variable # One	116
Table 24: Correlations Analysis for variable # Two	117
Table 25: Cont. Correlations Analysis for variable # Two	118
Table 26: Cont. Correlations Analysis for variable # Two	119
Table 27: Cont. Correlations Analysis for variable # Two	120
Table 28: Cont. Correlations Analysis for variable # Two	121

Table 29: Cont. Correlations Analysis for variable # Two	122
Table 30: Correlations Analysis for variable # Three	123
Table 31: Cont. Correlations Analysis for variable # Three	124
Table 32: Cont. Correlations Analysis for variable # Three	125
Table 33: Cont. Correlations Analysis for variable # Three	126
Table 34: Cont. Correlations Analysis for variable # Three	127
Table 35: Cont. Correlations Analysis for variable # Three	128
Table 36: Combined-Correlations Analysis for Variables # One, Two & Three	129
Table 37: Cont. Combined-Correlations Analysis for Variables # One, Two & Three	130
Table 38: Cont. Combined-Correlations Analysis for Variables # One, Two & Three	131
Table 39: Cont. Combined-Correlations Analysis for Variables # One, Two & Three	132
Table 40: Cont. Combined-Correlations Analysis for Variables # One, Two & Three	133
Table 41: Cont. Combined-Correlations Analysis for Variables # One, Two & Three	134
Table 42: Regression Analysis for Variable (A).....	135
Table 43: Cont. Regression Analysis for Variable (A).....	135
Table 44: Cont. Regression Analysis for Variable (A).....	135
Table 45: Regression Analysis for Variable (B).....	136
Table 46: Cont. Regression Analysis for Variable (B)	136
Table 47: Cont. Regression Analysis for Variable (B).....	136
Table 48: Regression Analysis for Variable (C).....	137
Table 49: Cont. Regression Analysis for Variable (C)	137
Table 50: Cont. Regression Analysis for Variable (C)	137
Table 51: Regression Analysis for Variable (D).....	138
Table 52: Cont. Regression Analysis for Variable (D).....	138
Table 53: Cont. Regression Analysis for Variable (D).....	138
Table 54: Regression Analysis for Variable (E)	139
Table 55: Cont. Regression Analysis for Variable (E)	139
Table 56: Cont. Regression Analysis for Variable (E)	139
Table 57: Regression Analysis for Variable (F)	140
Table 58: Cont. Regression Analysis for Variable (F)	140
Table 59: Cont. Regression Analysis for Variable (F)	140

Table 60: Regression Analysis for Variable (G).....	141
Table 61: Cont. Regression Analysis for Variable (G).....	141
Table 62: Cont. Regression Analysis for Variable (G).....	141
Table 63: Questionnaire number one.....	153
Table 64: Questionnaire number two.....	154
Table 65: Questionnaire number three.....	155

1. Chapter 1: Introduction

1.1. Research Background

Generally, well construction involves a series of operations that are directed by the lease operator, who employs the drilling contractor and third-party equipment and personnel (Saleh et al., 2014). The process of estimating and analyzing the overall cost of drilling presents new challenges and responsibilities for industry professionals. Furthermore, achieving cost-effective drilling is a key objective for the industry as it is essential for successful and sustainable drilling. By definition, sustainability includes cost as a critical factor (Agbon, 2002).

The oil industry has significantly increased worldwide drilling activities in response to the growing global demand for hydrocarbon. However, the addition of new and advanced equipment, tools, and technologies in drilling a well has led to higher costs. On the other hand, these facilities have reduced drilling time, which has contributed to lower drilling costs. Consequently, the drilling industry is faced with a cost analysis dilemma (Aggarwal & Kaldi, 2018).

Cost-effective drilling is a significant concern for the drilling industry to achieve success and sustainability (Al-Bani et al., 2007). Sustainability encompasses cost as one of its parameters. However, the current energy management sector is facing significant challenges due to the lack of proper training in managing financial sustainability. This has led to immense frustration in the industry (Oag. & Williams, 2000).

The energy management sector is facing a major problem due to the lack of appropriate training in handling financial sustainability. Despite numerous solutions being proposed, it is becoming increasingly evident that these options are not leading to a sustainable state in our drilling environment. This has caused significant frustration among stakeholders (Hossain & Al-Majed, 2015, pp. 227-247).

The main challenge was to implement the preferred optimization solution without a global track record. Additionally, we needed a full agreement from Aramco to trial test our new solution on their active projects, without incurring any additional costs or failures during the trial phase (Ikediashi et al., 2014).

This research aims to analyze the impact of optimization on reducing the cost of constructing wells in the oil and gas industry. It will provide a real-life example of full implementation in wells completed for Saudi Aramco, both onshore and offshore fields (Shammas, 2000).

1.2. Research Problem

While constructing the well, not doing the job right the first time can increase costs, which might end up suspending the whole project as it exceeds the original planned and estimated project costs and timeline (Seddeeq et al., 2019).

The research problem will address theoretical and empirical gaps.

1.2.1. Theoretical Gaps

The lack of understanding of the importance of fully applying optimization in drilling and completion projects on both types of projects for oil and gas resulted in blindly repeating the same process and making the same mistakes while not considering any other solution that could reduce the risk and faults of resolving the main issue, which is the integrity of the casing or tubular, while doing conventional drift operations (Abdullah et al., 2011).

1.2.2. Practical Gaps

The shortage of research shows the time and cost savings of applying new techniques to consider and recognize operational problems without waiting to run the checkout equipment at the end of the job, which can result in double the cost of the whole project once repeated due to the late discovery of problems in casing or tubulars, and which can affect the next phase of drilling or completion for the same project.

1.3. Research Significance

The importance of the theoretical and empirical aspects of this research is to close the gaps as well as improve the use of optimization in drilling and completion projects in both the oil and gas industries (Solares, 2001).

This search aims to conclude the following:

Optimization can improve budget utilization and planning for oil & gas projects, and by adopting a cost-conscious approach, further savings can be achieved in these projects.

1.3.1. At the theoretical level

This research will result in the development of a new operational plan and procedure that will help to improve the total process of doing the planned jobs and applications for Saudi Aramco by helping to identify any bad joints in either casing or tubulars before it is too late by applying an immediate inspection to all the joints without interrupting the normal operations of running in holes.

1.3.2. At the practical level

By applying a single example of optimization, the drilling and completion operations can run smoothly while meeting both the cost and timelines of the oil and gas drilling program, which results in significant time and cost savings by discovering any problems ahead of time and with no additional risk at all. Additionally, to complete all the needed and planned steps in a total health- and safety-risk-free working environment.

1.4. Research Questions

Based on all the above, this research will answer the below question:

“How can we reduce the cost of well construction for both oil and gas projects by implementing an optimization technique that can discover any problem at the early stage while ensuring successful operation without additional risk or cost beyond budget?”

1.4.1. Research Sub-Questions

- What impact does optimization have on the economy of oil and gas operations?
- How does empowerment affect budgets and the economy when optimizations are applied?
- What is the effect of adopting a cost-conscious approach for the entire process of oil and gas operations while applying optimizations?

1.5. Research Objectives

The general objective is to explore the relationship between cost reduction and optimization techniques in the oil and gas projects in Saudi Aramco.

The sub objectives will be:

- Identifying the effect of optimization in the oil and gas industry.
- Identifying the effect of optimization on the budget and economy of the oil and gas projects.
- Identifying the effect of applying optimization techniques on the cost-consciousness of oil and gas projects.

1.6. Research Hypotheses

1.6.1. Main Research Hypotheses H1

There is a significant correlation between optimizing the process of constructing oil and gas projects and reducing their costs.

1.6.2. The First Research Sub-Hypothesis Ha

There is a significant correlation between optimization and budget savings in oil and gas investment projects.

1.6.3. The Second Research Sub-Hypothesis Ha

There is a statistically significant relationship between optimization in the process of oil and gas projects and cost-consciousness.

1.6.4. The Third Research Sub-Hypothesis Ha

There is a significant relationship between optimizing the techniques of oil and gas projects and reducing their costs.

1.7. Research Model

The following figure shows the relationship between the research variables and the research hypotheses as follows:

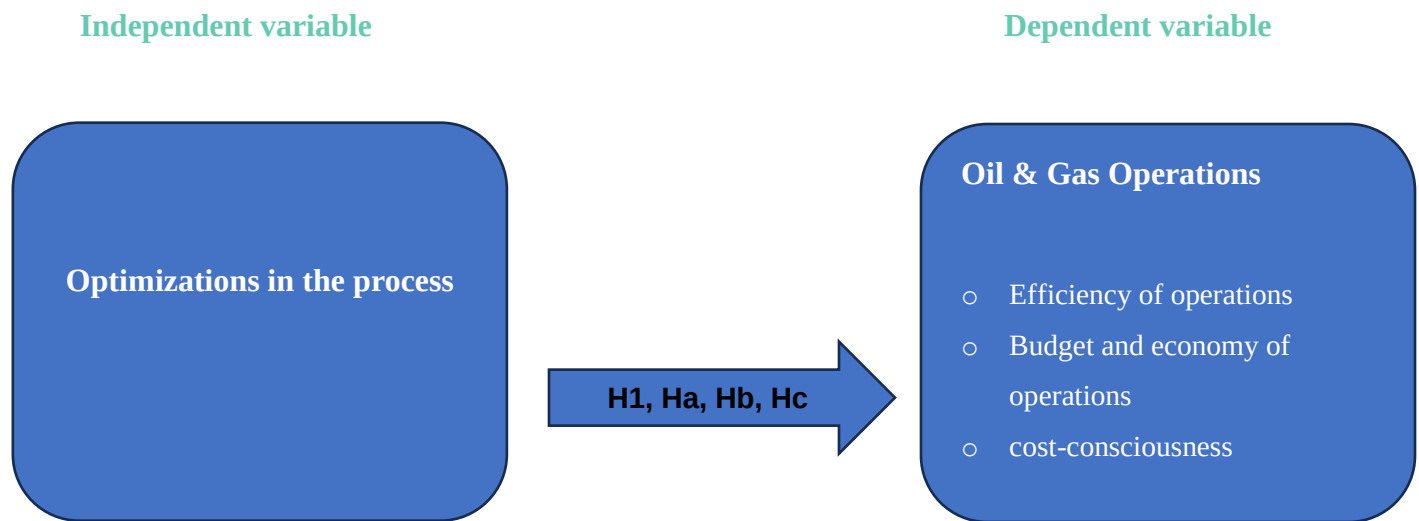


Figure 1: Proposed Research Model (The Researcher, 2024)

1.8. Scope of The Research

This research will be conducted in Dhahran, which is a city situated in the Eastern Province of Saudi Arabia. It serves as a significant administrative hub for the country's oil industry. For the past 90 years, Dhahran has been the headquarters of Saudi Aramco and is also the largest gated compound owned by the company (Khorsheed, 2015).

1.9. The Project Structure

Suggested Research Structure		
	Chapter 1: Introduction	
	Chapter 2: Literature Review	
	Chapter 3: Research Methodology	
	Chapter 4: Statistical Analysis	
	Chapter 5: Findings, Discussion and Conclusion	

Table 1: Suggested Research Structure (The Researcher, 2024)

2.Chapter 2: Literature Review

2.1. Introduction

In this chapter, I will discuss the independent variable and the three dependent variables based on my research. I focused on the optimization process in the oil and gas sector, specifically for the operations of Saudi Aramco in Dhahran. The three main variables that I covered in my research are efficiency in operations, budget and economy of operations, and cost-consciousness. These variables will be explained as we go through this chapter and during my analysis.

2.2. The Independent Variable

2.2.1. Literature Review- Independent Variable: Optimization Process

2.2.1.1. Introduction

The exploration and production (E&P) activities in the oil and gas industry are becoming more expensive, risky, and technology dependent as operations move from easy to challenging frontiers. To manage these risks and share operational costs, even major and super major oil companies are forming joint ventures and consortia to explore new frontiers. Given the inherent risks and uncertainties in the upstream business, it is crucial for oil companies to use their capital and resources wisely. Optimizing strategies, resources, and costs while improving business performance across all E&P activities is essential for survival and ensuring the sustainability of the business. The guiding principle is "money saved is money earned." Achieving these goals requires innovative ideas, a change in mindset, a fresh perspective, and new approaches to doing business.

2.2.1.2. Definition

Optimization, in its simplest form, refers to achieving the best available value or most favorable result under a given set of conditions or constraints. It commonly involves the maximization or minimization of an objective function while adhering to a set of constraints. Optimization is primarily a mathematical technique that finds wide application in engineering, management

science, economics, mathematics, and various other fields. The literature contains numerous definitions of optimization, ranging from simple to complex.

2.2.1.3. Development

Optimization models and techniques are classified based on the types of objective function and set of constraints. These classifications include linear programming, integer programming, geometric programming, goal programming, quadratic programming, nonlinear programming, fractional programming, dynamic programming, and so on. These techniques are essentially extensions of linear programming or particular cases of nonlinear programming.

2.2.1.4. Explanations

Multiple cutting-edge optimization and business enhancement techniques have been successfully applied to elevate productivity in drilling operations, minimize rig time loss, and strategically optimize deepwater oil and gas exploration. These techniques include benchmarking, diagnostic and root cause analysis, as well as technical, qualitative, and economic assessments. The implementation of queuing theory, critical path analysis, and uniform standards based on international codes has further streamlined operations, ensuring efficiency across supply chain management and workforce planning. Additionally, consumption standardization and linear programming have contributed to significant improvements, making our processes more robust and cost-effective.

2.3. The Dependent Variables

2.3.1. Literature Review-First Variable: Efficiency of Operations

2.3.1.1. Introduction

Why is operational efficiency important?

A business's operations encompass all the activities it undertakes to create products or services. Inefficient operations can lead to wastage of money and effort (Mohamed Khodja et al., 2010, pp. 227-247). On the other hand, efficient operations are cost-effective as they reduce waste while maintaining quality and service standards.

2.3.1.2. Definition

Operational efficiency can be defined as the relationship between the output and input of an organization is vital for businesses to thrive. When it is healthy, it can help them to reduce unnecessary costs while increasing revenue. Essentially, businesses aim to produce high-quality products on a large scale with minimal resources.

2.3.1.3. Development

Generally Streamlining base operations, eliminating redundancy and waste, and optimizing resource utilization, production, inventory, and distribution, can improve a company's operational efficiency (Khodja & Bergaya, 2010).

2.3.1.4. Theories

Research presents two theories: the Theory of Swift, Even Flow, and the Theory of Performance Frontiers. These theories address cross-operational productivity differences and multiple dimensions of oil and gas performance, respectively.

2.3.1.5. Dimensions

Operational efficiency is the measure of how well an oil and gas company manages its internal processes to improve the performance of its oil and gas customers. It is evaluated based on the business's flexibility, consistency, productivity, and cycle time. Flexibility refers to a company's ability to adapt to changing business conditions and meet customers' immediate and long-term needs (Muñoz et al., 2016).

2.3.1.6. Explanations

The People, Process, and Technology (PPT) framework is a comprehensive approach that companies can use to create a balanced and coordinated system that effectively supports their business operations and change management initiatives. The framework emphasizes the importance of ensuring that people, processes, and technology work together in harmony to achieve successful outcomes. If one of these elements is weak or not aligned with the others, it can negatively impact the overall effectiveness and efficiency of the business. The objective is to create synergy among all three components, leading to improved business outcomes.

Although the PPT framework is typically applied to project management and change management initiatives, it can be used to assess and optimize all aspects of a company's operations, including setting targets, managing risks, and pivoting strategies.



Figure 2: Three Pillars for c (Mustafa et al., 2021)



Table 2: 9-Steps to Improve Operational Efficiency (Brett & Millheim, 1986)

- Use Performance Data to Set Benchmarks and Goals:

One effective way to engage your staff in enhancing your business's efficiency is by setting SMART goals that are specific, measurable, achievable, relevant, and time bound. Moreover, it's important to establish methods of celebrating when those goals are either met or exceeded.

- Implement Automation:

Automating repetitive tasks maximizes staff efficiency and allows the project team to focus on critical duties.

By implementing suitable automation tools, the project manager can enhance the value of the time spent by his team. This is because the team can focus on responsibilities that truly require their skills and expertise. Automating repetitive

tasks will also help to keep the project team more engaged by freeing up their schedules from mundane tasks.

- Create Open Lines of Communication:

One way to show the project team that the project manager values and appreciates them is by implementing automation. However, providing additional support efforts can go a long way in improving the company culture, enhancing staff performance, and keeping your team motivated and invested in the business. Effective communication is also essential to ensure that team members are not overwhelmed with tasks that they are unable to handle or complete on time.

- Adopt Digital Time Tracking

Digital time tracking enables project managers to analyze their staff's time usage thoroughly, identifying tasks where employees spend excessive time.

- Encourage Employee Collaboration

Encouraging project team members to communicate and collaborate with one another can lay the foundation for discussing process improvements that lead to more efficient business operations. Working together, employees can find innovative solutions to challenges. You might be surprised by the ideas and innovative thinking that result from such collaboration.

To foster collaboration, project and staff management teams can implement regular meetings or calls, use team-building strategies, and focus on developing a company culture that promotes a collaborative work environment.

- Identify Bottlenecks in The Processes

As the project manager focuses on enhancing the efficiency of the business, it's essential to evaluate how the business operates as a whole. There may likely be bottlenecks in multiple processes, which may hinder your productivity. Identifying

bottlenecks can be challenging, especially if the project manager is not familiar with the processes. In such cases, it's advisable to communicate with the team and request them to identify areas that need improvement. Afterward, work with the team to come up with the necessary resources to improve the processes.

- Hire the Right People and Train Them Well

Improving operational efficiency can help maximize productivity, especially when working with a limited staff. However, it's crucial to ensure that the project manager has the right team members with the necessary skills. Employees who lack the required skill sets for their respective roles can slow down the team's progress and drain resources. By adding a key staff member, you can often increase a project's productivity, giving the existing team the additional support needed to succeed.

- Focus on Service

The project service team can boost sales, upsell products and services, and retain clients, provided they possess the necessary knowledge, skills, and tools.

- Choose the Right Technology:

Choosing the right technology is arguably the most important decision.

2.3.2. Literature Review-Second Variable: Budget and Economy of Operations

2.3.2.1. Introduction

The Oil and Gas Project Budget is a crucial tool used by project managers to determine the total cost of a project. A project budget template includes a detailed estimate of all costs that are likely to be incurred before the project is completed. Large commercial projects can have project budgets that are several pages long.

2.3.2.2. Definition

An operating budget is a detailed projection of an oil and gas company's expected revenue and expenses over a specific time period, often a year or the project life cycle.

2.3.2.3. Development

The operating budget for oil and gas is created and approved yearly, or prior to commencing any project. This budget is then compared to actual results throughout the year or the lifespan of the project to assess progress toward the organization's financial goals. The budget should include expected revenues and various types of expenses, which may incorporate fixed, variable, and one-time costs.

2.3.2.4. Theories

There are two methods to calculate the operational budget for oil and gas projects (Bianca Sarbu, 2011), which are:

- a. $\text{Operating Costs} = \text{Direct Production Costs} + \text{Fixed Charges} + \text{Asset Overhead Costs}.$
- b. $\text{Total OPEX (or Total Production Cost)} = \text{Operating Costs} + \text{General Expenses}.$

2.3.2.5. Dimensions

The operating budget primarily consists of sales budget, production budget, and cash budget (both cash receipt and cash payment budget). Of the components of the operating budget.

2.3.2.6. Explanations

CCH Tagetik empowers the oil and gas industry to comprehend the effects of market fluctuations, capital investments, and labor costs while forecasting profitability, regardless of the emerging scenario.

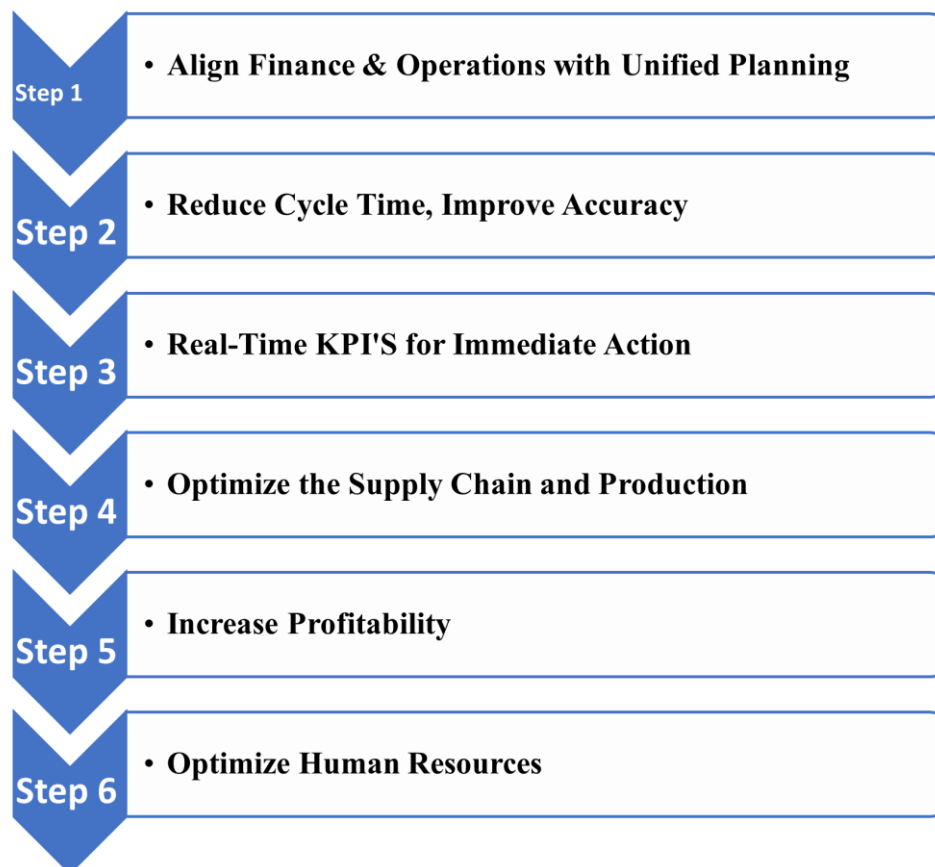


Table 3: CCH Tagetik Planning for Oil and Gas Projects (Alnash et al., 2020)



Figure 3: Key Benefits of Economic Budgeting in Projects (Ahmed et al., 2007)

The primary benefits of implementing economic budgeting in projects can be summarized into key points.

- Reduce Planning Cycle Time
- Optimize Resources
- Align Finance & Operations
- Increase Accuracy, Efficiency & Control
- Reduce Risk
- Lower Total Cost of Ownership (TCO)
- Modernize Finance Technology

In addition to forecasting, which represents an undeniable advantage of the budget, using budgeting in enterprise management has many benefits, including communication, coordination, authority, responsibility, mobilization, motivation, and support in decision-making.

2.3.3. Literature Review-Third Variable: Cost-Consciousness

2.3.3.1. Introduction

The awareness and attitude of project team members towards efficient resource use, waste minimization, and expense reduction are crucial for successful project management. It is essential that all members of an organization understand the significance of cost and its implications for organizational efficiency. A cost-conscious approach to cost management can be an effective method for achieving this (Oag & Williams, 2000).

2.3.3.2. Definition

Is the oil and gas project team members' awareness and attitude towards efficient resource use and minimizing waste and expenses.

2.3.3.3. Development

Establishing clear and achievable budget goals is crucial for developing a cost-conscious approach within your project team. By involving your team in the budget planning process, and clearly explaining the assumptions, risks, and limitations, you can foster a collective understanding of financial considerations. This will help your team work more effectively towards achieving financial goals.

2.3.3.4. Theories

The primary theory of cost consciousness is based on the assumption of 'waste not, want not'. Costs can be reduced through innovation.

2.3.3.5. Dimensions

Generally, businesses incur two types of costs: fixed and variable. Fixed costs, also known as overhead costs, remain constant regardless of output, while variable costs vary with output.

2.3.3.6. Explanations



Figure 4: Culture of Cost Consciousness (Jenkins & Crockford, 1975)

Equipping the team with the necessary tools, training, and resources to make cost-effective decisions, diving into data, encouraging innovation, and resetting performance management are key elements of a cost-conscious culture.

2.4. The relationship between the independent and the dependent variables

2.4.1. Literature Review-First Variable: Efficiency of Operations

The three variables, Efficiency of Operations, Budget, and Economy of Operations and Cost-Consciousness are interrelated in a positive way. This relationship is reflected positively in any project, specifically those that require huge resource input and result in high output. These projects do not just impact a small group of individuals, but also the economy of countries, as well as international investors who invest billions of dollars in global oil and gas projects.

2.4.2. Patterns

After summarizing all the studies conducted in the same field, specifically in the oil and gas industry, we can conclude that implementing optimization in the right way and addressing all relevant subjects during the planning phase of any project leads to the following positive outcomes:

- The efficiency of operations increases and can be monitored clearly.
- Budget and economic observations are used wisely, eliminating unnecessary wasteful investments in operations. This can be achieved by either replacing unneeded resources with more economically feasible solutions or by involving new solutions that will improve budget studies for oil and gas projects.

The project team, project managers, stakeholders, and investors will have an increased knowledge of cost consciousness, leading to better decision-making and minimum conflicts in a positive and supportive way (Lukawski et al., 2014).

2.4.3. Conflicts

Through a thorough examination and resolution of the variables listed above, we can ensure that any conflicts arising will be minimized, leading to increased success in the project. This will result in substantial savings in terms of resources and time, as the total planned days will be reduced to a minimum in the most efficient and cost-effective way possible.

It is important to note that conflicts between variables can arise if the pre-project planning is not given enough importance, and if corrective action is not taken in a timely manner during project monitoring and post-job evaluations. This can lead to delays in correcting the course of the project, which will be evident if stakeholders are not given routine feedback during the project life cycle. In addition, the involvement of outside resources, such as global economic decision-making processes, level of experience, global logistics cost, and manpower supply, are crucial to the success of any project, particularly oil and gas projects in upstream, midstream, or downstream investment projects.

2.4.4. Gaps

After reviewing several studies on the relationship between optimization and three variables, including Efficiency of Operations, Budget, and Economy of Operations and Cost-Consciousness, it was observed that most studies only covered the relationship between optimization and one of these variables, instead of examining all three together. This was particularly true for research studies related to projects in general or to the oil and gas industry.

This observation has piqued my interest in writing a research paper that examines the relationship between optimization and all three dependent variables in the oil and gas industry. Specifically, I plan to focus on ongoing projects related to the Saudi Aramco working environment for oil and gas projects, whether they have been completed, are ongoing, or are planned for the future (AbdulKarim et al., 2010).

By demonstrating the positive impact of optimization on all three dependent variables, including Efficiency of Operations, Budget, and Economy of Operations and Cost-Consciousness, we can fill the gap in the research and provide a more comprehensive understanding of the benefits of optimization in the oil and gas industry. This research will be applicable to upstream, midstream, and downstream projects in the industry.

2.5. Conclusion

After researching and analyzing optimization, we can conclude that it has a direct positive relationship with improving the efficiency and economy of operations, cost-consciousness, and budget. This improvement can be observed in any projects related to the oil and gas working environment, including projects completed under the supervision of Saudi Aramco. Throughout the upcoming semester, we will apply our studies and knowledge to real-life examples from the field. We look forward to continuing our research under her direct supervision and the team at Midocean University in the next phase.

3. Chapter 3: Research Methodology

3.1. Introduction

This chapter outlines the research methodology employed to investigate (The Impact of Optimization on Reducing Construction Costs in the Oil and Gas Sector in Dhahran, Saudi Arabia: A Case Research of Saudi Aramco's Projects). It details the operational definitions for research variables, research design, research population & sampling methods and technique, data collection methods, types of data, and data analysis methods & procedures.

3.2. Operational definitions for research variables

In research studies, operational definitions are key in clearly defining the variables being measured. An operational definition describes how a variable will be measured, observed, or manipulated. It helps researchers ensure that their studies are consistent, reliable, and valid.

3.2.1 The Independent Variable

I am selecting my main independent variable, as Optimization.

Operational Definition: Optimization, in its simplest form, refers to achieving the best available value or most favorable result under a given set of conditions or constraints.

3.2.2 The Dependent Variable

On my research, there are three main dependent variables, which are:

Operational efficiency, Budget and Economy of Operations and the third and last one is, Cost-Consciousness

The Operational Definition for the first dependent variable, Efficiency of Operations, the relationship between the output and input of an organization is vital for businesses to thrive.

The Operational Definition for the second dependent variable, Budget and Economy of Operations. is:

An operating budget is a detailed projection of an oil and gas company's expected revenue and expenses over a specific time period, often a year or the project life cycle.

Where the operational dependent for the third selected dependent variable, Cost-Consciousness, is:

The oil and gas project team members' awareness and attitude towards efficient resource use and minimizing waste and expenses.

3.3. Research Design (Research Onion)

On my research, I have followed the below set up:

- Research Philosophy: Interpretivist
- Research Approach: Inductive
- Research Strategy: Case Research
- Research Choice: Qualitative
- Time Horizon: Longitudinal
- Data Collection and Analysis Techniques: Statistical analysis of survey results

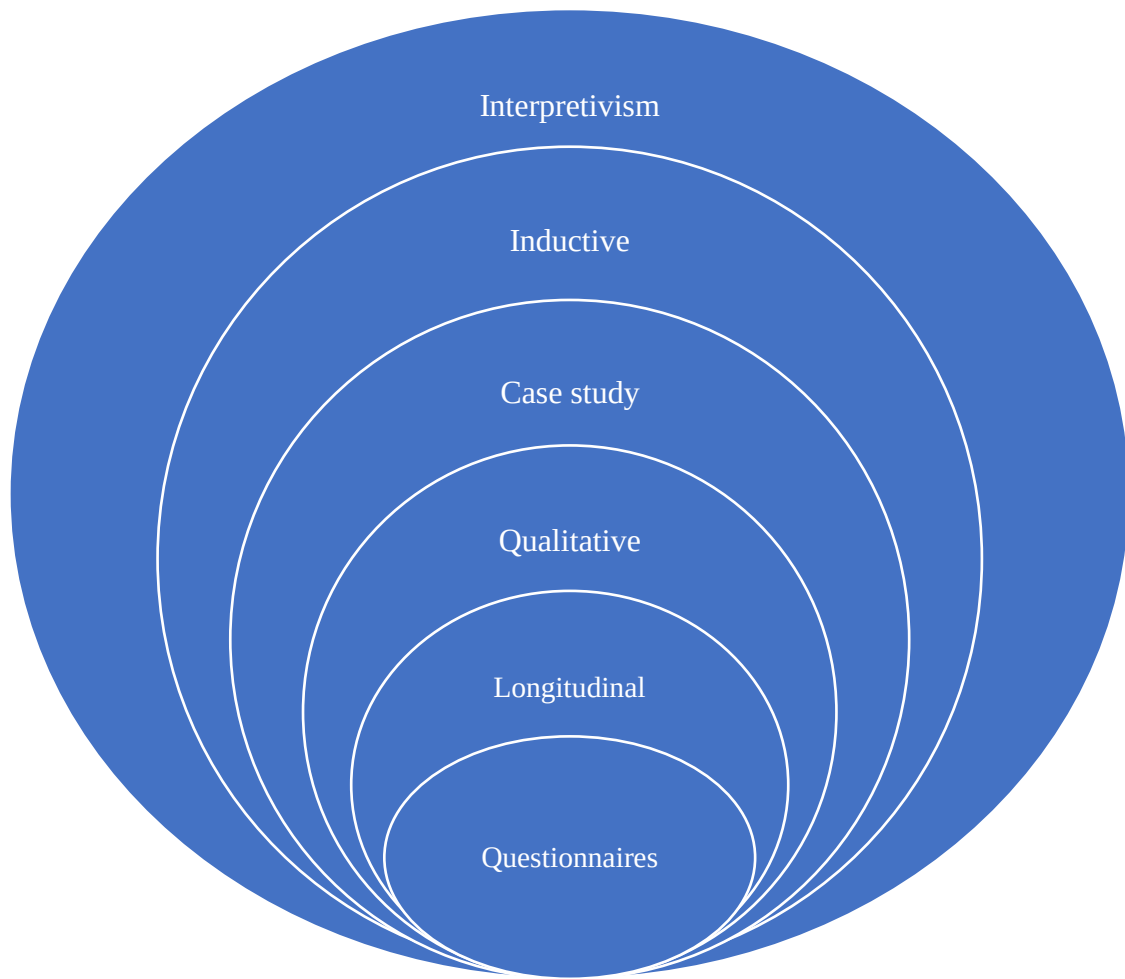


Figure 5: Proposed Research Methodology (The Researcher, 2024)

3.4. Research Population & Sampling Methods & Technique

This section provides information about the research population and sample, which was used during my research.

3.4.1 Research Population

Sector or Company name	Classifications	Number of employees
Saudi Aramco	Director	14
	Manager	22
	Engineer	24
	Employee	16
	Operational supportive team (Administrative)	14
	Total Population Size	90

Table 4:Research Population (The Researcher, 2024)

3.4.2 Research Sample

The research sample	Sample size
Target employees in Saudi Aramco company	20-50 employees

Table 5:Research Sample (The Researcher, 2024)

3.4.3 Sampling Method & Techniques

The sampling method is Probability, and the sampling techniques is Simple Random Sampling.

3.5. Data collection method

The collected data will be analyzed Statistically. Statistical analysis involves identifying, analyzing, and turning raw data into useful information. This approach will help to uncover the key relationships between the independent variable (Optimizations in operations) and the Dependent variables (Operational efficiency, Budget and Economy of Operations and Cost-Consciousness) at Saudi Aramco.

3.5.1 The independent variable

The researcher relied on the questionnaire of Shammass, P., Mr. (2000). In order to measure the independent variable (Optimizations in operations), in terms of three dimensions: cost reduction, flexibility, and quality, overall, 10 items for the entire variable. Whereas the cost reduction dimension consists of 4 elements, the flexibility dimension It consists of 3 elements, and the quality dimension consists of 3 elements.

Type of instrument is Likert: Strongly agree, agree, neutral, disagree, strongly disagree.

Variable	Dimension	Number of items	Source
Optimizations in operations	Cost Reduction	4	Shammass, P., Mr. (2000).
	Flexibility	3	
	Quality	3	
	Overall	10	

Table 6: Independent variable (The Researcher, 2024)

3.5.2 The Dependent Variable

The researcher relied on the questionnaire of Solares, J. R., Mr. (2001). In order to measure the independent variable (project success), in terms of one dimension, which is the projects' success with the total.

10 items for the entire variables.

The instrument type is Likert: Strongly agree, agree, neutral, disagree, strongly disagree.

Variable	Dimension	Number of items	Source
Operational efficiency	6	27	Solares, J. R., Mr. (2001).
Budget and Economy of Operations	6	27	
Cost-Consciousness	6	27	
Overall	18	81	

Table 7: Dependent variable (The Researcher, 2024)

3.6. Types Of Data

3.6.1 Primary Data

Primary data refers to the data that the researcher collects directly from original sources. It is authentic and unique data that represents the focus of the research. The main objective of collecting primary data is to address the research problem. Examples of primary data collection methods include interviews, questionnaires, and observations. For my research, I have opted for the questionnaire method, using the set of questions provided below. These questionnaires will be distributed to the specific client team included in my research sample.

3.6.2 Secondary Data

Secondary data refers to information collected by other researchers. It involves the analysis and interpretation of primary data for purposes other than solving the specific research problem. This type of data may provide valuable information to support scientific writing. Examples of secondary data sources include books, articles, periodicals, and official reports, which have already been included in my references for this research.

3.7. Data Analysis Methods & Procedures

After collecting data, it is essential to analyze the information gathered to draw meaningful conclusions. The Statistical Package for the Social Sciences (SPSS), specifically version 28, was used to analyze the collected data. The sample profile test was conducted through descriptive analysis to gain insights into the characteristics of the sample population. This helps researchers understand the demographics, preferences, and other relevant information about the individuals involved in the research. Validity and reliability tests are crucial in ensuring that the collected data is accurate and consistent. Validity tests (Exploratory factor analysis) are used to determine if the research instruments measure what they are intended to measure, while reliability tests (Cronbach's Alpha test) assess the consistency of results over time.

3.8. Conclusion

By applying thorough analysis techniques to the research questionnaire from the selected population, we can determine the main factors that need to be highlighted. Additionally, we can examine the relationship between different independent and dependent variables. This analysis can help fill the gaps in historical research studies on similar operator companies in the Middle East region or in the GCC, with a specific

focus on Saudi Aramco engineering and operations. These operations are centered around construction projects for the oil and gas sector in Dhahran.

4. Chapter 4: Statistical Analysis & Findings Discussion

4.1. Introduction

In this chapter, I will present the results of the field research. The data was analyzed using the statistical program SPSS version 28. The statistical analysis will include descriptive statistics for the research sample obtained through SPSS version 28. Additionally, I will discuss the validation and reliability testing of the questionnaires used to collect data from the research sample. The research hypotheses and model suitability will be tested using simple linear regression analysis conducted via SPSS 28.

4.2. Sample profile (descriptive statistics for research sample)

The research sample was divided based on gender, age group, years of experience, nature of work, and educational level. Frequencies and percentages were calculated for the research sample members and are represented by demographic information that includes:

- Gender: male, female
- Age group: less than 20 years, 21 to 30 years, 31 to 40 years, 51 to 60 years
- Marital Status: Single, married, divorced, or widower.
- Qualifications: High School, Diploma, BSc, Ph.D.
- Function: Admin, employee, engineer, manager, or director.
- Years of experience: less than 1 year, 1 to 4 years, 5 to 10 years, more than 10 years

Variable	Variable Classes	The Number	Percentage of the total sample
Gender	Male	31	68.90%
	Female	14	31.10%
	Total	45	100%
The age group	Less than 20 years	4	8.90%
	From 20 to 30 years	10	22.20%
	From 31 to 40 years	11	24.40%
	From 41 to 50 years	13	28.90%
	From 51 to 60 years	7	15.60%
	Total	45	100%
Marital status	Single	10	22.20%
	Married	17	37.80%
	Divorced	13	28.90%
	Widower	5	11.10%
	Total	45	100%
Qualification	High School	10	22.20%
	Diploma	6	13.30%
	Bachelor's	13	28.90%
	Master's	10	22.20%
	Ph.D.	6	13.30%
	Total	45	100%
Function	Administrative	7	15.60%
	Employee	8	17.80%
	Engineer	12	26.70%
	Manager	11	24.40%
	Director	7	15.60%
	Total	45	100%
Years of Experience	Less than one year	8	17.80%
	From 1 year to 4 years	12	26.70%
	From 5 years to 10 years	13	28.90%
	More than 10 years	12	26.70%
	Total	45	100%

Table 8: Questionnaire output for the Personal Information

Section One: Personal and Professional Information:

45 responses

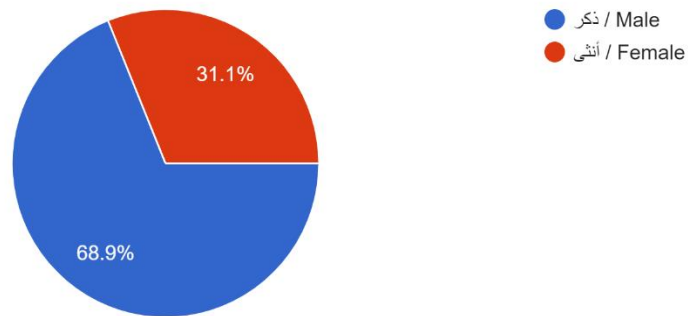


Figure 6: Personal & Professional Information

العمر / Age

45 responses

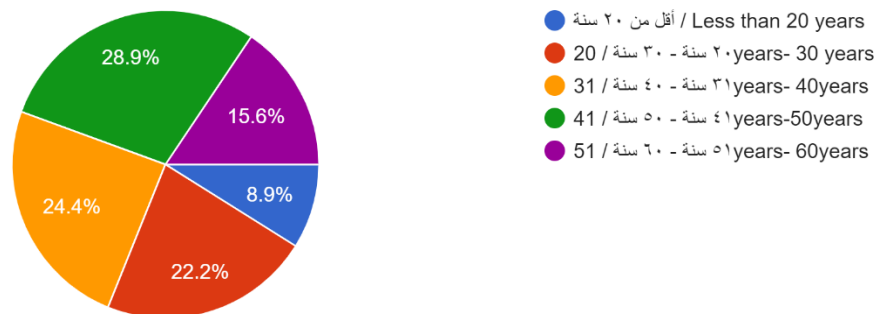


Figure 7: Age Distribution on the Questionnaire

Marital status / الحالة الإجتماعية

45 responses

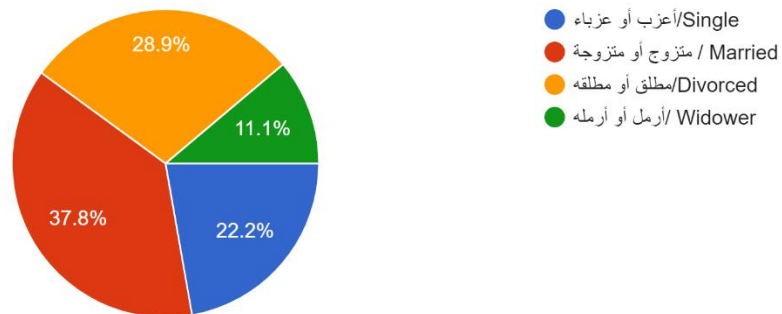


Figure 8: Marital Status Distribution on the Questionnaire

Qualification / المؤهل العلمي

45 responses

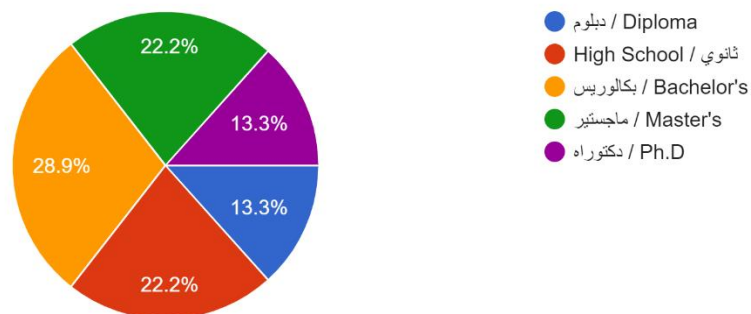


Figure 9: Qualification Distribution on the Questionnaire

Function / الوظيفة

45 responses

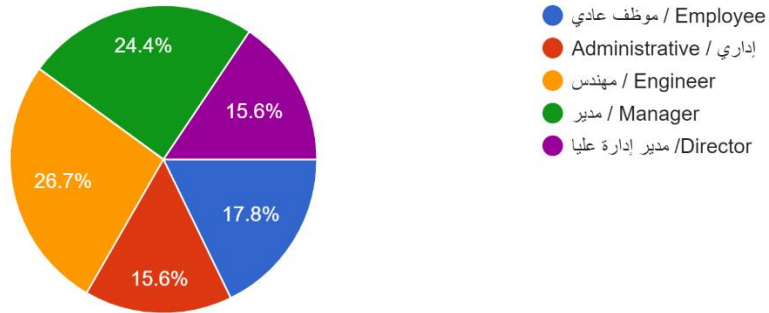


Figure 10: Function-Distribution on the Questionnaire

Years of Experience / عدد سنوات الخبرة

45 responses



Figure 11: Experience-Distribution on the Questionnaire

Efficiency of Operations (Dependent Variable # One)

All Parties-related causes: Efficiency in oil and gas construction projects can be affected by the following: Incompetent project team

45 responses

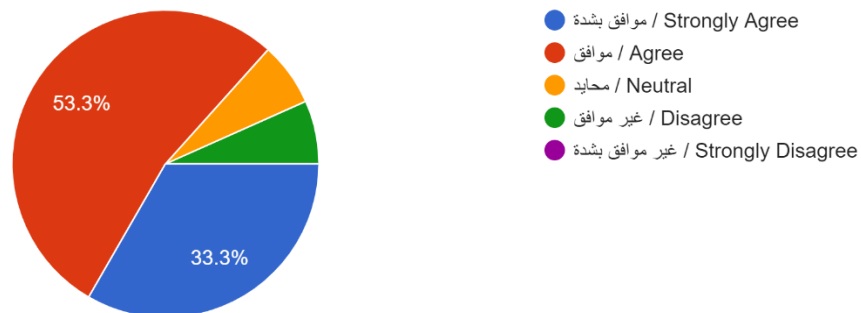


Figure 12: Questionnaire Output-Incompetent Project Team

All Parties-related causes: Efficiency in oil and gas construction projects can be affected by the following: Personality clash between two or mor...members/service companies from different parties

45 responses

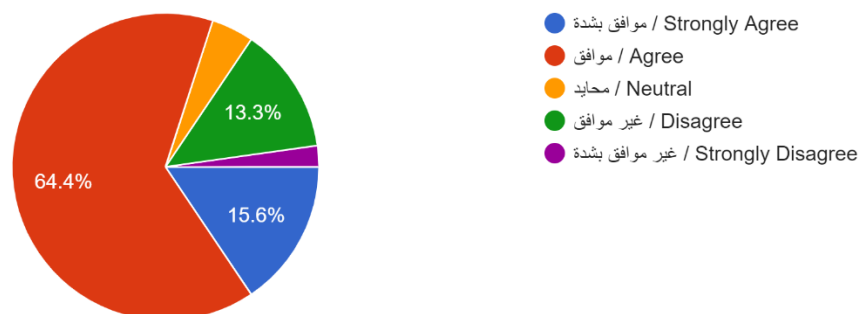


Figure 13: Questionnaire Output- Personality clash between team members

All Parties-related causes: Efficiency in oil and gas construction projects can be affected by the following: Poor planning and scheduling of the project.

45 responses

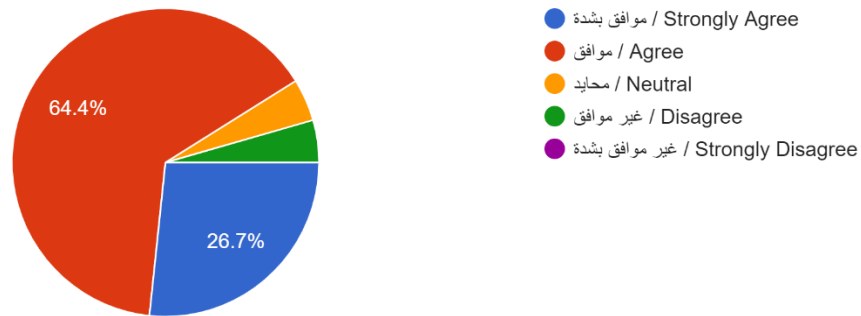


Figure 14: Questionnaire Output-Poor planning & Scheduling of projects

Consultant/designer-related causes: Efficiency in oil and gas construction projects can be affected due to: Design errors

45 responses

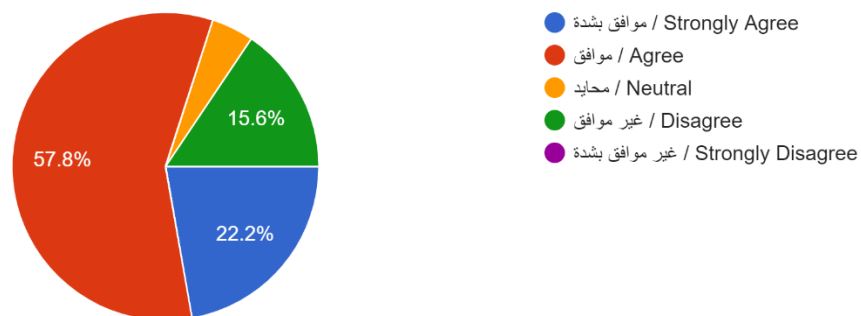


Figure 15: Questionnaire Output-Design Errors

Consultant/designer-related causes: Efficiency in oil and gas construction projects can be affected due to: Inadequate cost estimating approach / inaccurate material estimation

45 responses

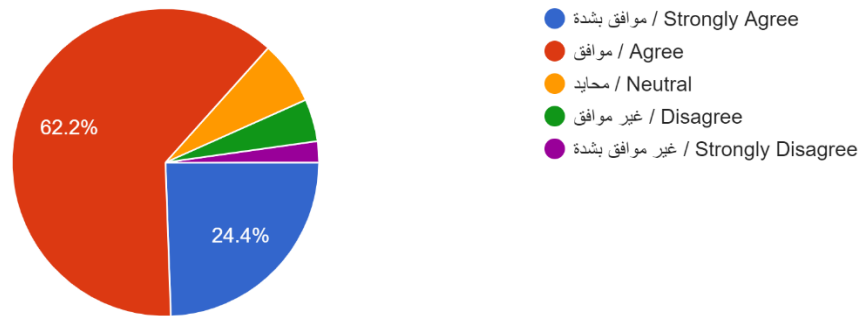


Figure 16: Questionnaire Output-Inadequate cost estimation

Consultant/designer-related causes: Efficiency in oil and gas construction projects can be affected due to: Inadequate quality control/assurance

45 responses

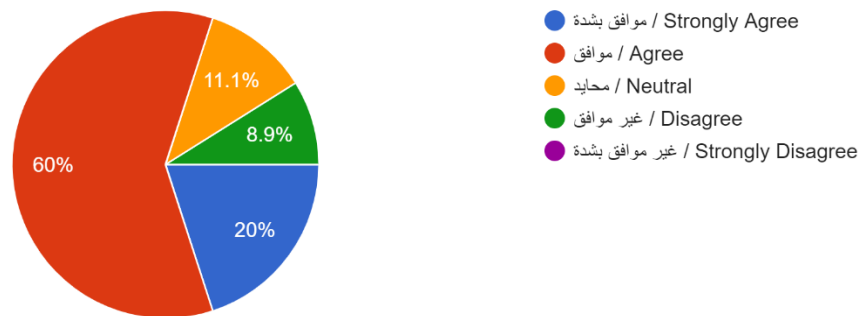


Figure 17: Questionnaire Output-Inadequate QC control & Assurance

Consultant/designer-related causes: Efficiency in oil and gas construction projects can be affected due to: Inadequate management of contractor's schedule by consultant

45 responses

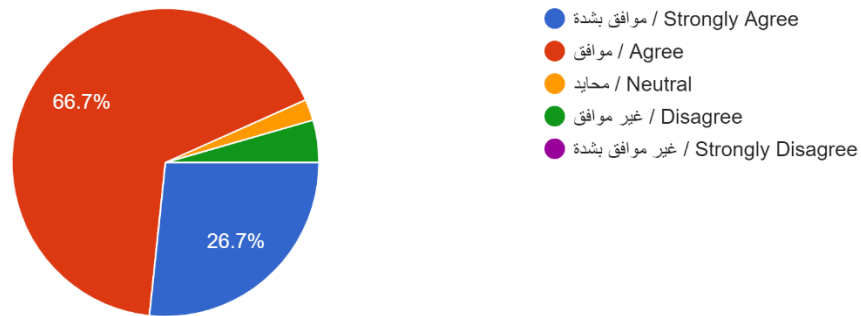


Figure 18: Questionnaire Output-Inadequate management

Consultant/designer-related causes: Efficiency in oil and gas construction projects can be affected due to: Unforeseen conditions and structural modifications

45 responses

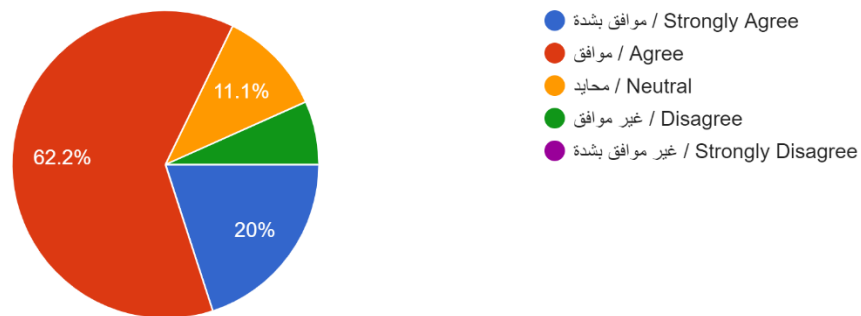


Figure 19: Questionnaire Output-Unforeseen conditions

Consultant/designer-related causes: Efficiency in oil and gas construction projects can be affected due to: Weak and insufficient technical studies

45 responses

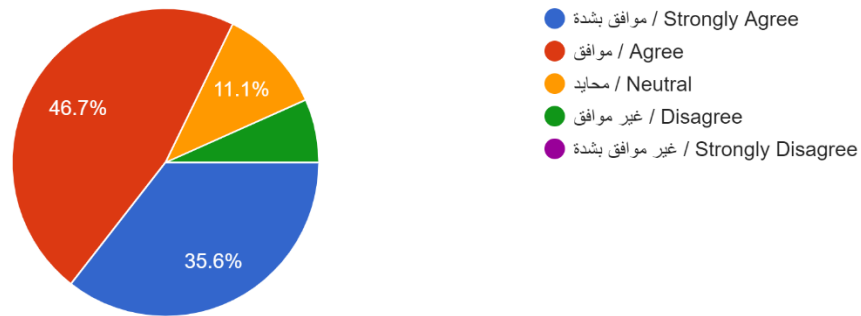


Figure 20: Questionnaire Output-Weak & insufficient studies

Contract-related causes: Efficiency in oil and gas construction projects can be affected due to: Poor communication among the parties

45 responses

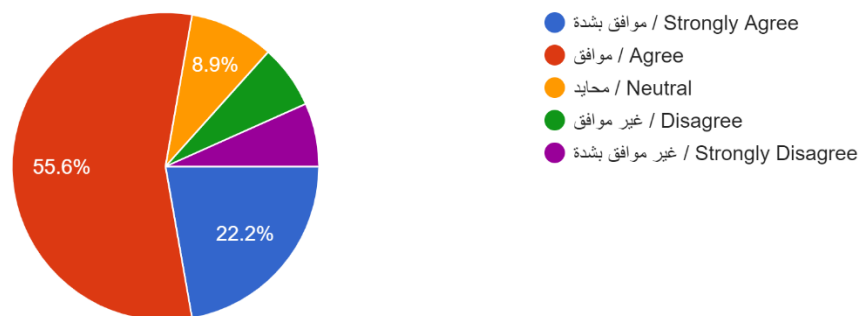


Figure 21: Questionnaire Output-Poor communications

Contract-related causes: Efficiency in oil and gas construction projects can be affected due to: Discrepancies in contract documents

45 responses

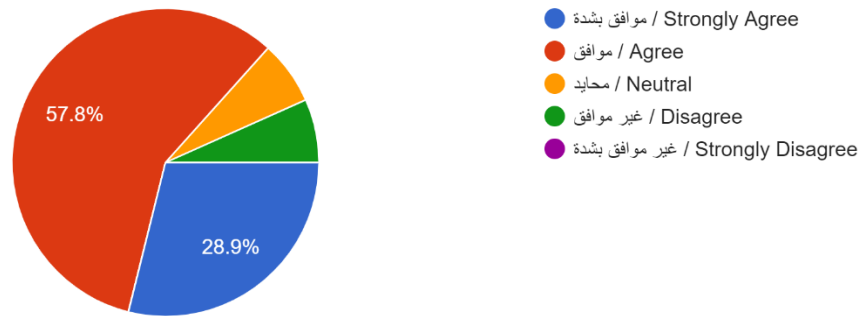


Figure 22: Questionnaire Output-Discrepancies in contract documents

Contract-related causes: Efficiency in oil and gas construction projects can be affected due to: Poorly defined payment milestones

45 responses

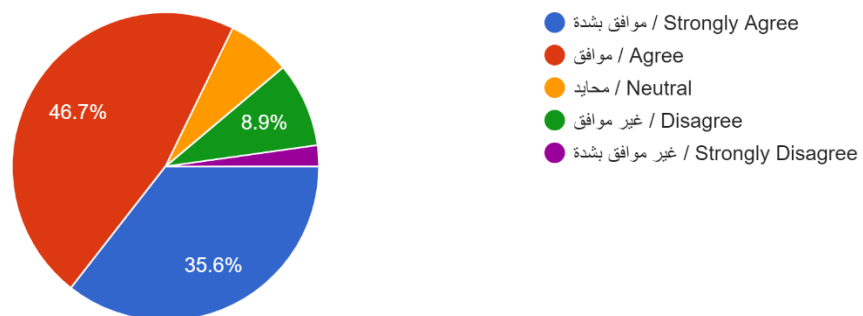


Figure 23: Questionnaire Output-Poorly defined payments

Contract-related causes: Efficiency in oil and gas construction projects can be affected due to: Lack of communication with suppliers in the engineering and procurement phases

45 responses

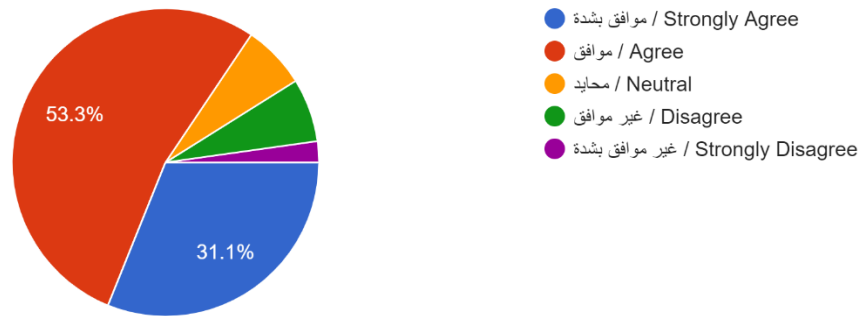


Figure 24: Questionnaire Output-Lack of communication with suppliers

Contract-related causes: Efficiency in oil and gas construction projects can be affected due to: Poor project implementation strategies

45 responses

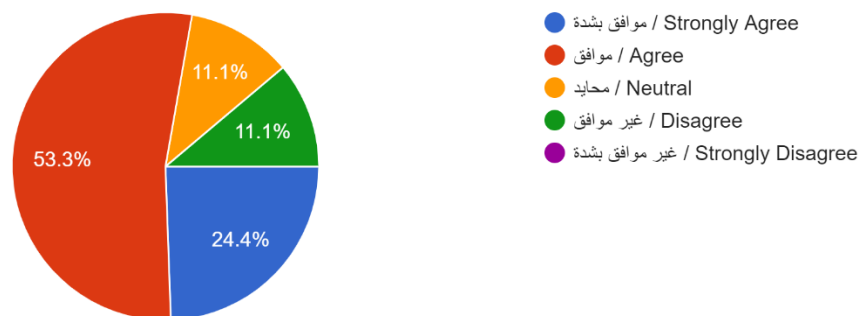


Figure 25: Questionnaire Output-Poor project implemetations

External-related causes: Efficiency in oil and gas construction projects can be affected due to: Impact of weather conditions on work

45 responses

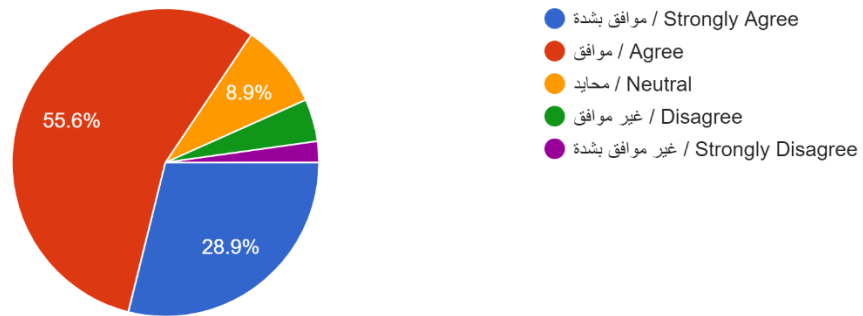


Figure 26: Questionnaire Output-Impact of weather conditions

External-related causes: Efficiency in oil and gas construction projects can be affected due to: Impact of formation's stability on work

45 responses

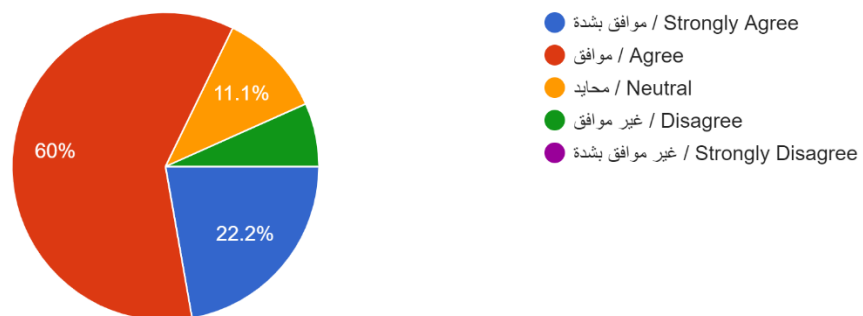


Figure 27: Questionnaire Output-Impact of formation's stability

External-related causes: Efficiency in oil and gas construction projects can be affected due to: Impact of sea's condition on work

45 responses

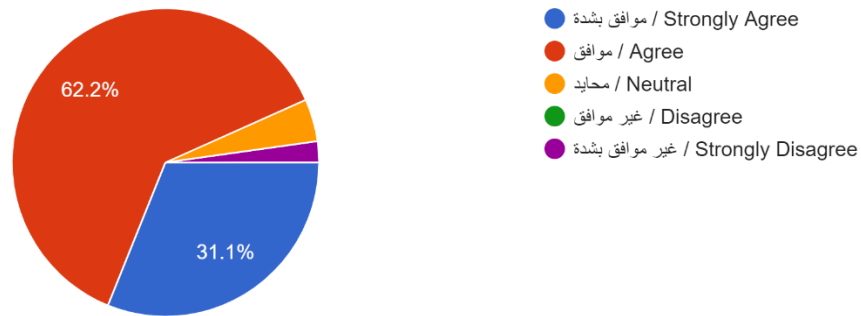


Figure 28: Questionnaire Output-Impact of sea's condition

External-related causes: Efficiency in oil and gas construction projects can be affected due to: Impact of onshore/offshore' s location on work

45 responses

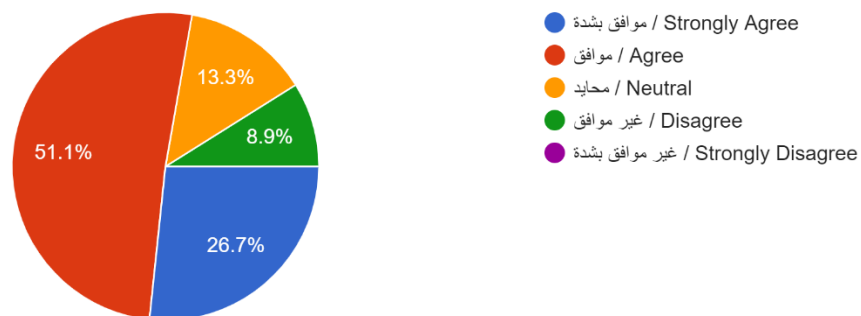


Figure 29: Questionnaire Output-Impact of project location (On/Off-Shore)

Owner-related causes: Efficiency in oil and gas construction projects can be affected due to: Deficient documentation and incomplete scope definition

45 responses

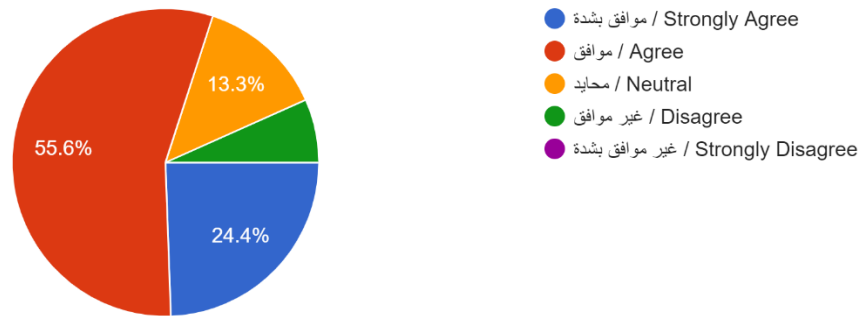


Figure 30: Questionnaire Output-Deficient documentation & incomplete scope

Owner-related causes: Efficiency in oil and gas construction projects can be affected due to: Changing of design and scope by client during construction

45 responses

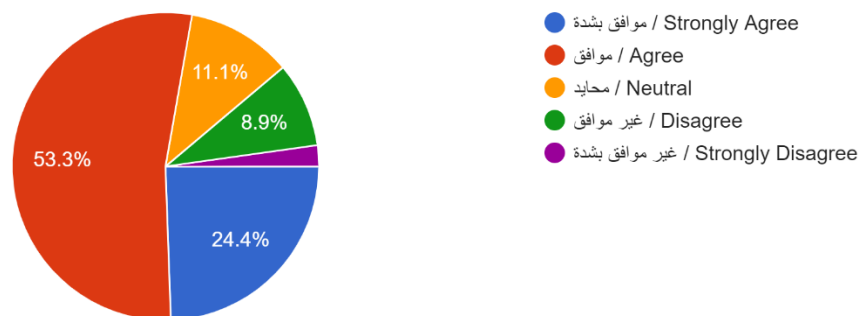


Figure 31: Questionnaire Output-Changing of design and scope during project execution

Owner-related causes: Efficiency in oil and gas construction projects can be affected due to: Long project approval procedures

45 responses

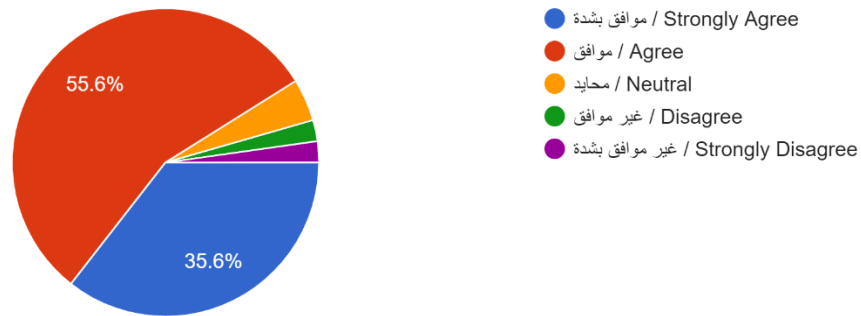


Figure 32: Questionnaire Output-Long project approval procedure

Owner-related causes: Efficiency in oil and gas construction projects can be affected due to: Many stakeholders

45 responses

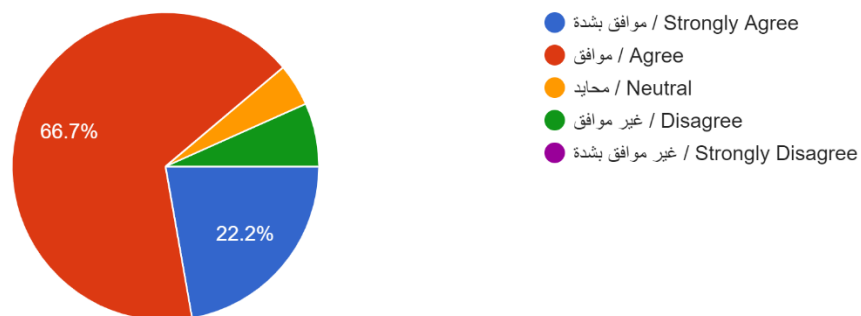


Figure 33: Figure 32: Questionnaire Output-Stakeholders involvement

Owner-related causes: Efficiency in oil and gas construction projects can be affected due to: Poor definition of subsurface data

45 responses

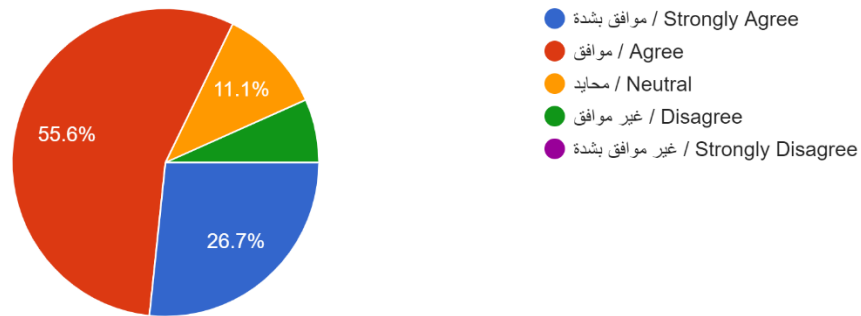


Figure 34: Figure 32: Questionnaire Output-Poor definition of subsurface data

Resources-related causes: Efficiency in oil and gas construction projects can be affected due to: Labor's lack of skills and productivity

45 responses

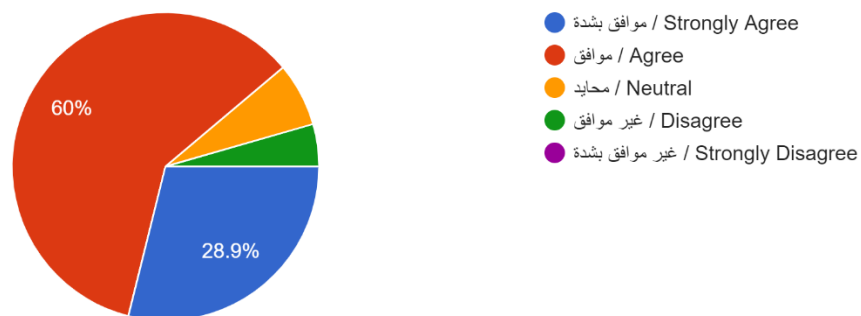


Figure 35: Questionnaire Output-Labor's lack of skills and productivity

Resources-related causes: Efficiency in oil and gas construction projects can be affected due to: Lack of equipment

45 responses

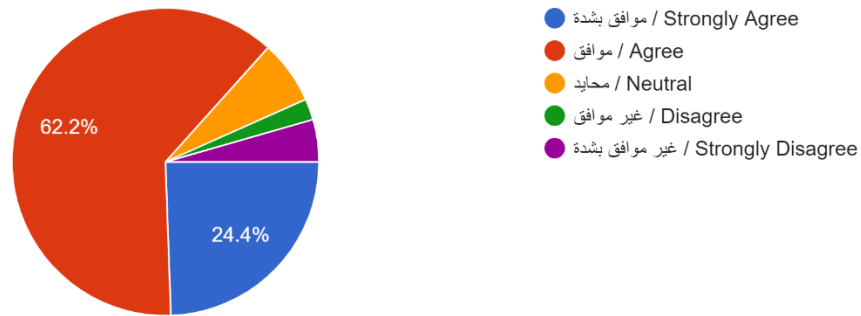


Figure 36: Questionnaire Output-Lack of equipments

Resources-related causes: Efficiency in oil and gas construction projects can be affected due to: Manpower shortage

45 responses

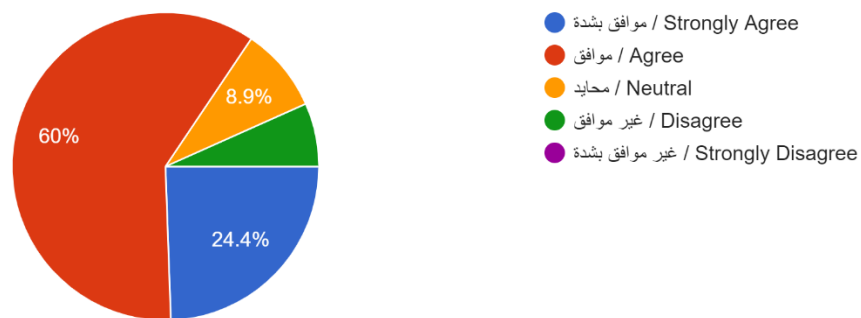


Figure 37: Questionnaire Output-Manpower shortage

Resources-related causes: Efficiency in oil and gas construction projects can be affected due to: Material procurement issues

45 responses

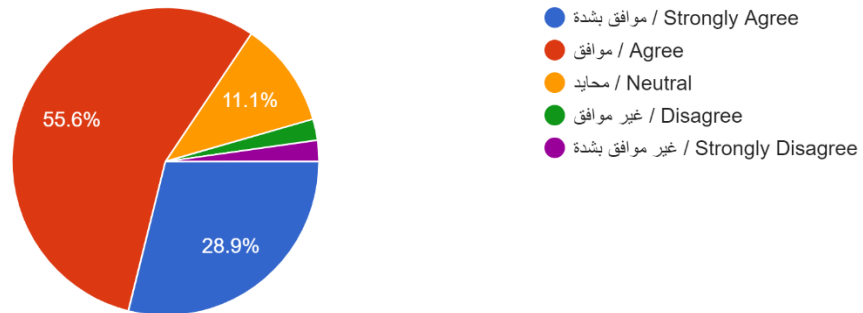


Figure 38: Questionnaire Output-Material procurement issues

Budget and Economy of Operations (Dependent Variable # Two)

All Parties-related causes: Project Budget and Economy in oil and gas construction projects can be affected by the following: Incompetent project team

45 responses

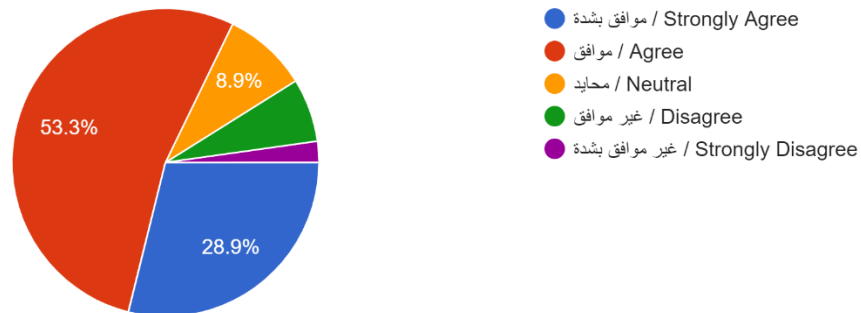


Figure 39: Questionnaire Output-Budget & Economy-Incompetent project team

All Parties-related causes: Project Budget and Economy in oil and gas construction projects can be affected by the following: Personality clash bet... members/service companies from different parties

45 responses

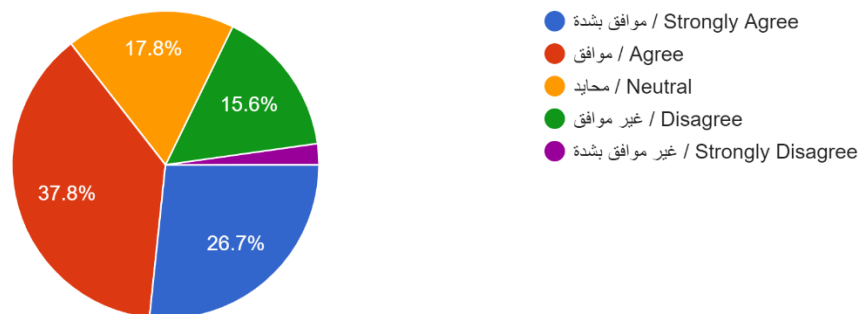


Figure 40: Questionnaire Output-Budget & Economy-Peronality clash between team members

All Parties-related causes: Project Budget and Economy in oil and gas construction projects can be affected by the following: Poor planning and scheduling of the project.

45 responses

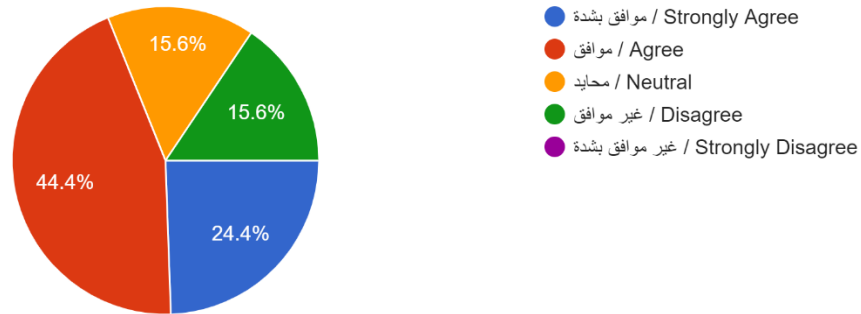


Figure 41: Questionnaire Output-Budget & Economy-Poor planning & scheduling

Consultant/designer-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Design errors

45 responses

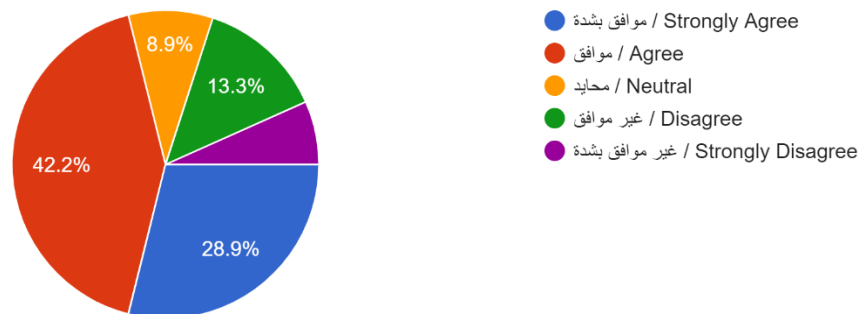


Figure 42: Questionnaire Output-Budget & Economy-Design Errors

Consultant/designer-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Inadequate cost ...imating approach / inaccurate material estimation
45 responses

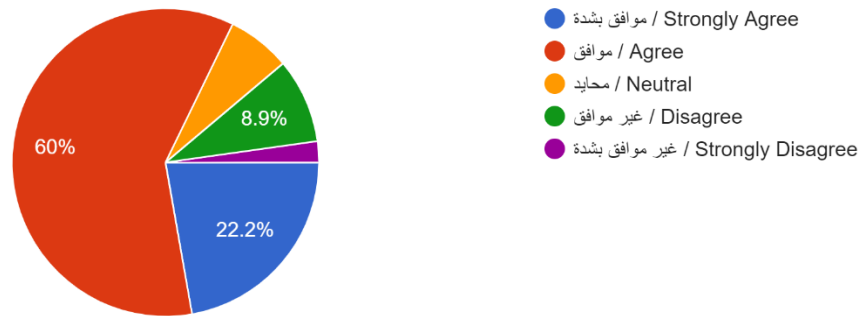


Figure 43: Questionnaire Output-Budget & Economy-Inadequate cost planning

Consultant/designer-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Inadequate quality control/assurance
45 responses

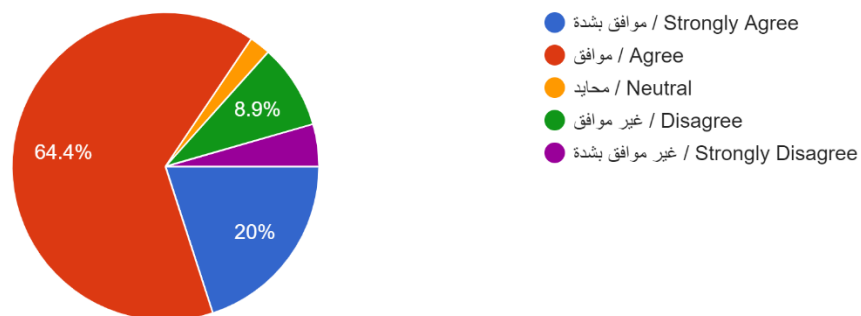


Figure 44: Questionnaire Output-Budget & Economy-Inadequate QC control and assurance

Consultant/designer-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Inadequate management of contractor's schedule by consultant
45 responses

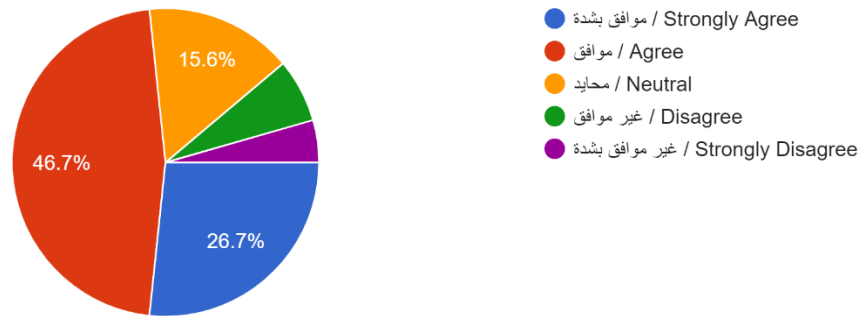


Figure 45: Questionnaire Output-Budget & Economy-Inadequate managemnts

Consultant/designer-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Unforeseen conditions and structural modifications
45 responses

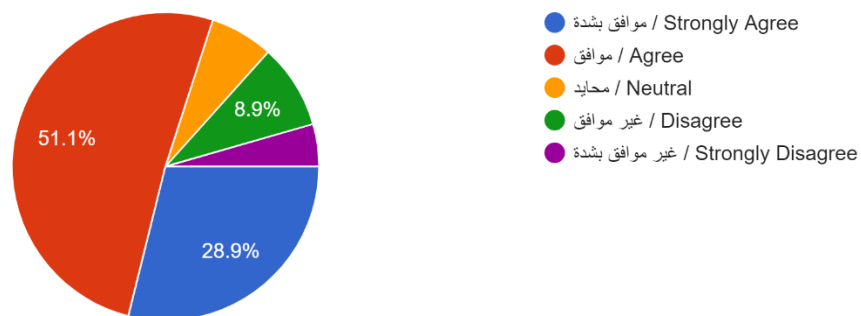


Figure 46: Questionnaire Output-Budget & Economy-Unforeseen conditions

Consultant/designer-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Weak and insufficient technical studies

45 responses

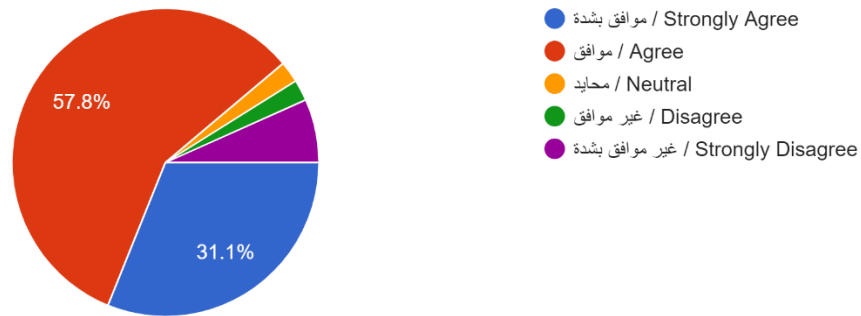


Figure 47: Questionnaire Output-Budget & Economy-weak technical studies

Contract-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Poor communication among the parties

45 responses

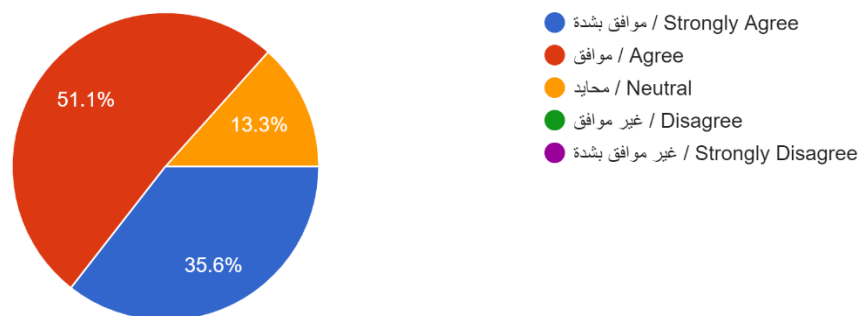


Figure 48: Questionnaire Output-Budget & Economy-Poor communication

Contract-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Discrepancies in contract documents

45 responses

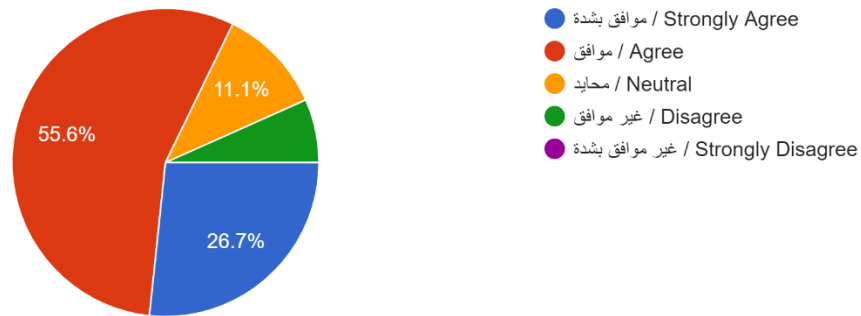


Figure 49: Questionnaire Output-Budget & Economy-Discrepancies in contract

Contract-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Poorly defined payment milestones

45 responses

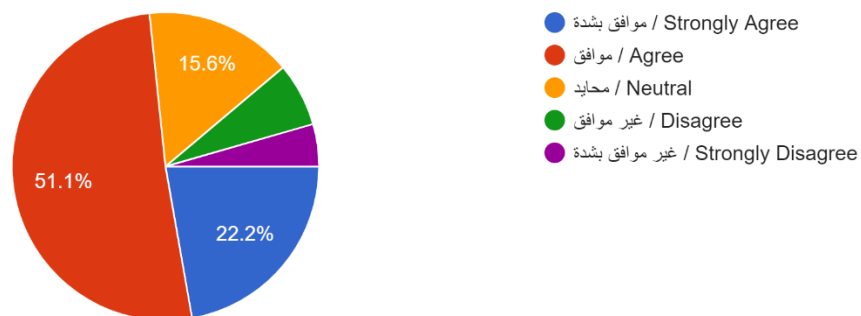


Figure 50: Questionnaire Output-Budget & Economy-Poorly defined payments

Contract-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Lack of communication with suppliers in the engineering and procurement phases

45 responses

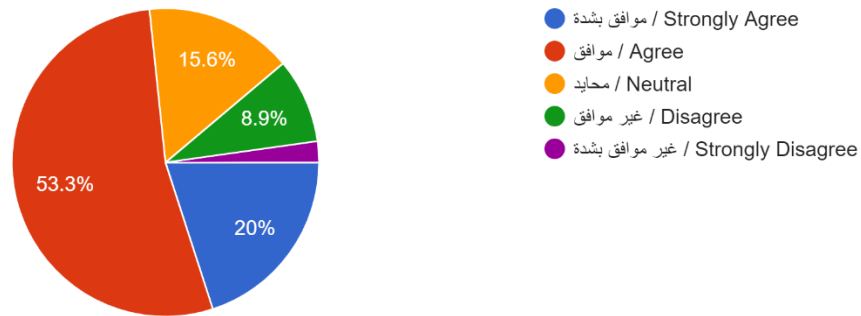


Figure 51: Questionnaire Output-Budget & Economy-Lack of communication with suppliers

Contract-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Poor project implementation strategies

45 responses

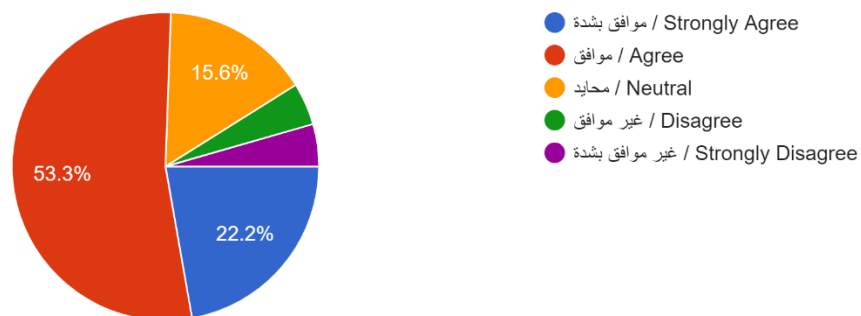


Figure 52: Questionnaire Output-Budget & Economy-Poor project implementations

External-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Impact of weather conditions on work

45 responses

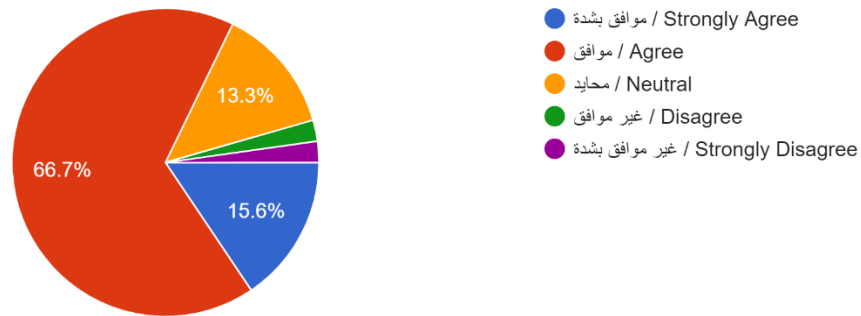


Figure 53: Questionnaire Output-Budget & Economy-Impact of weather conditions

External-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Impact of formation's stability on work

45 responses

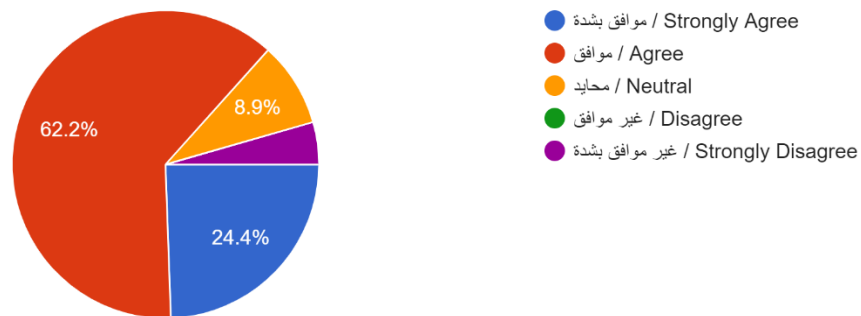


Figure 54: Questionnaire Output-Budget & Economy-Impact of formation's stability

External-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Impact of sea's condition on work

45 responses

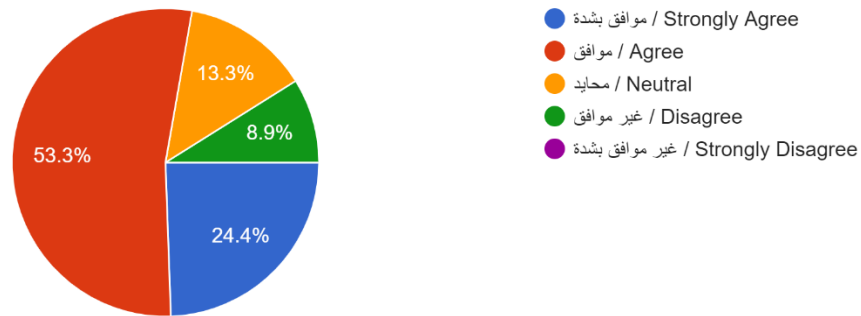


Figure 55: Questionnaire Output-Budget & Economy-Impact of sea's condition

External-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Impact of onshore/offshore' s location on work

45 responses

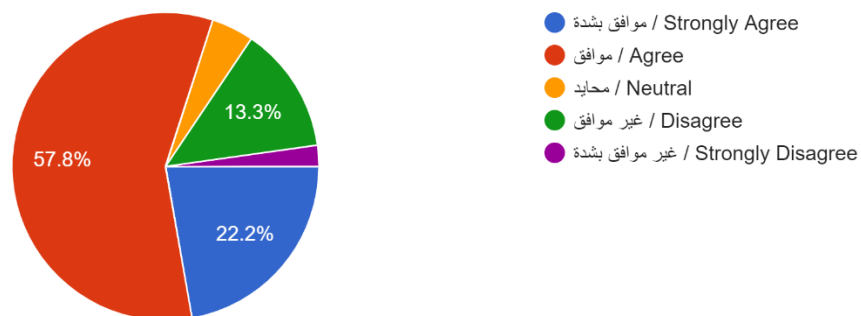


Figure 56: Questionnaire Output-Budget & Economy-Impact of On/Offshore location

Owner-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Deficient documentation and incomplete scope definition

45 responses

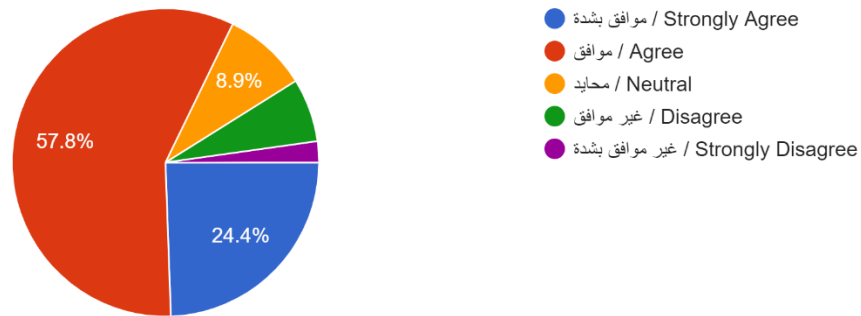


Figure 57: Questionnaire Output-Budget & Economy-Impact of incompletet scope definistions

Owner-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Changing of design and scope by client during construction

45 responses

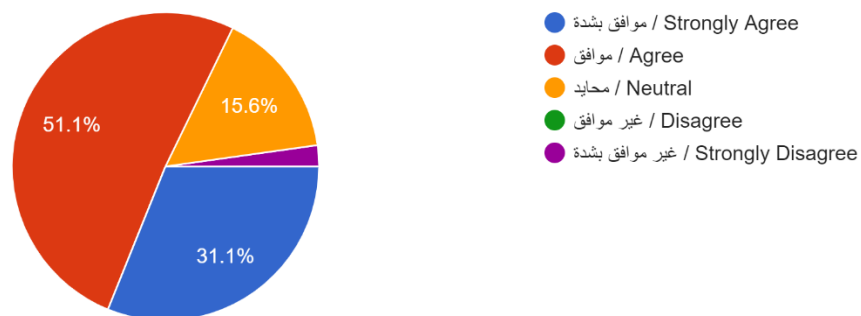


Figure 58: Questionnaire Output-Budget & Economy-Impact of changing of design and scope during exectutions

Owner-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Long project approval procedures

45 responses

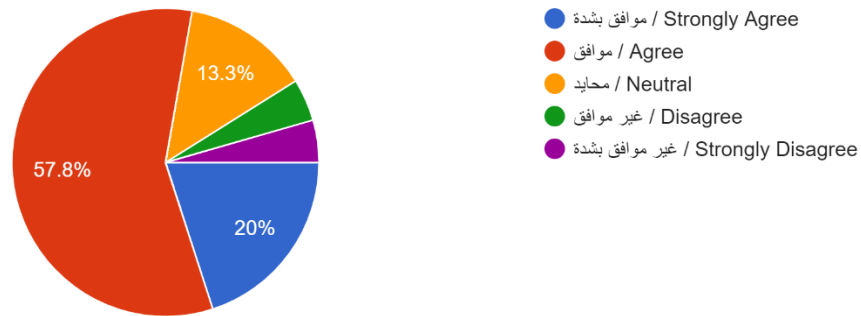


Figure 59: Questionnaire Output-Budget & Economy-Impact of long project's approval prodecuders

Owner-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Many stakeholders

45 responses

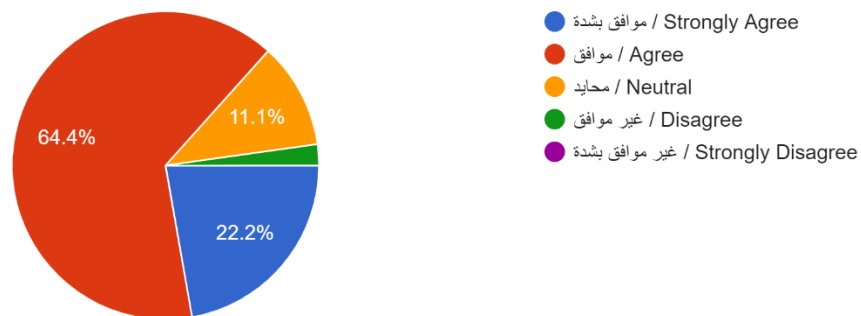


Figure 60: Questionnaire Output-Budget & Economy-Impact of Many stakeholders

Owner-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Poor definition of subsurface data

45 responses

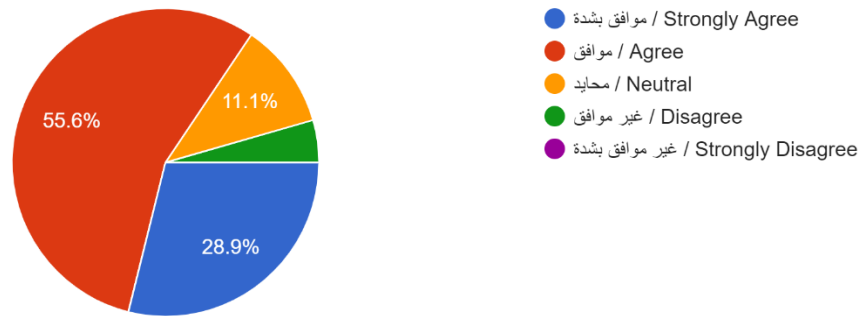


Figure 61: Questionnaire Output-Budget & Economy-Impact of poor definition of subsurface data

Resources-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Labor's lack of skills and productivity

45 responses

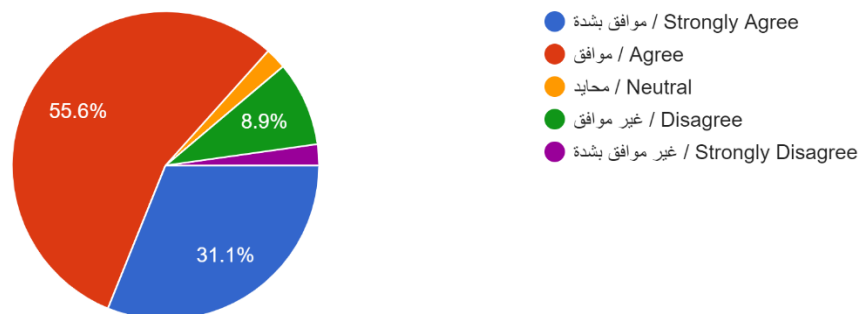


Figure 62: Questionnaire Output-Budget & Economy-Impact of lack's of labor

Resources-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Lack of equipment

45 responses

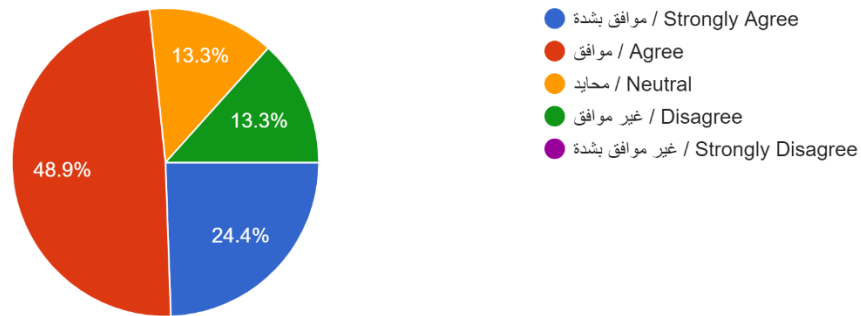


Figure 63: Questionnaire Output-Budget & Economy-Impact of Lack of equipments

Resources-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Manpower shortage

45 responses

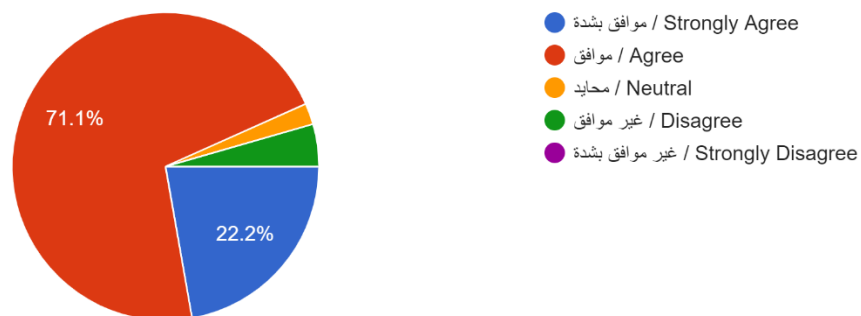


Figure 64: Questionnaire Output-Budget & Economy-Impact of Manpower shortage

Resources-related causes: Project Budget and Economy in oil and gas construction projects can be affected due to: Material procurement issues

45 responses

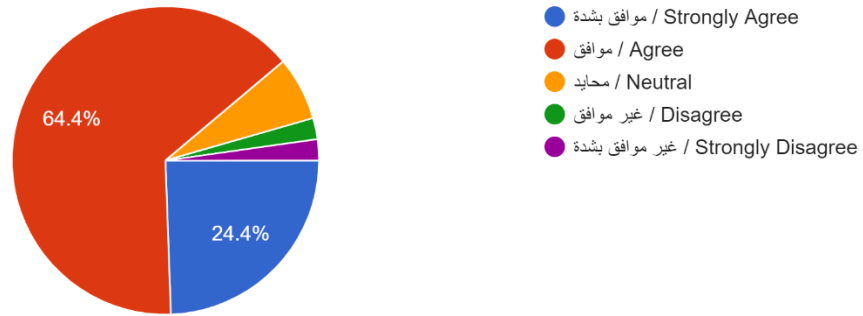


Figure 65: Questionnaire Output-Budget & Economy-Impact of Material procurments issues

Cost-Consciousness of Operations (Dependent Variable # Three)

All Parties-related causes: Cost-Consciousness in oil and gas construction projects can be affected by the following: Incompetent project team

45 responses

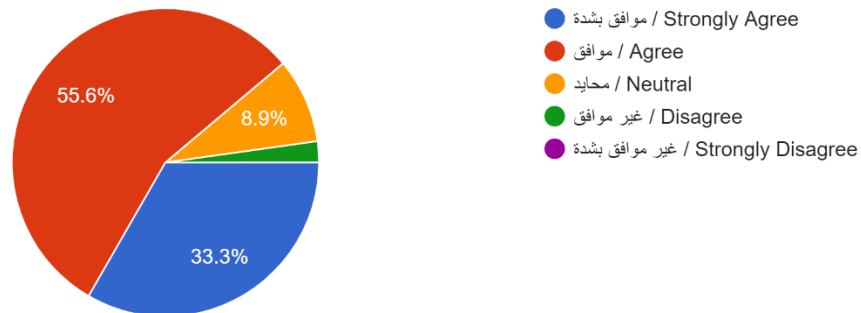


Figure 66: Questionnaire Output-Cost Consciousness-Impact of Incompetent project team

All Parties-related causes: Cost-Consciousness in oil and gas construction projects can be affected by the following: Personality clash between two...members/service companies from different parties

45 responses

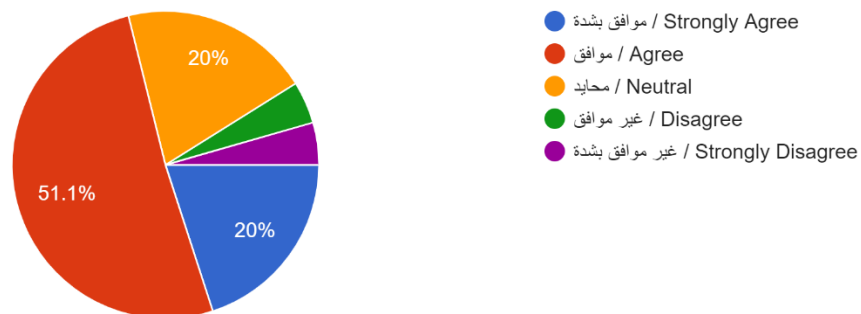


Figure 67: Questionnaire Output-Cost Consciousness-Impact of personality clash between team members

All Parties-related causes: Cost-Consciousness in oil and gas construction projects can be affected by the following: Poor planning and scheduling of the project.

45 responses

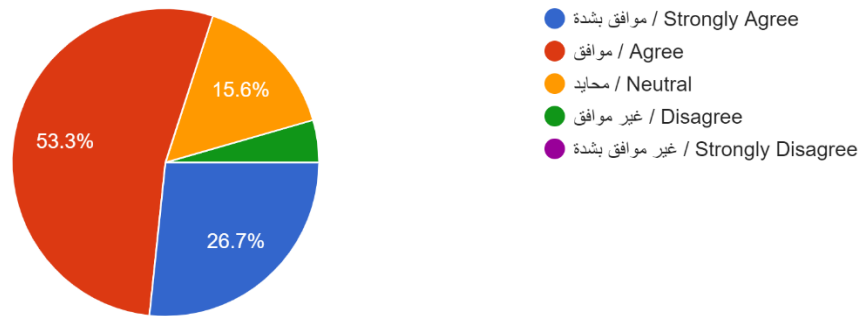


Figure 68: Questionnaire Output-Cost Consciousness-Impact of poor planning and scheduling

Consultant/designer-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Design errors

45 responses

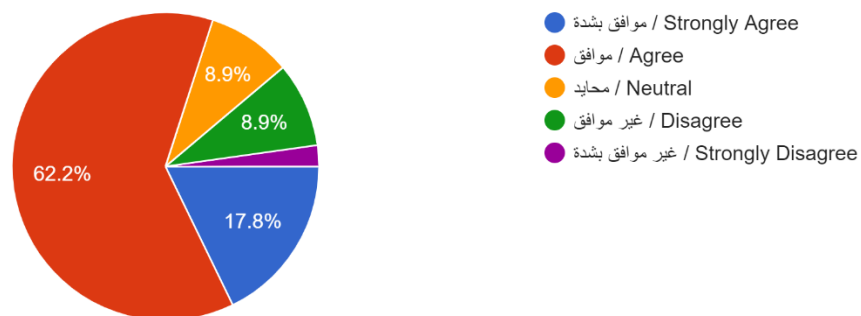


Figure 69: Questionnaire Output-Cost Consciousness-Impact of design error

Consultant/designer-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Inadequate cost estimating approach / inaccurate material estimation

45 responses

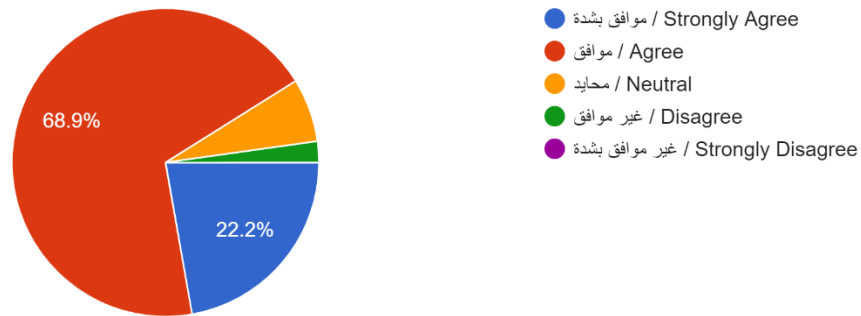


Figure 70: Questionnaire Output-Cost Consciousness-Impact of Inadequate cost estimation

Consultant/designer-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Inadequate quality control/assurance

45 responses

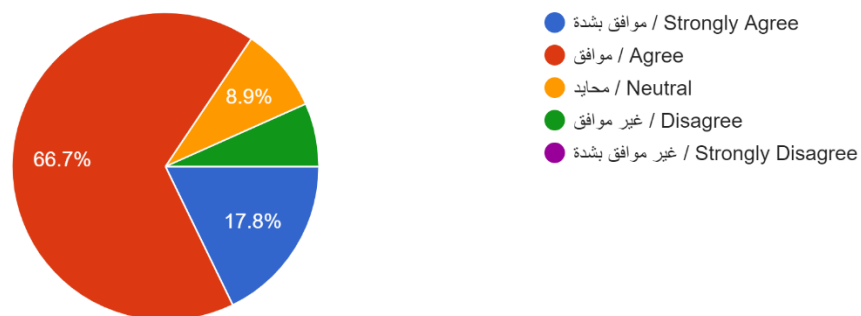


Figure 71: Questionnaire Output-Cost Consciousness-Impact of Inadequate QA/QC

Consultant/designer-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Inadequate management of contractor's schedule by consultant

45 responses

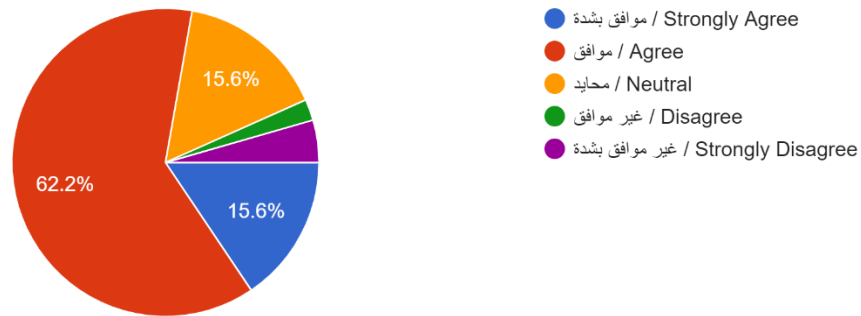


Figure 72: Questionnaire Output-Cost Consciousness-Impact of Inadequate managments and scheduling

Consultant/designer-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Unforeseen conditions and structural modifications

45 responses

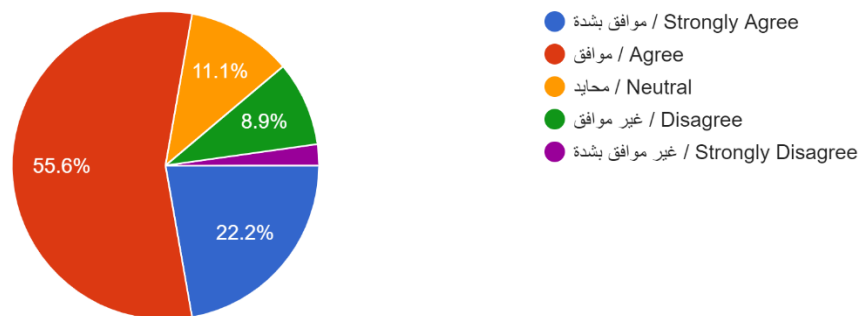


Figure 73: Questionnaire Output-Cost Consciousness-Impact unforeseen conditions

Consultant/designer-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Weak and insufficient technical studies

45 responses

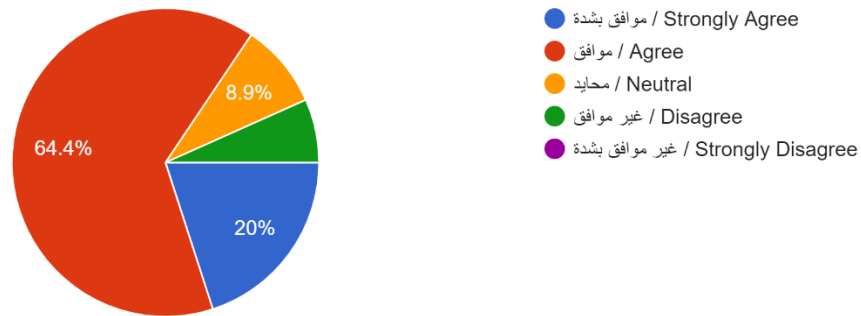


Figure 74: Questionnaire Output-Cost Consciousness-Impact of weak technical studies

Contract-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Poor communication among the parties

45 responses

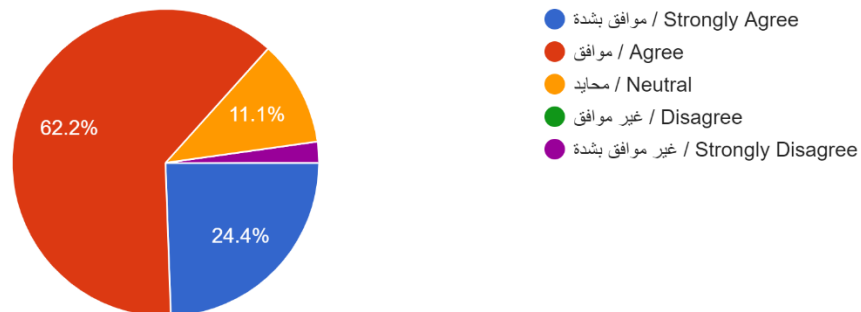


Figure 75: Questionnaire Output-Cost Consciousness-Impact of poor communications

Contract-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Discrepancies in contract documents

45 responses

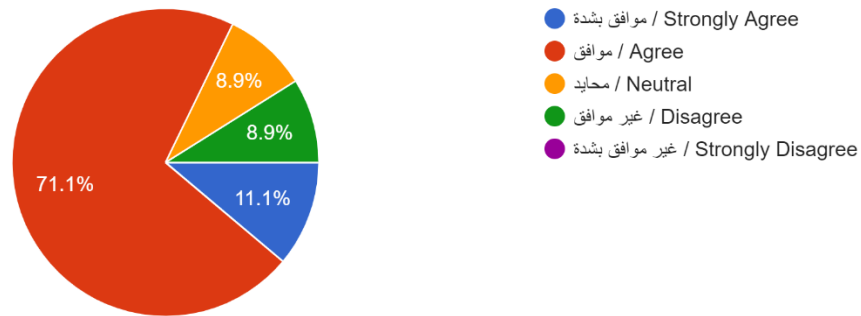


Figure 76: Questionnaire Output-Cost Consciousness-Impact of discrepancies in the contract

Contract-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Poorly defined payment milestones

45 responses

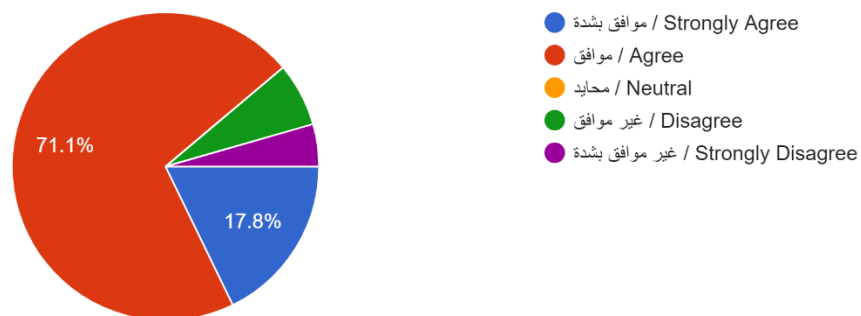


Figure 77: Questionnaire Output-Cost Consciousness-Impact of poorly defined payment

Contract-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Lack of communication with suppliers in the engineering and procurement phases

45 responses

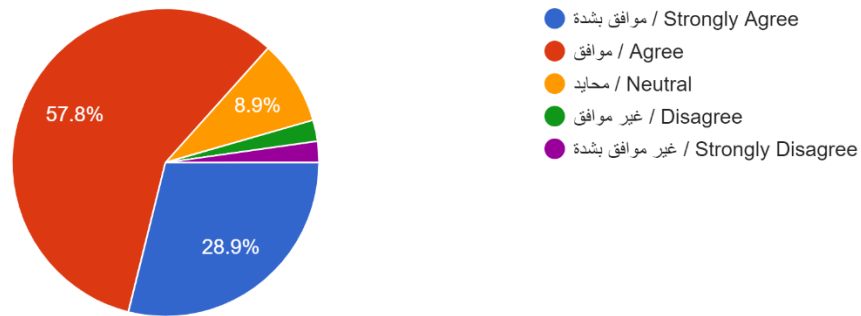


Figure 78: Questionnaire Output-Cost Consciousness-Impact of lack of communication with suppliers

Contract-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Poor project implementation strategies

45 responses

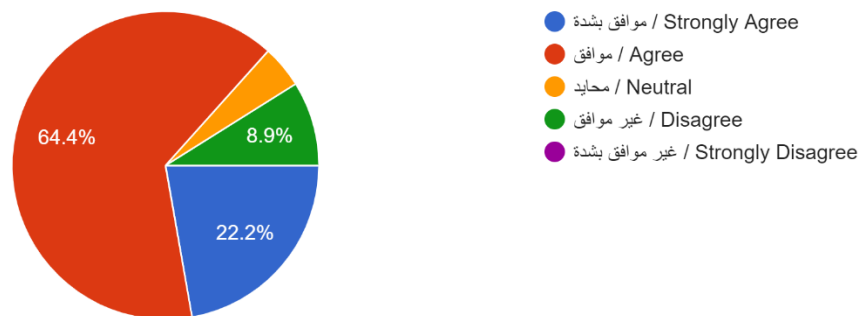


Figure 79: Questionnaire Output-Cost Consciousness-Impact of poor project implementation

External-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Impact of weather conditions on work

45 responses

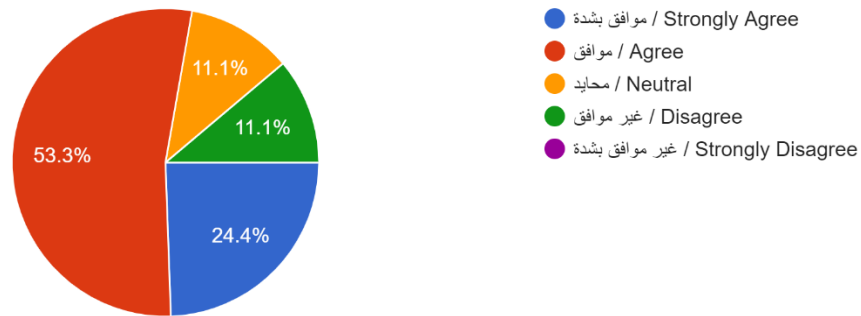


Figure 80: Questionnaire Output-Cost Consciousness-Impact of weather conditions

External-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Impact of formation's stability on work

45 responses

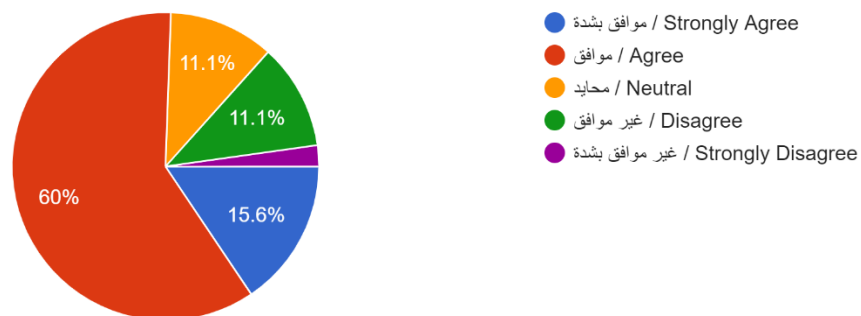


Figure 81: Questionnaire Output-Cost Consciousness-Impact of formation stability

External-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Impact of sea's condition on work

45 responses

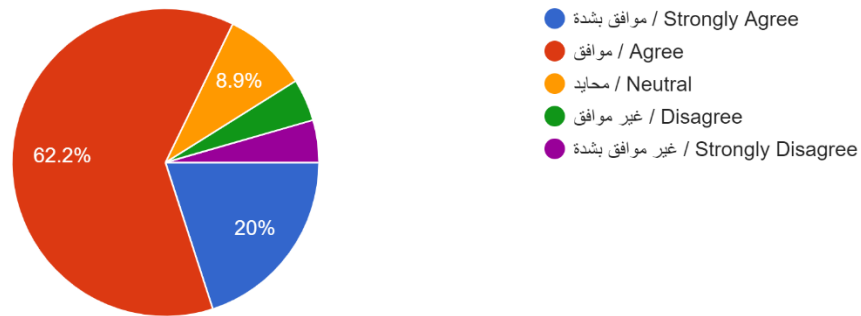


Figure 82: Questionnaire Output-Cost Consciousness-Impact of sea condition

External-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Impact of onshore/offshore's location on work

45 responses

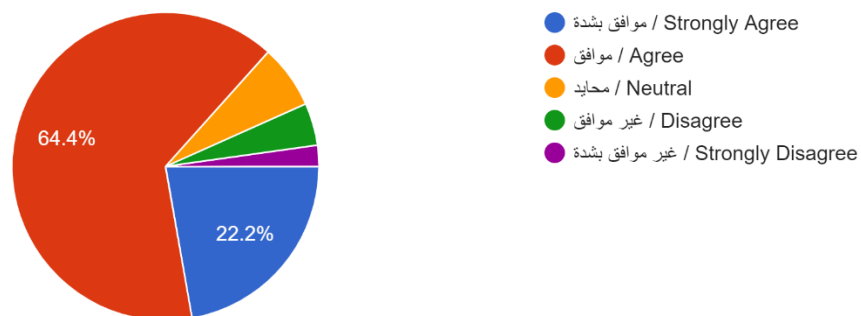


Figure 83: Questionnaire Output-Cost Consciousness-Impact of On/Offshore location

Owner-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Deficient documentation and incomplete scope definition

45 responses

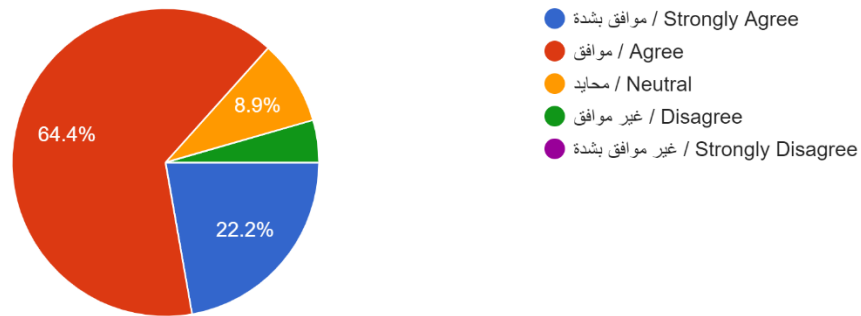


Figure 84: Questionnaire Output-Cost Consciousness-Impact of incomplete scope definition

Owner-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Changing of design and scope by client during construction

45 responses

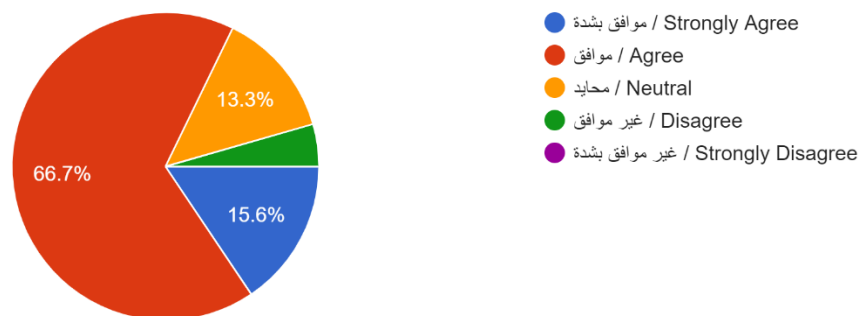


Figure 85: Questionnaire Output-Cost Consciousness-Impact of changing design and scope during execution

Owner-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Long project approval procedures

45 responses

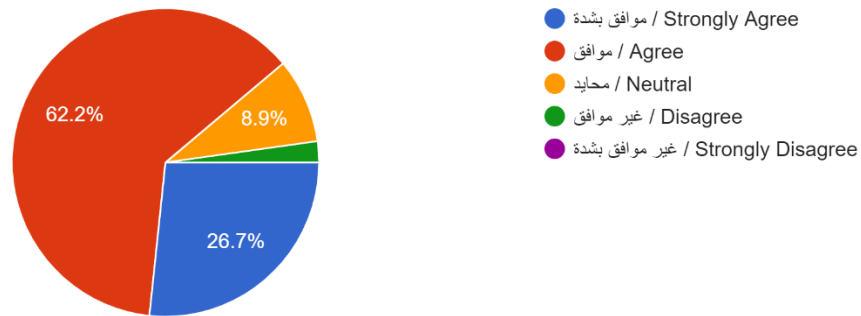


Figure 86: Questionnaire Output-Cost Consciousness-Impact of long project approvals

Owner-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Many stakeholders

45 responses

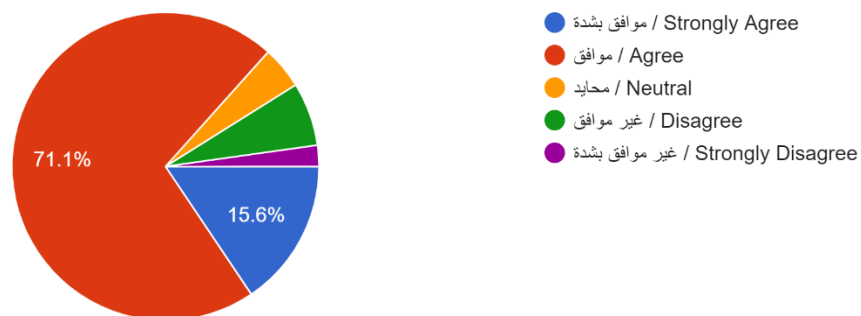


Figure 87: Questionnaire Output-Cost Consciousness-Impact of too many stakeholders

Owner-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Poor definition of subsurface data

45 responses

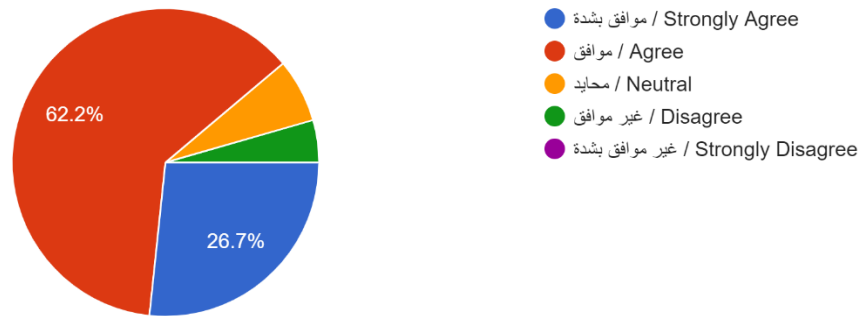


Figure 88: Questionnaire Output-Cost Consciousness-Impact of poor definition of subsurface data

Resources-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Labor's lack of skills and productivity

45 responses

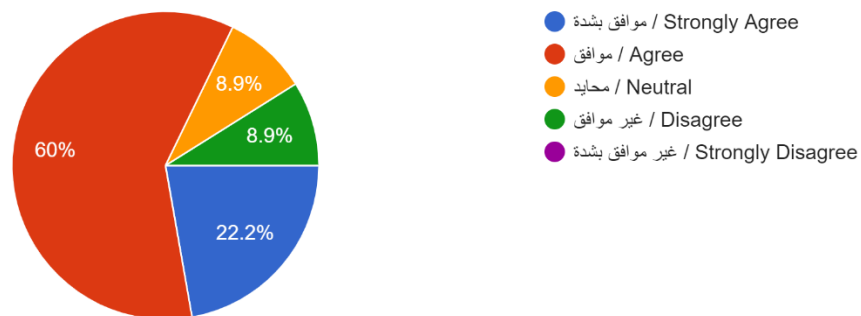


Figure 89: Questionnaire Output-Cost Consciousness-Impact of Labor's lack of skills and productivity

Resources-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Lack of equipment

45 responses

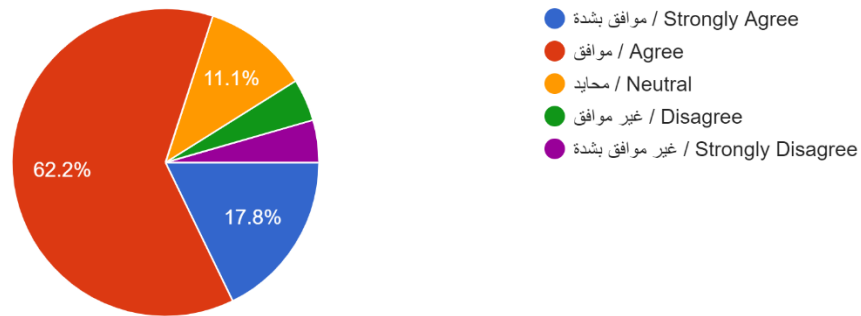


Figure 90: Questionnaire Output-Cost Consciousness-Impact of lack of equipments

Resources-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Manpower shortage

45 responses

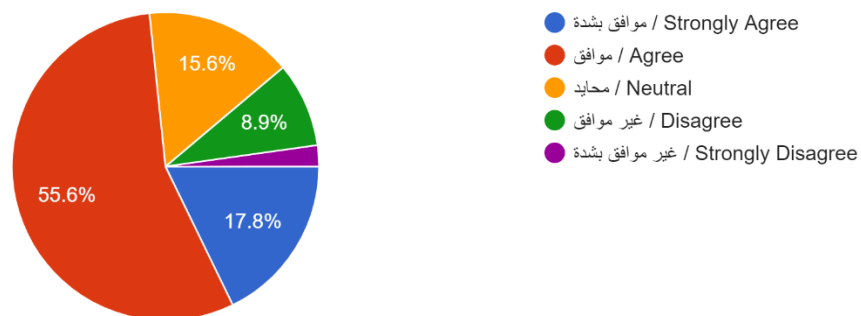


Figure 91: Questionnaire Output-Cost Consciousness-Impact of manpower shortage

Resources-related causes: Cost-Consciousness in oil and gas construction projects can be affected due to: Material procurement issues

45 responses

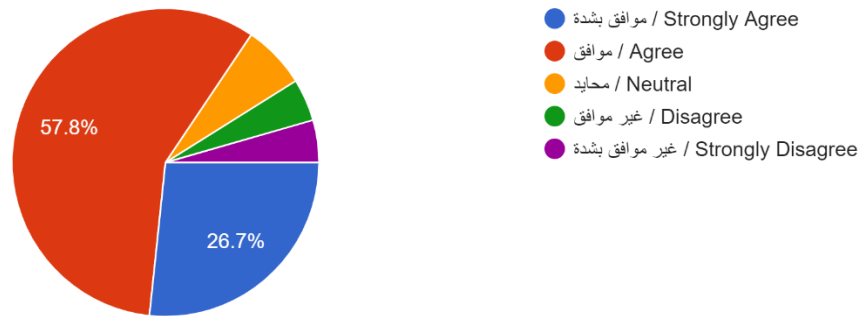


Figure 92: Questionnaire Output-Cost Consciousness-Impact of procurment issues

4.3. Validity & reliability tests for the questionnaires

To ensure the measures used in the research are valid and reliable, we tested the internal consistency of the questionnaires used to measure the research variables. We also assessed the convergent validity by measuring the Average Variance Extracted (AVE). Additionally, we measured the reliability of the research measures using Cronbach's alpha value through structural equation modeling (SEM) in the statistical analysis program SPSS version 28. Further details and tables elaborating on these procedures are provided in the following sections.

4.3.1 Validity of the measures used in the research

The internal consistency validity of the scales used to measure the research variables was tested, in

addition to measuring the convergent validity by measuring the average variance extracted.

Internal consistency validity: It means the extent to which each statement of the questionnaire is

consistent with the variable to which it belongs. Therefore, the researcher measured the internal consistency of the questionnaires by calculating the correlation coefficients between the score of each statement and the total score of the variable to which it belongs. According to Kaiser (1974) research, a correlation coefficient of less than 0.5 is removed from the questionnaire.

Convergent Validity: The average variance between statements that measure the same scale is measured by calculating the average variance extracted (AVE), whose value must be greater than 0.5 according to Hair et al (2006).

The following tables show the statistical results for (correlation coefficients, standard deviation, calculated T value, and P value between the score of each statement and the total score of the variable to measure the validity of the internal consistency of the questionnaires. Also, calculating the value of the average variance extracted (AVE) to measure the convergent validity of the questionnaires through the equation model. Structural SPSS version 28, as follows:

Variable		Statements Description	KMO	Factor loadings	Standard deviation	P Values	Mean	Average variance extracted	
First variable	First dimension	All Parties-related causes Efficiency of Operations	0.642	0.799	0.815	0.00	4.13	4.01	4.02
				0.726	0.951	0.00	3.78		
				0.8	0.694	0.00	4.13		
	Second dimension	Consultant/designer-related causes: Efficiency of Operations		0.827	0.944	0.00	3.87		
				0.577	0.839	0.00	4.02		
				0.473	0.821	0.00	3.91		
				0.485	0.673	0.00	4.16		
				0.548	0.767	0.00	3.96		
				0.61	0.859	0.00	4.11		
				0.776	1.079	0.00	3.80	3.98	
	Third dimension	Contract-related causes: Efficiency of Operations		0.59	0.793	0.00	4.09		
				0.62	0.999	0.00	4.04		
				0.548	0.928	0.00	4.04		
				0.799	0.9	0.00	3.91		
	Fourth dimension	External-related causes: Efficiency of Operations		0.828	0.878	0.00	4.04	4.05	
				0.71	0.783	0.00	3.98		
				0.61	0.726	0.00	4.20		
				0.697	0.878	0.00	3.96		
	Fifth dimension	Owner-related causes: Efficiency of Operations		0.586	0.812	0.00	3.98	4.03	
				0.779	0.959	0.00	3.89		
				0.722	0.815	0.00	4.20		
				0.719	0.737	0.00	4.04		
				0.656	0.812	0.00	4.02		
	Sixth dimension	Resources-related causes: Efficiency of Operations		0.689	0.726	0.00	4.13	4.06	
0.532			0.905	0.00	4.00				
0.621			0.783	0.00	4.02				
0.759			0.837	0.00	4.07				
0.768			0.78	0.00	4.07				
0.808			0.927	0.00	3.78				
0.842	0.965	0.00	3.98						

Table 9: Validity of the measures for Variable # One

Variable		Statements Description	KMO	Factor loadings	Standard deviation	p Values	Mean	Average variance extracted	
Second variable	First dimension	All Parties-related causes Project Budget and Economy	0.608	0.874	0.929	0.00	4.00	3.83	3.93
				0.663	1.1	0.00	3.71		
				0.584	0.997	0.00	3.78		
	Second dimension	Consultant/designer-related causes: Project Budget and Economy		0.601	1.214	0.00	3.73		
				0.52	0.925	0.00	3.91		
				0.772	0.991	0.00	3.87		
				0.644	1.043	0.00	3.84		
				0.752	1.062	0.00	3.91		
				0.531	1.021	0.00	4.04		
				0.612	0.67	0.00	4.22	3.94	
	Third dimension	Contract-related causes: Project Budget and Economy		0.626	0.812	0.00	4.02		
				0.803	1.014	0.00	3.80		
				0.731	0.944	0.00	3.80		
				0.64	0.976	0.00	3.84		
	Fourth dimension	External-related causes: Project Budget and Economy		0.828	0.763	0.00	3.91	3.93	
				0.8	0.866	0.00	4.02		
				0.59	0.863	0.00	3.93		
				0.592	0.999	0.00	3.84	4.01	
	Fifth dimension	Owner-related causes: Project Budget and Economy		0.828	0.903	0.00	3.96		
				0.567	0.821	0.00	4.09		
				0.811	0.952	0.00	3.84		
				0.729	0.654	0.00	4.07		
				0.562	0.763	0.00	4.09	4.02	
	Sixth dimension	Resources-related causes: Project Budget and Economy		0.84	0.952	0.00	4.04		
				0.862	0.952	0.00	3.84		
				0.822	0.647	0.00	4.11		
				0.768	0.78	0.00	4.07		

Table 10: Validity of the measures for Variable # Two

Variable		Statements Description	KMO	Factor loadings	Standard deviation	p Values	Mean	Average variance extracted	
Third variable	First dimension	All Parties-related causes Cost-Consciousness	0.554	0.809	0.694	0.00	4.20	4.00	3.95
				0.576	0.974	0.00	3.78		
				0.887	0.783	0.00	4.02		
	Second dimension	Consultant/designer-related causes: Cost-Consciousness		0.615	0.903	0.00	3.84	3.93	
				0.573	0.611	0.00	4.11		
				0.828	0.737	0.00	3.96		
				0.589	0.886	0.00	3.82		
				0.904	0.944	0.00	3.87		
				0.509	0.753	0.00	3.98		
	Third dimension	Contract-related causes: Cost-Consciousness		0.811	0.751	0.00	4.07	3.98	
				0.605	0.737	0.00	3.84		
				0.582	0.925	0.00	3.91		
				0.787	0.821	0.00	4.09		
				0.46	0.798	0.00	4.00		
	Fourth dimension	External-related causes: Cost-Consciousness		0.77	0.9	0.00	3.91	3.89	
				0.736	0.933	0.00	3.76		
				0.543	0.935	0.00	3.89		
				0.578	0.826	0.00	4.00		
	Fifth dimension	Owner-related causes: Cost-Consciousness		0.708	0.706	0.00	4.04	4.02	
				0.551	0.688	0.00	3.93		
				0.851	0.661	0.00	4.13		
				0.812	0.821	0.00	3.91		
				0.59	0.714	0.00	4.11		
	Sixth dimension	Resources-related causes: Cost-Consciousness		0.686	0.824	0.00	3.96	3.89	
				0.477	0.928	0.00	3.84		
				0.808	0.927	0.00	3.78		
				0.842	0.965	0.00	3.98		

Table 11: Validity of the measures for Variable # Three

It is clear from the table above:

The scale of applying the first variable: All correlation coefficients for all statements are strongly correlated with their dependent variable **(the variable and its dimensions)**, at values greater than 0.7. In addition, the values of all correlation coefficients for the statements are statistically significant at a significance level less than 0.001. Accordingly, the internal consistency validity of the scale has been achieved. Also, from the results above related to the value of the average variance extracted AVE, it is clear that its value for the variable of applying **(the variable and its dimensions)** is $0.642 > 0.5$. Accordingly, the convergent validity of the questionnaire has been achieved.

The scale of applying the second variable: All correlation coefficients for the statements that measure **(the variable and its dimensions)** have a value greater than 0.7. In addition, the values of all correlation coefficients for the statements are statistically significant at a significance level less than 0.0001. Accordingly, the internal consistency validity of the scale has been achieved in its three dimensions. Also, from the results above related to the value of the average variance extracted AVE for the variable of **(the variable and its dimensions)** as a whole, which is equal to 0.608. Accordingly, the convergent validity of the questionnaire has been achieved.

The scale of applying the third variable: All correlation coefficients for the statements that measure **(the variable and its dimensions)** have a value greater than 0.7. In addition, the values of all correlation coefficients for the statements are statistically significant at a significance level less than 0.0001. Accordingly, the internal consistency validity of the scale has been achieved in its three dimensions. Also, from the results above related to the value of the average variance extracted AVE for the variable of **(the variable and its dimensions)** as a whole, which is equal to 0.554. Accordingly, the convergent validity of the questionnaire has been achieved.

4.3.2 Reliability of the research tool

The stability of the questionnaire refers to the stability of the questionnaire results and their non-change significantly if they were redistributed to the sample individuals several times during specific time periods. To measure the stability of the questionnaires used to measure the research variables, Cronbach's alpha values were calculated using SPSS version 28. According to (2010) Hair et al, the value must be greater than 0.7 for the scale to be stable.

Variable		Statements Description	Number of Statements	Cronbach's alpha		
First variable	First dimension	All Parties-related causes Efficiency of Operations	3	0.935 0.934 0.935	0.935	0.934 > 0.7
	Second dimension	Consultant/designer-related causes: Efficiency of Operations	6	0.932 0.934 0.934 0.934 0.934 0.934	0.934	
	Third dimension	Contract-related causes: Efficiency of Operations	5	0.935 0.935 0.934 0.934 0.934	0.934	
	Fourth dimension	External-related causes: Efficiency of Operations	4	0.934 0.934 0.937 0.934	0.935	
	Fifth dimension	Owner-related causes: Efficiency of Operations	5	0.933 0.934 0.937 0.935 0.935	0.935	
	Sixth dimension	Resources-related causes: Efficiency of Operations	4	0.935 0.934 0.934 0.936	0.935	

Table 12: Reliability analysis for Variable # One

(First Variable and the dimensions):

The statistical results showed that the values of Cronbach's alpha are mentioned on the above table, which indicates that all values are greater than 0.7. According to Hair et al (2010), the stability of the scale has been achieved.

Variable		Statements Description	Number of Statements	Cronbach's alpha		
Second variable	First dimension	All Parties-related causes Project Budget and Economy	3	0.925	0.923	0.923>0.7
				0.921		
				0.922		
	Second dimension	Consultant/designer-related causes: Project Budget and Economy	6	0.919	0.922	
				0.924		
				0.923		
				0.921		
				0.921		
				0.924		
				0.924		
	Third dimension	Contract-related causes: Project Budget and Economy	5	0.924	0.923	
				0.924		
				0.923		
				0.921		
				0.923		
	Fourth dimension	External-related causes: Project Budget and Economy	4	0.924	0.923	
				0.923		
				0.922		
				0.921		
	Fifth dimension	Owner-related causes: Project Budget and Economy	5	0.922	0.923	
				0.924		
				0.923		
				0.923		
				0.922		
	Sixth dimension	Resources-related causes: Project Budget and Economy	4	0.923	0.925	
				0.924		
0.925						
0.926						

Table 13: Reliability analysis for Variable # Two

(Second Variable and the dimensions):

The statistical results showed that the values of Cronbach's alpha are as per the above table, which indicates that all values are greater than 0.7. According to Hair et al (2010), the stability of the scale has been achieved.

Variable		Statements Description	Number of Statements	Cronbach's alpha		
Third variable	First dimension	All Parties-related causes Cost-Consciousness	3	0.895	0.895	0.896>0.7
				0.892		
				0.899		
	Second dimension	Consultant/designer-related causes: Cost-Consciousness	6	0.895	0.896	
				0.896		
				0.895		
				0.894		
				0.899		
				0.897		
				Third dimension		
	0.896					
	0.895					
	0.898					
	0.897					
	Fourth dimension	External-related causes: Cost-Consciousness	4	0.895	0.896	
				0.897		
				0.895		
				0.897		
	Fifth dimension	Owner-related causes: Cost-Consciousness	5	0.897	0.897	
				0.899		
				0.895		
				0.895		
				0.899		
	Sixth dimension	Resources-related causes: Cost-Consciousness	4	0.899	0.896	
				0.895		
				0.894		
				0.895		

Table 14: Reliability analysis for Variable # Three

(Third Variable and the dimensions): The statistical results showed that the values of Cronbach's alpha are per the above, which indicates that all values are greater than 0.7. According to Hair et al (2010), the stability of the scale has been achieved.

4.4. Descriptive Statistics for Research Variables

The following table shows the descriptive analysis of the research variables represented by the arithmetic means based on the five-point Likert scale and the standard deviations of the variables according to the table related to the importance of the arithmetic mean.

Variable		Number of Statements	Arithmetic Mean		Std. Deviation		Relative Index			Importance Level		
First variable	First dimension	3	4.13	4.013	0.815	0.820	0.83	0.83	0.80	High	High	High
			3.78		0.951		0.76			High-Medium		
			4.13		0.694		0.83			High		
	Second dimension	6	3.87	4.005	0.944	0.817	0.77	0.77		High-Medium	High	
			4.02		0.839		0.80			High		
			3.91		0.821		0.78			High-Medium		
			4.16		0.673		0.83			High		
			3.96		0.767		0.79			High-Medium		
			4.11		0.859		0.82			High		
	Third dimension	5	3.8	3.976	1.079	0.940	0.76	0.76		High-Medium	High	
			4.09		0.793		0.82			High		
			4.04		0.999		0.81			High		
			4.04		0.928		0.81			High		
			3.91		0.9		0.78			High-Medium		
	Fourth dimension	4	4.04	4.045	0.878	0.816	0.81	0.81		High	High	
			3.98		0.783		0.80			High		
			4.2		0.726		0.84			High		
			3.96		0.878		0.79			High-Medium		
	Fifth dimension	5	3.98	4.026	0.812	0.827	0.80	0.80		High	High	
			3.89		0.959		0.78			High-Medium		
			4.2		0.815		0.84			High		
			4.04		0.737		0.81			High		
			4.02		0.812		0.80			High		
	Sixth dimension	4	4.13	4.055	0.726	0.813	0.83	0.83		High	High	
			4		0.905		0.80			High		
			4.02		0.783		0.80			High		
			4.07		0.837		0.81			High		

Table 15: Descriptive analysis for variable # One

Variable		Number of Statements	Arithmetic Mean		Std. Deviation		Relative Index			Importance Level		
Second variable	First dimension	3	4	3.830	0.929	1.009	0.80	0.80	0.80	High	High-	High
			3.71		1.1		0.74			High-Medium		
			3.78		0.997		0.76			High-Medium		
	Second dimension	6	3.73	3.883	1.214	1.043	0.75	0.75		High-Medium	High-Medium	
			3.91		0.925		0.78			High-Medium		
			3.87		0.991		0.77			High-Medium		
			3.84		1.043		0.77			High-Medium		
			3.91		1.062		0.78			High-Medium		
			4.04		1.021		0.81			High		
			Third dimension		5		4.22			3.936		
	4.02	0.812		0.80		High						
	3.8	1.014		0.76		High-Medium						
	3.8	0.944		0.76		High-Medium						
	3.84	0.976		0.77		High-Medium						
	Fourth dimension	4	3.91	3.925	0.763	0.873	0.78	0.78		High-Medium	High-	
			4.02		0.866		0.80			High		
			3.93		0.863		0.79			High-Medium		
			3.84		0.999		0.77			High-Medium		
	Fifth dimension	5	3.96	4.010	0.903	0.819	0.79	0.79		High-Medium	High	
			4.09		0.821		0.82			High		
			3.84		0.952		0.77			High-Medium		
			4.07		0.654		0.81			High		
			4.09		0.763		0.82			High		
	Sixth dimension	4	4.04	4.015	0.952	0.833	0.81	0.81		High	High	
			3.84		0.952		0.77			High-Medium		
			4.11		0.647		0.82			High		
			4.07		0.78		0.81			High		

Table 16: Descriptive analysis for variable # Two

Variable		Number of Statements	Arithmetic Mean		Std. Deviation		Relative Index			Importance Level		
Third variable	First dimension	3	4.2	4.000	0.694	0.817	0.84	0.84	0.80	High	High	High
			3.78		0.974		0.76			High-Medium		
			4.02		0.783		0.80			High		
	Second dimension	6	3.84	3.930	0.903	0.806	0.77	0.77		High-Medium	High-Medium	
			4.11		0.611		0.82			High		
			3.96		0.737		0.79			High-Medium		
			3.82		0.886		0.76			High-Medium		
			3.87		0.944		0.77			High-Medium		
			3.98		0.753		0.80			High		
			4.07		0.751		0.81			High		
	3.84	0.737	0.77	High-Medium								
	3.91	0.925	0.78	High-Medium								
	4.09	0.821	0.82	High								
	4	0.798	0.80	High								
	Fourth dimension	4	3.91	3.890	0.9	0.899	0.78	0.78		High-Medium	High-Medium	
			3.76		0.933		0.75			High-Medium		
			3.89		0.935		0.78			High-Medium		
			4		0.826		0.80			High		
	Fifth dimension	5	4.04	4.024	0.706	0.718	0.81	0.81		High	High	
			3.93		0.688		0.79					
			4.13		0.661		0.83			High		
			3.91		0.821		0.78					
			4.11		0.714		0.82			High		
	Sixth dimension	4	3.96	3.890	0.824	0.911	0.79	0.79		High-Medium	High-Medium	
			3.84		0.928		0.77			High-Medium		
			3.78		0.927		0.76			High-Medium		
			3.98		0.965		0.80			High		

Table 17: Descriptive analysis for variable # Three

4.5. Testing Hypotheses & Findings Discussion

		Correlations		
		All Parties-related causes: Efficiency (Dep. V1)	All Parties-related causes: Efficiency (Dep. V1)	All Parties-related causes: Efficiency (Dep. V1)
All Parties-related causes: Efficiency (Dep. V1)	Pearson Correlation	1	.509**	.731**
	Sig. (2-tailed)		<.001	<.001
	N	45	45	45
All Parties-related causes: Efficiency (Dep. V1)	Pearson Correlation	.509**	1	.494**
	Sig. (2-tailed)	<.001		<.001
	N	45	45	45
All Parties-related causes: Efficiency (Dep. V1)	Pearson Correlation	.731**	.494**	1
	Sig. (2-tailed)	<.001	<.001	
	N	45	45	45

** . Correlation is significant at the 0.01 level (2-tailed).

Table 18: Correlations Analysis for variable # One

		Correlations					
		Consultant/designer-related causes: Efficiency (Dep. V1)	Consultant/designer-related causes: Efficiency (Dep. V1)	Consultant/designer-related causes: Efficiency (Dep. V1)	Consultant/designer-related causes: Efficiency (Dep. V1)	Consultant/designer-related causes: Efficiency (Dep. V1)	Consultant/designer-related causes: Efficiency (Dep. V1)
Consultant/designer-related causes: Efficiency (Dep. V1)	Pearson Correlation	1	.406**	.630**	.642**	.556**	.383**
	Sig. (2-tailed)		.006	<.001	<.001	<.001	.009
	N	45	45	45	45	45	45
Consultant/designer-related causes: Efficiency (Dep. V1)	Pearson Correlation	.406**	1	.234	.557**	.425**	.627**
	Sig. (2-tailed)	.006		.122	<.001	.004	<.001
	N	45	45	45	45	45	45
Consultant/designer-related causes: Efficiency (Dep. V1)	Pearson Correlation	.630**	.234	1	.478**	.390**	.272
	Sig. (2-tailed)	<.001	.122		<.001	.008	.070
	N	45	45	45	45	45	45
Consultant/designer-related causes: Efficiency (Dep. V1)	Pearson Correlation	.642**	.557**	.478**	1	.278	.323*
	Sig. (2-tailed)	<.001	<.001	<.001		.065	.030
	N	45	45	45	45	45	45
Consultant/designer-related causes: Efficiency (Dep. V1)	Pearson Correlation	.556**	.425**	.390**	.278	1	.456**
	Sig. (2-tailed)	<.001	.004	.008	.065		.002
	N	45	45	45	45	45	45
Consultant/designer-related causes: Efficiency (Dep. V1)	Pearson Correlation	.383**	.627**	.272	.323*	.456**	1
	Sig. (2-tailed)	.009	<.001	.070	.030	.002	
	N	45	45	45	45	45	45

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 19: Cont. Correlations Analysis for variable # One

		Correlations				
		Contract-related causes: Efficiency (Dep. V1)	Contract-related causes: Efficiency (Dep. V1)	Contract-related causes: Efficiency (Dep. V1)	Contract-related causes: Efficiency (Dep. V1)	Contract-related causes: Efficiency (Dep. V1)
Contract-related causes: Efficiency (Dep. V1)	Pearson Correlation	1	.101	.515**	.440**	.590**
	Sig. (2-tailed)		.509	<.001	.002	<.001
	N	45	45	45	45	45
Contract-related causes: Efficiency (Dep. V1)	Pearson Correlation	.101	1	.311*	.334*	.298*
	Sig. (2-tailed)	.509		.038	.025	.047
	N	45	45	45	45	45
Contract-related causes: Efficiency (Dep. V1)	Pearson Correlation	.515**	.311*	1	.513**	.535**
	Sig. (2-tailed)	<.001	.038		<.001	<.001
	N	45	45	45	45	45
Contract-related causes: Efficiency (Dep. V1)	Pearson Correlation	.440**	.334*	.513**	1	.522**
	Sig. (2-tailed)	.002	.025	<.001		<.001
	N	45	45	45	45	45
Contract-related causes: Efficiency (Dep. V1)	Pearson Correlation	.590**	.298*	.535**	.522**	1
	Sig. (2-tailed)	<.001	.047	<.001	<.001	
	N	45	45	45	45	45

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 20: Cont. Correlations Analysis for variable # One

		Correlations			
		External-related causes: Efficiency (Dep. V1)	External-related causes: Efficiency (Dep. V1)	External-related causes: Efficiency (Dep. V1)	External-related causes: Efficiency (Dep. V1)
External-related causes: Efficiency (Dep. V1)	Pearson Correlation	1	.299 [*]	.200	.298 [*]
	Sig. (2-tailed)		.046	.189	.047
	N	45	45	45	45
External-related causes: Efficiency (Dep. V1)	Pearson Correlation	.299 [*]	1	.128	.362 [*]
	Sig. (2-tailed)	.046		.402	.014
	N	45	45	45	45
External-related causes: Efficiency (Dep. V1)	Pearson Correlation	.200	.128	1	.513 ^{**}
	Sig. (2-tailed)	.189	.402		<.001
	N	45	45	45	45
External-related causes: Efficiency (Dep. V1)	Pearson Correlation	.298 [*]	.362 [*]	.513 ^{**}	1
	Sig. (2-tailed)	.047	.014	<.001	
	N	45	45	45	45

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 21: Cont. Correlations Analysis for variable # One

		Correlations				
		Owner-related causes: Efficiency (Dep. V1)	Owner-related causes: Efficiency (Dep. V1)	Owner-related causes: Efficiency (Dep. V1)	Owner-related causes: Efficiency (Dep. V1)	Owner-related causes: Efficiency (Dep. V1)
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	1	.464**	.179	.230	.242
	Sig. (2-tailed)		.001	.240	.129	.109
	N	45	45	45	45	45
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	.464**	1	.029	.361*	.354*
	Sig. (2-tailed)	.001		.850	.015	.017
	N	45	45	45	45	45
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	.179	.029	1	.590**	.337*
	Sig. (2-tailed)	.240	.850		<.001	.024
	N	45	45	45	45	45
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	.230	.361*	.590**	1	.378*
	Sig. (2-tailed)	.129	.015	<.001		.010
	N	45	45	45	45	45
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	.242	.354*	.337*	.378*	1
	Sig. (2-tailed)	.109	.017	.024	.010	
	N	45	45	45	45	45

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 22: Cont. Correlations Analysis for variable # One

Correlations

		Resources-related causes: Efficiency (Dep. V1)	Resources-related causes: Efficiency (Dep. V1)	Resources-related causes: Efficiency (Dep. V1)	Resources-related causes: Efficiency (Dep. V1)
Resources-related causes: Efficiency (Dep. V1)	Pearson Correlation	1	.277	.274	.359 [*]
	Sig. (2-tailed)		.066	.068	.015
	N	45	45	45	45
Resources-related causes: Efficiency (Dep. V1)	Pearson Correlation	.277	1	.545 ^{**}	.270
	Sig. (2-tailed)	.066		<.001	.073
	N	45	45	45	45
Resources-related causes: Efficiency (Dep. V1)	Pearson Correlation	.274	.545 ^{**}	1	.275
	Sig. (2-tailed)	.068	<.001		.067
	N	45	45	45	45
Resources-related causes: Efficiency (Dep. V1)	Pearson Correlation	.359 [*]	.270	.275	1
	Sig. (2-tailed)	.015	.073	.067	
	N	45	45	45	45

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 23: Cont. Correlations Analysis for variable # One

Correlations

		All Parties-related causes: Project Budget (Dep. V2)	All Parties-related causes: Project Budget (Dep. V2)	All Parties-related causes: Project Budget (Dep. V2)
All Parties-related causes: Project Budget (Dep. V2)	Pearson Correlation	1	.578**	.588**
	Sig. (2-tailed)		<.001	<.001
	N	45	45	45
All Parties-related causes: Project Budget (Dep. V2)	Pearson Correlation	.578**	1	.624**
	Sig. (2-tailed)	<.001		<.001
	N	45	45	45
All Parties-related causes: Project Budget (Dep. V2)	Pearson Correlation	.588**	.624**	1
	Sig. (2-tailed)	<.001	<.001	
	N	45	45	45

** . Correlation is significant at the 0.01 level (2-tailed).

Table 24: Correlations Analysis for variable # Two

		Correlations					
		Consultant/designer-related causes: Project Budget (Dep. V2)	Consultant/designer-related causes: Project Budget (Dep. V2)	Consultant/designer-related causes: Project Budget (Dep. V2)	Consultant/designer-related causes: Project Budget (Dep. V2)	Consultant/designer-related causes: Project Budget (Dep. V2)	Consultant/designer-related causes: Project Budget (Dep. V2)
Consultant/designer-related causes: Project Budget (Dep. V2)	Pearson Correlation	1	.343*	.650**	.325*	.757**	.431**
	Sig. (2-tailed)		.021	<.001	.029	<.001	.003
	N	45	45	45	45	45	45
Consultant/designer-related causes: Project Budget (Dep. V2)	Pearson Correlation	.343*	1	.483**	.409**	.269	.004
	Sig. (2-tailed)	.021		<.001	.005	.074	.978
	N	45	45	45	45	45	45
Consultant/designer-related causes: Project Budget (Dep. V2)	Pearson Correlation	.650**	.483**	1	.419**	.744**	.365*
	Sig. (2-tailed)	<.001	<.001		.004	<.001	.014
	N	45	45	45	45	45	45
Consultant/designer-related causes: Project Budget (Dep. V2)	Pearson Correlation	.325*	.409**	.419**	1	.459**	.625**
	Sig. (2-tailed)	.029	.005	.004		.002	<.001
	N	45	45	45	45	45	45
Consultant/designer-related causes: Project Budget (Dep. V2)	Pearson Correlation	.757**	.269	.744**	.459**	1	.548**
	Sig. (2-tailed)	<.001	.074	<.001	.002		<.001
	N	45	45	45	45	45	45
Consultant/designer-related causes: Project Budget (Dep. V2)	Pearson Correlation	.431**	.004	.365*	.625**	.548**	1
	Sig. (2-tailed)	.003	.978	.014	<.001	<.001	
	N	45	45	45	45	45	45

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 25: Cont. Correlations Analysis for variable # Two

		Correlations				
		Contract-related causes: Project Budget (Dep. V2)	Contract-related causes: Project Budget (Dep. V2)	Contract-related causes: Project Budget (Dep. V2)	Contract-related causes: Project Budget (Dep. V2)	Contract-related causes: Project Budget (Dep. V2)
Contract-related causes: Project Budget (Dep. V2)	Pearson Correlation	1	.701**	.435**	.215	.262
	Sig. (2-tailed)		<.001	.003	.155	.082
	N	45	45	45	45	45
Contract-related causes: Project Budget (Dep. V2)	Pearson Correlation	.701**	1	.586**	.362*	.464**
	Sig. (2-tailed)	<.001		<.001	.015	.001
	N	45	45	45	45	45
Contract-related causes: Project Budget (Dep. V2)	Pearson Correlation	.435**	.586**	1	.432**	.427**
	Sig. (2-tailed)	.003	<.001		.003	.003
	N	45	45	45	45	45
Contract-related causes: Project Budget (Dep. V2)	Pearson Correlation	.215	.362*	.432**	1	.533**
	Sig. (2-tailed)	.155	.015	.003		<.001
	N	45	45	45	45	45
Contract-related causes: Project Budget (Dep. V2)	Pearson Correlation	.262	.464**	.427**	.533**	1
	Sig. (2-tailed)	.082	.001	.003	<.001	
	N	45	45	45	45	45

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 26: Cont. Correlations Analysis for variable # Two

Correlations

		External-related causes: Project Budget (Dep. V2)	External-related causes: Project Budget (Dep. V2)	External-related causes: Project Budget (Dep. V2)	External-related causes: Project Budget (Dep. V2)
External-related causes: Project Budget (Dep. V2)	Pearson Correlation	1	.588**	.163	.428**
	Sig. (2-tailed)		<.001	.284	.003
	N	45	45	45	45
External-related causes: Project Budget (Dep. V2)	Pearson Correlation	.588**	1	.367*	.608**
	Sig. (2-tailed)	<.001		.013	<.001
	N	45	45	45	45
External-related causes: Project Budget (Dep. V2)	Pearson Correlation	.163	.367*	1	.383**
	Sig. (2-tailed)	.284	.013		.009
	N	45	45	45	45
External-related causes: Project Budget (Dep. V2)	Pearson Correlation	.428**	.608**	.383**	1
	Sig. (2-tailed)	.003	<.001	.009	
	N	45	45	45	45

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 27: Cont. Correlations Analysis for variable # Two

		Correlations				
		Owner-related causes: Project Budget (Dep. V2)	Owner-related causes: Project Budget (Dep. V2)	Owner-related causes: Project Budget (Dep. V2)	Owner-related causes: Project Budget (Dep. V2)	Owner-related causes: Project Budget (Dep. V2)
Owner-related causes: Project Budget (Dep. V2)	Pearson Correlation	1	.036	.309*	.467**	.632**
	Sig. (2-tailed)		.814	.039	.001	<.001
	N	45	45	45	45	45
Owner-related causes: Project Budget (Dep. V2)	Pearson Correlation	.036	1	.367*	.201	.132
	Sig. (2-tailed)	.814		.013	.187	.387
	N	45	45	45	45	45
Owner-related causes: Project Budget (Dep. V2)	Pearson Correlation	.309*	.367*	1	.163	.207
	Sig. (2-tailed)	.039	.013		.284	.172
	N	45	45	45	45	45
Owner-related causes: Project Budget (Dep. V2)	Pearson Correlation	.467**	.201	.163	1	.489**
	Sig. (2-tailed)	.001	.187	.284		<.001
	N	45	45	45	45	45
Owner-related causes: Project Budget (Dep. V2)	Pearson Correlation	.632**	.132	.207	.489**	1
	Sig. (2-tailed)	<.001	.387	.172	<.001	
	N	45	45	45	45	45

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 28: Cont. Correlations Analysis for variable # Two

Correlations

		Resources-related causes: Project Budget (Dep. V2)	Resources-related causes: Project Budget (Dep. V2)	Resources-related causes: Project Budget (Dep. V2)	Resources-related causes: Project Budget (Dep. V2)
Resources-related causes: Project Budget (Dep. V2)	Pearson Correlation	1	.359*	.360*	.332*
	Sig. (2-tailed)		.016	.015	.026
	N	45	45	45	45
Resources-related causes: Project Budget (Dep. V2)	Pearson Correlation	.359*	1	.029	.228
	Sig. (2-tailed)	.016		.852	.131
	N	45	45	45	45
Resources-related causes: Project Budget (Dep. V2)	Pearson Correlation	.360*	.029	1	.255
	Sig. (2-tailed)	.015	.852		.091
	N	45	45	45	45
Resources-related causes: Project Budget (Dep. V2)	Pearson Correlation	.332*	.228	.255	1
	Sig. (2-tailed)	.026	.131	.091	
	N	45	45	45	45

*. Correlation is significant at the 0.05 level (2-tailed).

Table 29: Cont. Correlations Analysis for variable # Two

Correlations

		All Parties-related causes: Cost-Consciousness (Dep. V3)	All Parties-related causes: Cost-Consciousness (Dep. V3)	All Parties-related causes: Cost-Consciousness (Dep. V3)
All Parties-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	1	.571**	.452**
	Sig. (2-tailed)		<.001	.002
	N	45	45	45
All Parties-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.571**	1	.334*
	Sig. (2-tailed)	<.001		.025
	N	45	45	45
All Parties-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.452**	.334*	1
	Sig. (2-tailed)	.002	.025	
	N	45	45	45

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 30: Correlations Analysis for variable # Three

		Correlations					
		Consultant/designer-related causes: Cost-Consciousness (Dep. V3)	Consultant/designer-related causes: Cost-Consciousness (Dep. V3)	Consultant/designer-related causes: Cost-Consciousness (Dep. V3)	Consultant/designer-related causes: Cost-Consciousness (Dep. V3)	Consultant/designer-related causes: Cost-Consciousness (Dep. V3)	Consultant/designer-related causes: Cost-Consciousness (Dep. V3)
Consultant/designer-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	1	.279	.297*	.334*	.375*	.195
	Sig. (2-tailed)		.064	.048	.025	.011	.199
	N	45	45	45	45	45	45
Consultant/designer-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.279	1	.516**	.415**	.263	.598**
	Sig. (2-tailed)	.064		<.001	.005	.081	<.001
	N	45	45	45	45	45	45
Consultant/designer-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.297*	.516**	1	.335*	.253	.285
	Sig. (2-tailed)	.048	<.001		.024	.094	.058
	N	45	45	45	45	45	45
Consultant/designer-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.334*	.415**	.335*	1	.351*	.164
	Sig. (2-tailed)	.025	.005	.024		.018	.281
	N	45	45	45	45	45	45
Consultant/designer-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.375*	.263	.253	.351*	1	.379*
	Sig. (2-tailed)	.011	.081	.094	.018		.010
	N	45	45	45	45	45	45
Consultant/designer-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.195	.598**	.285	.164	.379*	1
	Sig. (2-tailed)	.199	<.001	.058	.281	.010	
	N	45	45	45	45	45	45

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 31: Cont. Correlations Analysis for variable # Three

		Correlations				
		Contract-related causes: Cost-Consciousness (Dep. V3)	Contract-related causes: Cost-Consciousness (Dep. V3)	Contract-related causes: Cost-Consciousness (Dep. V3)	Contract-related causes: Cost-Consciousness (Dep. V3)	Contract-related causes: Cost-Consciousness (Dep. V3)
Contract-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	1	.307*	.041	.027	.000
	Sig. (2-tailed)		.040	.787	.860	1.000
	N	45	45	45	45	45
Contract-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.307*	1	.346*	-.240	-.039
	Sig. (2-tailed)	.040		.020	.113	.801
	N	45	45	45	45	45
Contract-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.041	.346*	1	.430**	.370*
	Sig. (2-tailed)	.787	.020		.003	.012
	N	45	45	45	45	45
Contract-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.027	-.240	.430**	1	.625**
	Sig. (2-tailed)	.860	.113	.003		<.001
	N	45	45	45	45	45
Contract-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.000	-.039	.370*	.625**	1
	Sig. (2-tailed)	1.000	.801	.012	<.001	
	N	45	45	45	45	45

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 32: Cont. Correlations Analysis for variable # Three

Correlations

		External-related causes: Cost-Consciousness (Dep. V3)	External-related causes: Cost-Consciousness (Dep. V3)	External-related causes: Cost-Consciousness (Dep. V3)	External-related causes: Cost-Consciousness (Dep. V3)
External-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	1	.163	.366*	.061
	Sig. (2-tailed)		.285	.013	.690
	N	45	45	45	45
External-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.163	1	.515**	.295*
	Sig. (2-tailed)	.285		<.001	.049
	N	45	45	45	45
External-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.366*	.515**	1	.000
	Sig. (2-tailed)	.013	<.001		1.000
	N	45	45	45	45
External-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.061	.295*	.000	1
	Sig. (2-tailed)	.690	.049	1.000	
	N	45	45	45	45

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 33: Cont. Correlations Analysis for variable # Three

		Correlations				
		Owner-related causes: Cost-Consciousness (Dep. V3)	Owner-related causes: Cost-Consciousness (Dep. V3)	Owner-related causes: Cost-Consciousness (Dep. V3)	Owner-related causes: Cost-Consciousness (Dep. V3)	Owner-related causes: Cost-Consciousness (Dep. V3)
Owner-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	1	.475**	.280	.321*	.170
	Sig. (2-tailed)		<.001	.063	.032	.263
	N	45	45	45	45	45
Owner-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.475**	1	.170	.352*	.015
	Sig. (2-tailed)	<.001		.264	.018	.920
	N	45	45	45	45	45
Owner-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.280	.170	1	.567**	.257
	Sig. (2-tailed)	.063	.264		<.001	.088
	N	45	45	45	45	45
Owner-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.321*	.352*	.567**	1	.095
	Sig. (2-tailed)	.032	.018	<.001		.536
	N	45	45	45	45	45
Owner-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.170	.015	.257	.095	1
	Sig. (2-tailed)	.263	.920	.088	.536	
	N	45	45	45	45	45

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 34: Cont. Correlations Analysis for variable # Three

Correlations

		Resources-related causes: Cost-Consciousness (Dep. V3)	Resources-related causes: Cost-Consciousness (Dep. V3)	Resources-related causes: Cost-Consciousness (Dep. V3)	Resources-related causes: Cost-Consciousness (Dep. V3)
Resources-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	1	.169	.255	.113
	Sig. (2-tailed)		.267	.092	.460
	N	45	45	45	45
Resources-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.169	1	.408**	.123
	Sig. (2-tailed)	.267		.005	.421
	N	45	45	45	45
Resources-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.255	.408**	1	.325*
	Sig. (2-tailed)	.092	.005		.030
	N	45	45	45	45
Resources-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.113	.123	.325*	1
	Sig. (2-tailed)	.460	.421	.030	
	N	45	45	45	45

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 35: Cont. Correlations Analysis for variable # Three

Correlations

		All Parties-related causes: Efficiency (Dep. V1)	All Parties-related causes: Efficiency (Dep. V1)	All Parties-related causes: Efficiency (Dep. V1)	All Parties-related causes: Project Budget (Dep. V2)	All Parties-related causes: Project Budget (Dep. V2)	All Parties-related causes: Project Budget (Dep. V2)	All Parties-related causes: Cost-Consciousness (Dep. V3)	All Parties-related causes: Cost-Consciousness (Dep. V3)	All Parties-related causes: Cost-Consciousness (Dep. V3)
All Parties-related causes: Efficiency (Dep. V1)	Pearson Correlation	1	.509**	.731**	.120	.145	.261	.072	.181	-.005
	Sig. (2-tailed)		<.001	<.001	.432	.341	.083	.637	.233	.975
	N	45	45	45	45	45	45	45	45	45
All Parties-related causes: Efficiency (Dep. V1)	Pearson Correlation	.509**	1	.494**	.514**	.480**	.450**	.344*	.264	.312*
	Sig. (2-tailed)	<.001		<.001	<.001	<.001	.002	.021	.079	.037
	N	45	45	45	45	45	45	45	45	45
All Parties-related causes: Efficiency (Dep. V1)	Pearson Correlation	.731**	.494**	1	.176	.171	.241	.274	.314*	.078
	Sig. (2-tailed)	<.001	<.001		.247	.262	.111	.069	.036	.610
	N	45	45	45	45	45	45	45	45	45
All Parties-related causes: Project Budget (Dep. V2)	Pearson Correlation	.120	.514**	.176	1	.578**	.588**	.317*	.301*	.312*
	Sig. (2-tailed)	.432	<.001	.247		<.001	<.001	.034	.044	.037
	N	45	45	45	45	45	45	45	45	45
All Parties-related causes: Project Budget (Dep. V2)	Pearson Correlation	.145	.480**	.171	.578**	1	.624**	.286	.342*	.324*
	Sig. (2-tailed)	.341	<.001	.262	<.001		<.001	.057	.022	.030
	N	45	45	45	45	45	45	45	45	45
All Parties-related causes: Project Budget (Dep. V2)	Pearson Correlation	.261	.450**	.241	.588**	.624**	1	.394**	.205	.094
	Sig. (2-tailed)	.083	.002	.111	<.001	<.001		.007	.176	.540
	N	45	45	45	45	45	45	45	45	45
All Parties-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.072	.344*	.274	.317*	.286	.394**	1	.571**	.452**
	Sig. (2-tailed)	.637	.021	.069	.034	.057	.007		<.001	.002
	N	45	45	45	45	45	45	45	45	45
All Parties-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	.181	.264	.314*	.301*	.342*	.205	.571**	1	.334*
	Sig. (2-tailed)	.233	.079	.036	.044	.022	.176	<.001		.025
	N	45	45	45	45	45	45	45	45	45
All Parties-related causes: Cost-Consciousness (Dep. V3)	Pearson Correlation	-.005	.312*	.078	.312*	.324*	.094	.452**	.334*	1
	Sig. (2-tailed)	.975	.037	.610	.037	.030	.540	.002	.025	
	N	45	45	45	45	45	45	45	45	45

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 36: Combined-Correlations Analysis for Variables # One, Two & Three

		Correlations															
		Consultant/related causes	super-related causes	super-related causes	super-related causes	super-related causes	super-related causes	super-related causes	super-related causes	super-related causes	super-related causes	super-related causes	super-related causes	super-related causes	super-related causes	super-related causes	super-related causes
		Efficiency (Dep. V1)	Efficiency (Dep. V1)	Efficiency (Dep. V1)	Efficiency (Dep. V1)	Efficiency (Dep. V1)	Efficiency (Dep. V1)	Efficiency (Dep. V1)	Efficiency (Dep. V1)	Efficiency (Dep. V1)	Efficiency (Dep. V1)	Efficiency (Dep. V1)	Efficiency (Dep. V1)	Efficiency (Dep. V1)	Efficiency (Dep. V1)	Efficiency (Dep. V1)	Efficiency (Dep. V1)
Consultant/related causes	Pearson Correlation	1	408**	630**	642**	556**	383**	286	184	029	209	360	313*	162	223	089	408**
Efficiency (Dep. V1)	Sig. (2-tailed)		.006	<.001	<.001	<.001	.009	.078	.201	.849	.168	.085	.036	.289	.141	.560	.594
Consultant/related causes	Pearson Correlation	408**	1	234	557**	423**	627**	229	061	086	367*	257	370*	155	172	222	372*
Efficiency (Dep. V1)	Sig. (2-tailed)		.006	.122	<.001	.004	<.001	.130	.680	.516	.013	.088	.012	.311	.288	.143	.727
Consultant/related causes	Pearson Correlation	630**	234	1	478**	380**	272	249	319*	135	302*	173	032	042	025	157	165
Efficiency (Dep. V1)	Sig. (2-tailed)		.006	.45	.45	.004	.008	.070	.088	.033	.414	.044	.255	.793	.870	.303	.484
Consultant/related causes	Pearson Correlation	<.001	.122	<.001	<.001	.008	.070	.088	.033	.414	.044	.255	.793	.870	.303	.484	.005
Efficiency (Dep. V1)	Sig. (2-tailed)		.45	.45	.45	.008	.070	.088	.033	.414	.044	.255	.793	.870	.303	.484	.005
Consultant/related causes	Pearson Correlation	642**	557**	478**	1	.065	.030	.482	.109	.242	.066	.197	.083	.153	.123	.014	.411**
Efficiency (Dep. V1)	Sig. (2-tailed)		<.001	<.001	.001	.005	.002	.042	.058	.058	.067	.194	.086	.425	.166	.297	.357
Consultant/related causes	Pearson Correlation	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Efficiency (Dep. V1)	Sig. (2-tailed)		.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45
Consultant/related causes	Pearson Correlation	556**	425**	380**	278	1	.465	.304	.058	.112	.161	.274	.235	.252	.301	.197	.086
Efficiency (Dep. V1)	Sig. (2-tailed)		<.001	<.001	.006	.002	.002	.042	.073	.466	.289	.089	.121	.095	.044	.194	.086
Consultant/related causes	Pearson Correlation	383**	627**	272	323*	456**	1	.182	.184	.045	.375*	.235	.367*	.159	.149	.100	.075
Efficiency (Dep. V1)	Sig. (2-tailed)		.006	.030	.002	.002	.182	.225	.225	.772	.011	.130	.016	.191	.318	.515	.625
Consultant/related causes	Pearson Correlation	009	<.001	.070	.030	.002	.45	45	45	45	45	45	45	45	45	45	45
Efficiency (Dep. V1)	Sig. (2-tailed)		.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45
Consultant/related causes	Pearson Correlation	286	229	249	108	304*	.182	1	.342*	.650**	.325*	.757**	.431**	.086	.194	.206	.071
Efficiency (Dep. V1)	Sig. (2-tailed)		.078	.130	.088	.482	.042	.232	.021	<.001	.029	<.001	.003	.576	.202	.077	.641
Consultant/related causes	Pearson Correlation	078	.130	.088	.482	.042	.232	.021	.342*	.650**	.325*	.757**	.431**	.086	.194	.206	.071
Efficiency (Dep. V1)	Sig. (2-tailed)		.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45
Consultant/related causes	Pearson Correlation	.194	.061	.319*	.242	.058	.184	.342*	1	.483*	.409*	.289	.004	-.017	-.183	-.075	-.173
Efficiency (Dep. V1)	Sig. (2-tailed)		.201	.680	.109	.703	.225	.021	<.001	<.001	.005	.074	.978	.912	.229	.257	.624
Consultant/related causes	Pearson Correlation	201	.680	.109	.703	.225	.021	.342*	.650**	.325*	.757**	.431**	.086	.194	.206	.071	.641
Efficiency (Dep. V1)	Sig. (2-tailed)		.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45
Consultant/related causes	Pearson Correlation	.029	.086	.125	.066	.112	.045	.650**	.483*	1	.419*	.744*	.365*	.002	.882	.857	.727
Efficiency (Dep. V1)	Sig. (2-tailed)		.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45
Consultant/related causes	Pearson Correlation	.849	.576	.414	.667	.466	.772	<.001	<.001	.004	<.001	.014	.014	.991	.935	.882	.857
Efficiency (Dep. V1)	Sig. (2-tailed)		.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45
Consultant/related causes	Pearson Correlation	.209	.367*	.302*	.197	.161	.375	.325	.409*	.419*	1	.459*	.625*	.215	.156	.453	.756
Efficiency (Dep. V1)	Sig. (2-tailed)		.168	.013	.044	.289	.011	.029	.005	.004	.002	.002	.002	.002	.002	.002	.002
Consultant/related causes	Pearson Correlation	.168	.013	.044	.194	.289	.011	.029	.005	.004	.002	.002	.002	.002	.002	.002	.002
Efficiency (Dep. V1)	Sig. (2-tailed)		.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45
Consultant/related causes	Pearson Correlation	.280	.257	.173	.083	.274	.225	.757**	.269	.744*	.459*	1	.548*	.175	.131	.111	.297*
Efficiency (Dep. V1)	Sig. (2-tailed)		.036	.012	.035	.425	.121	.016	.003	.014	<.001	<.001	.548*	.175	.131	.111	.297*
Consultant/related causes	Pearson Correlation	.036	.012	.035	.425	.121	.016	.003	.014	<.001	<.001	.548*	.175	.131	.111	.297*	.192
Efficiency (Dep. V1)	Sig. (2-tailed)		.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45
Consultant/related causes	Pearson Correlation	.162	.155	.042	.153	.252	.199	.086	-.017	.002	.215	.175	.180	1	.237	.166	.158
Efficiency (Dep. V1)	Sig. (2-tailed)		.289	.311	.793	.316	.095	.191	.576	.912	.591	.156	.251	.237	.166	.158	.158
Consultant/related causes	Pearson Correlation	.289	.311	.793	.316	.095	.191	.576	.912	.591	.156	.251	.237	.166	.158	.158	.158
Efficiency (Dep. V1)	Sig. (2-tailed)		.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45
Consultant/related causes	Pearson Correlation	.223	.172	-.025	.123	.301*	.149	.184	-.183	-.013	.115	.121	.210	.279	1	.516*	.415*
Efficiency (Dep. V1)	Sig. (2-tailed)		.141	.256	.870	.422	.328	.202	.229	.935	.453	.430	.166	.084	.004	<.001	.005
Consultant/related causes	Pearson Correlation	.141	.256	.870	.422	.328	.202	.229	.935	.453	.430	.166	.084	.004	.004	<.001	.005
Efficiency (Dep. V1)	Sig. (2-tailed)		.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45
Consultant/related causes	Pearson Correlation	.089	.222	-.157	.024	.194	-.100	.266	-.173	.023	.020	.111	.197	.214	.287*	.516*	.335*
Efficiency (Dep. V1)	Sig. (2-tailed)		.089	.143	.303	.926	.194	.515	.077	.257	.882	.894	.468	.159	.048	<.001	.024
Consultant/related causes	Pearson Correlation	.089	.143	.303	.926	.194	.515	.077	.257	.882	.894	.468	.159	.048	.048	.024	.024
Efficiency (Dep. V1)	Sig. (2-tailed)		.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45
Consultant/related causes	Pearson Correlation	.406*	.372*	.165	.276	.255	.415	.272	-.075	-.028	.166	.297*	.310	.334	.415*	.335*	.357*
Efficiency (Dep. V1)	Sig. (2-tailed)		.006	.012	.278	.066	.005	.071	.624	.857	.276	.048	.038	.025	.005	.024	.357*
Consultant/related causes	Pearson Correlation	.082	-.054	.102	.141	.086	.075	.45	-.071	.053	.048	.192	.112	.375	.263	.293	.357*
Efficiency (Dep. V1)	Sig. (2-tailed)		.594	.727	.506	.575	.625	.641	.928	.727	.756	.207	.466	.011	.081	.084	.018
Consultant/related causes	Pearson Correlation	.594	.727	.506	.575	.625	.641	.928	.727	.756	.207	.466	.011	.081	.084	.018	.018
Efficiency (Dep. V1)	Sig. (2-tailed)		.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45
Consultant/related causes	Pearson Correlation	.219	.109	.107	.411**	.155	.144	.182	.128	.148	-.004	.111	.090	.195	.598**	.285	.164
Efficiency (Dep. V1)	Sig. (2-tailed)		.148	.477	.484	.005	.344	.206	.404	.331	.977	.468	.557	.199	<.001	.058	.379*
Consultant/related causes	Pearson Correlation	.148	.477	.484	.005	.344	.206	.404	.331	.977	.468	.557	.199	.199	<.001	.058	.379*
Efficiency (Dep. V1)	Sig. (2-tailed)		.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45

*. Correlation is significant at the 0.01 level (2-tailed).

**. Correlation is significant at the 0.05 level (2-tailed).

Table 37: Cont. Combined-Correlations Analysis for Variables # One, Two & Three

Correlations													
External-related causes: Efficiency (Dep. V1)	External-related causes: Efficiency (Dep. V1)	External-related causes: Efficiency (Dep. V1)	External-related causes: Efficiency (Dep. V1)	External-related causes: Efficiency (Dep. V1)	External-related causes: Project Budget (Dep. V2)	External-related causes: Project Budget (Dep. V2)	External-related causes: Project Budget (Dep. V2)	External-related causes: Project Budget (Dep. V2)	External-related causes: Project Budget (Dep. V2)	External-related causes: Project Budget (Dep. V2)	External-related causes: Project Budget (Dep. V2)	External-related causes: Project Budget (Dep. V2)	External-related causes: Project Budget (Dep. V2)
1	.299*	.200	.298**	-.028	.118	.394**	.449**	.002	.45	.45	.45	.45	.45
N	45	45	45	45	45	45	45	45	45	45	45	45	45
External-related causes: Efficiency (Dep. V1)	.299*	1	.128	.362*	.111	.166	.449**	.007	.45	.45	.45	.45	.45
N	45	45	45	45	45	45	45	45	45	45	45	45	45
External-related causes: Efficiency (Dep. V1)	.406	.402	.402	.402	.402	.402	.402	.402	.402	.402	.402	.402	.402
N	45	45	45	45	45	45	45	45	45	45	45	45	45
External-related causes: Efficiency (Dep. V1)	.200	.128	1	.513**	.566**	.535**	.566**	.535**	.566**	.535**	.566**	.535**	.566**
N	189	.402	.402	.402	.402	.402	.402	.402	.402	.402	.402	.402	.402
External-related causes: Efficiency (Dep. V1)	.189	.402	.402	.402	.402	.402	.402	.402	.402	.402	.402	.402	.402
N	45	45	45	45	45	45	45	45	45	45	45	45	45
External-related causes: Efficiency (Dep. V1)	.298*	.362*	.513**	1	.265	.480**	.386**	.381**	.097	.097	.097	.097	.097
N	45	45	45	45	45	45	45	45	45	45	45	45	45
External-related causes: Efficiency (Dep. V1)	.047	.014	.014	.014	.014	.014	.014	.014	.014	.014	.014	.014	.014
N	45	45	45	45	45	45	45	45	45	45	45	45	45
External-related causes: Efficiency (Dep. V1)	.028	.111	.566**	.265	.588**	.163	.428**	.187	.128	.128	.128	.128	.128
N	856	.469	.469	.469	.469	.469	.469	.469	.469	.469	.469	.469	.469
External-related causes: Efficiency (Dep. V1)	.856	.469	.469	.469	.469	.469	.469	.469	.469	.469	.469	.469	.469
N	45	45	45	45	45	45	45	45	45	45	45	45	45
External-related causes: Efficiency (Dep. V1)	.118	.168	.535**	.480**	.588**	.367*	.608**	.236	-.078	-.053	.159	.351*	.159
N	439	.269	<.001	<.001	<.001	.013	<.001	.119	.613	.729	.297	.049	.159
External-related causes: Efficiency (Dep. V1)	.439	.269	<.001	<.001	<.001	.013	<.001	.119	.613	.729	.297	.049	.159
N	45	45	45	45	45	45	45	45	45	45	45	45	45
External-related causes: Efficiency (Dep. V1)	.394**	.166	.131	.386**	.163	.367*	.608**	.236	-.078	-.053	.159	.351*	.159
N	.007	.276	.393	.009	.284	.013	<.001	.009	.889	.676	.295	.018	.889
External-related causes: Efficiency (Dep. V1)	.007	.276	.393	.009	.284	.013	<.001	.009	.889	.676	.295	.018	.889
N	45	45	45	45	45	45	45	45	45	45	45	45	45
External-related causes: Efficiency (Dep. V1)	.449**	.112	.545**	.381**	.428**	.608**	.383**	1	.085	.007	.151	.028	.085
N	.002	.465	<.001	.010	.003	<.001	.009	1	.577	.963	.321	.857	.577
External-related causes: Efficiency (Dep. V1)	.002	.465	<.001	.010	.003	<.001	.009	1	.577	.963	.321	.857	.577
N	45	45	45	45	45	45	45	45	45	45	45	45	45
External-related causes: Efficiency (Dep. V1)	.120	.191	.167	.024	.187	.236	.021	.085	.163	.163	.366*	.061	.163
N	.432	.210	.273	.877	.219	.119	.889	.577	.285	.013	.690	.45	.285
External-related causes: Efficiency (Dep. V1)	.432	.210	.273	.877	.219	.119	.889	.577	.285	.013	.690	.45	.285
N	45	45	45	45	45	45	45	45	45	45	45	45	45
External-related causes: Efficiency (Dep. V1)	.208	.117	.040	.097	.128	-.078	.064	.007	.163	1	.515**	.295*	.163
N	.171	.445	.793	.524	.401	.613	.676	.963	.285	<.001	.049	.049	.285
External-related causes: Efficiency (Dep. V1)	.171	.445	.793	.524	.401	.613	.676	.963	.285	<.001	.049	.049	.285
N	45	45	45	45	45	45	45	45	45	45	45	45	45
External-related causes: Efficiency (Dep. V1)	.366*	.183	.167	.215	-.014	-.053	.160	.151	.366*	.515**	1	.000	.151
N	.013	.229	.272	.155	.926	.729	.295	.321	.013	<.001	.000	.45	.295
External-related causes: Efficiency (Dep. V1)	.013	.229	.272	.155	.926	.729	.295	.321	.013	<.001	.000	.45	.295
N	45	45	45	45	45	45	45	45	45	45	45	45	45
External-related causes: Efficiency (Dep. V1)	.000	.387**	.227	.470**	.144	.159	.351*	.028	.061	.295*	.000	1	.028
N	1.000	.009	.133	.001	.345	.287	.018	.857	.680	.049	1.000	.000	.857
External-related causes: Efficiency (Dep. V1)	1.000	.009	.133	.001	.345	.287	.018	.857	.680	.049	1.000	.000	.857
N	45	45	45	45	45	45	45	45	45	45	45	45	45

*. Correlation is significant at the 0.05 level (2-tailed).
 **. Correlation is significant at the 0.01 level (2-tailed).

Table 39: Cont. Combined-Correlations Analysis for Variables # One, Two & Three

Correlations															
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	1	.464**	.179	.230	.242	.212	.247	.344**	.407**	.131	.223	.280	.242	.441**
Owner-related causes: Efficiency (Dep. V1)	Sig. (2-tailed)		.001	.240	.129	.109	.102	.021	.006	.390	.140	.063	.110	.001	.002
Owner-related causes: Efficiency (Dep. V1)	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	.464**	1	.029	.361*	.354*	.335*	.273	.254	.157	.324*	.007	-.011	.455**	.34*
Owner-related causes: Efficiency (Dep. V1)	Sig. (2-tailed)		.001	.850	.015	.017	.024	.070	.002	.303	.030	.961	.940	.002	.025
Owner-related causes: Efficiency (Dep. V1)	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	.179	.029	1	.590**	.337*	.259	.041	.217	.273	.153	.063	.227	-.051	-.078
Owner-related causes: Efficiency (Dep. V1)	Sig. (2-tailed)		.240	.850	<.001	.024	.085	.790	.153	.069	.314	.069	.133	.441**	.567**
Owner-related causes: Efficiency (Dep. V1)	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	.230	.361*	.590**	1	.378*	.413**	.106	.172	.324*	.397**	.171	.230	.221	.270
Owner-related causes: Efficiency (Dep. V1)	Sig. (2-tailed)		.129	.015	<.001	.010	.005	.488	.259	.030	.007	.262	.128	.145	.073
Owner-related causes: Efficiency (Dep. V1)	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	.242	.354*	.337*	.378*	1	.342*	.099	-.084	.211	.327*	.163	.277	.025	.334*
Owner-related causes: Efficiency (Dep. V1)	Sig. (2-tailed)		.109	.017	.024	.010	.021	.516	.585	.163	.028	<.001	.277	.025	.021
Owner-related causes: Efficiency (Dep. V1)	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	.247	.335*	.259	.413**	.342*	1	.036	.309*	.467**	.632**	.110	.039	.619**	.454**
Owner-related causes: Efficiency (Dep. V1)	Sig. (2-tailed)		.102	.024	.085	.021	.814	.039	.001	<.001	<.001	.471	.030	<.001	.002
Owner-related causes: Efficiency (Dep. V1)	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	.344*	.273	.041	.106	.089	.036	1	.367*	.201	.132	.150	.051	.103	.012
Owner-related causes: Efficiency (Dep. V1)	Sig. (2-tailed)		.021	.790	.488	.516	.814	.367*	.187	.387	.379	.325	.739	.499	.936
Owner-related causes: Efficiency (Dep. V1)	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	.407**	.254	.217	.172	-.084	.309*	.367*	1	.163	.202	.011	.227	.287	.098
Owner-related causes: Efficiency (Dep. V1)	Sig. (2-tailed)		.006	.092	.153	.259	.039	.013	.284	.172	.045	.134	.056	.521	.865
Owner-related causes: Efficiency (Dep. V1)	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	.131	.157	.273	.324	.211	.163	.201	.163	1	.489**	.092	.314*	.242	.360*
Owner-related causes: Efficiency (Dep. V1)	Sig. (2-tailed)		.300	.069	.030	.467**	.001	.187	.284	<.001	.548	.036	.109	.018	.395
Owner-related causes: Efficiency (Dep. V1)	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	.223	.324*	.153	.397**	.327*	.632**	.132	.207	.489**	1	.161	.358*	.382**	.521**
Owner-related causes: Efficiency (Dep. V1)	Sig. (2-tailed)		.140	.030	.314	.028	<.001	.387	.172	<.001	.290	.016	.010	.010	.684
Owner-related causes: Efficiency (Dep. V1)	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	.083	.961	.680	.262	<.001	.471	.325	.945	.548	.290	1	.475**	.280	.032
Owner-related causes: Efficiency (Dep. V1)	Sig. (2-tailed)		.003	.007	.063	.001	.001	.001	.001	.001	.001	<.001	<.001	.063	.283
Owner-related causes: Efficiency (Dep. V1)	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	.110	.940	.133	.128	.166	.324*	.739	.134	.036	.016	<.001	.264	.018	.920
Owner-related causes: Efficiency (Dep. V1)	Sig. (2-tailed)		.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45	.45
Owner-related causes: Efficiency (Dep. V1)	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	.472**	.455**	-.051	.221	.334*	.619**	.498	.066	.109	.010	.063	.264	.567**	.257
Owner-related causes: Efficiency (Dep. V1)	Sig. (2-tailed)		.001	.850	.024	.085	.070	.002	.303	.030	.961	.940	.002	.025	.440
Owner-related causes: Efficiency (Dep. V1)	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	.441**	.334*	-.007	.270	.344*	.454**	.012	.098	.350*	.521**	.321*	.352*	.567**	.1
Owner-related causes: Efficiency (Dep. V1)	Sig. (2-tailed)		.002	.025	.965	.073	.021	.002	.938	.521	<.001	.032	.018	<.001	.536
Owner-related causes: Efficiency (Dep. V1)	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Owner-related causes: Efficiency (Dep. V1)	Pearson Correlation	.122	.118	-.078	.206	.035	.043	.177	.026	.130	-.060	.170	.015	.257	.095
Owner-related causes: Efficiency (Dep. V1)	Sig. (2-tailed)		.425	.440	.610	.174	.779	.246	.865	.395	.694	.263	.920	.088	.536
Owner-related causes: Efficiency (Dep. V1)	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 40: Cont. Combined-Correlations Analysis for Variables # One, Two & Three

Correlations													
Resources-related causes: Efficiency (Dep. V1)	Pearson Correlation	Resources-related causes: Efficiency (Dep. V1)	Resources-related causes: Efficiency (Dep. V1)	Resources-related causes: Efficiency (Dep. V1)	Resources-related causes: Project Budget (Dep. V2)	Resources-related causes: Project Budget (Dep. V2)	Resources-related causes: Project Budget (Dep. V2)	Resources-related causes: Project Budget (Dep. V2)	Resources-related causes: Project Budget (Dep. V2)	Resources-related causes: Project Budget (Dep. V2)	Resources-related causes: Project Budget (Dep. V2)	Resources-related causes: Project Budget (Dep. V2)	Resources-related causes: Project Budget (Dep. V2)
	1	.277	.274	.359	.517**	.228	.306	.425**	.238	-.002	.349	.296	.296
		.066	.068	.015	<.001	.132	.041	.004	.116	.988	.116	.988	.048
	N	45	45	45	45	45	45	45	45	45	45	45	45
Resources-related causes: Efficiency (Dep. V1)	Pearson Correlation	.277	1	.545**	.270	.317*	.026	.161	.161	.135	.375	.296	.296
	Sig. (2-tailed)			<.001		.073	.863	.446	.446	.291	.091	.259	.086
	N	45	45	45	45	45	45	45	45	45	45	45	45
Resources-related causes: Efficiency (Dep. V1)	Pearson Correlation	.274	.545**	1	.275	.060	.130	.072	.107	.183	.375	.296	.296
	Sig. (2-tailed)		<.001			.697	.150	.396	.639	.483	.230	.056	.081
	N	45	45	45	45	45	45	45	45	45	45	45	45
Resources-related causes: Efficiency (Dep. V1)	Pearson Correlation	.068	<.001	.067	.697	.150	.396	.639	.483	.230	.056	.081	.081
	Sig. (2-tailed)					.45	.45	.45	.45	.45	.45	.45	.45
Resources-related causes: Efficiency (Dep. V1)	Pearson Correlation	.359	.270	.275	1	.196	.213	.238	.550**	.499**	.394**	.401**	.401**
	Sig. (2-tailed)					.197	.160	.116	<.001	<.001	.007	.006	.262
	N	45	45	45	45	45	45	45	45	45	45	45	45
Resources-related causes: Project Budget (Dep. V2)	Pearson Correlation	.517**	.317*	.060	1	.359	.360	.332*	.332*	.559	.216	.069	.069
	Sig. (2-tailed)					.016	.015	.026	.026	.026	.026	.026	.026
	N	45	45	45	45	45	45	45	45	45	45	45	45
Resources-related causes: Project Budget (Dep. V2)	Pearson Correlation	.228	.026	.218	.359*	1	.029	.228	.228	.078	.255	.166	.166
	Sig. (2-tailed)					.016	.852	.131	.091	.611	.079	.265	.265
	N	45	45	45	45	45	45	45	45	45	45	45	45
Resources-related causes: Project Budget (Dep. V2)	Pearson Correlation	.306*	.116	.130	.238	.360*	.029	.45	.45	.255	.181	.093	.093
	Sig. (2-tailed)					.015	.852	.45	.45	.45	.45	.45	.45
	N	45	45	45	45	45	45	45	45	45	45	45	45
Resources-related causes: Project Budget (Dep. V2)	Pearson Correlation	.425**	.161	.072	.550**	.332*	.228	.255	1	.429**	.517**	.430**	.430**
	Sig. (2-tailed)					.026	.131	.091	.091	.003	<.001	.003	.003
	N	45	45	45	45	45	45	45	45	45	45	45	45
Resources-related causes: Project Budget (Dep. V2)	Pearson Correlation	.004	.291	.639	<.001	.131	.091	.091	.091	.003	.003	.003	.003
	Sig. (2-tailed)					.45	.45	.45	.45	.45	.45	.45	.45
	N	45	45	45	45	45	45	45	45	45	45	45	45
Resources-related causes: Project Budget (Dep. V2)	Pearson Correlation	.238	.122	.107	.499**	.089	.078	.265	.429**	.003	.169	.255	.255
	Sig. (2-tailed)				<.001	.611	.079	.265	.429**	.003	.169	.255	.255
	N	45	45	45	45	45	45	45	45	45	45	45	45
Resources-related causes: Project Budget (Dep. V2)	Pearson Correlation	.116	.425	.483	<.001	.559	.079	.003	.003	.169	.255	.255	.255
	Sig. (2-tailed)					.079	.079	.003	.003	.169	.255	.255	.255
	N	45	45	45	45	45	45	45	45	45	45	45	45
Resources-related causes: Project Budget (Dep. V2)	Pearson Correlation	-.002	.135	-.183	.384**	.188	.255	.181	.517**	.169	1	.408**	.408**
	Sig. (2-tailed)					.188	.255	.181	.517**	.169	1	.408**	.408**
	N	45	45	45	45	45	45	45	45	45	45	45	45
Resources-related causes: Project Budget (Dep. V2)	Pearson Correlation	.349**	.244	-.056	.401**	.166	.194	.430**	.430**	.255	.408**	1	.325
	Sig. (2-tailed)					.091	.235	.001	.001	.005	.005	.005	.005
	N	45	45	45	45	45	45	45	45	45	45	45	45
Resources-related causes: Project Budget (Dep. V2)	Pearson Correlation	.019	.106	.716	.002	.276	.203	.003	.092	.005	.005	.005	.005
	Sig. (2-tailed)					.45	.45	.45	.45	.45	.45	.45	.45
	N	45	45	45	45	45	45	45	45	45	45	45	45
Resources-related causes: Project Budget (Dep. V2)	Pearson Correlation	.296*	.443**	.091	.171	.669**	.169	.259	.093	.113	.123	.325*	.325*
	Sig. (2-tailed)					.086	.086	.086	.086	.086	.086	.086	.086
	N	45	45	45	45	45	45	45	45	45	45	45	45

*. Correlation is significant at the 0.05 level (2-tailed).
 **. Correlation is significant at the 0.01 level (2-tailed).

Table 41: Cont. Combined-Correlations Analysis for Variables # One, Two & Three

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.467 ^a	.218	.200	.729

a. Predictors: (Constant), Consultant/designer-related causes: Efficiency (Dep. V1)

Table 42: Regression Analysis for Variable (A)

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.368	1	6.368	11.994	.001 ^b
	Residual	22.832	43	.531		
	Total	29.200	44			

a. Dependent Variable: All Parties-related causes: Efficiency (Dep. V1)

b. Predictors: (Constant), Consultant/designer-related causes: Efficiency (Dep. V1)

Table 43: Cont. Regression Analysis for Variable (A)

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.575	.463		5.562	<.001
	Consultant/designer-related causes: Efficiency (Dep. V1)	.403	.116	.467	3.463	.001

a. Dependent Variable: All Parties-related causes: Efficiency (Dep. V1)

Table 44: Cont. Regression Analysis for Variable (A)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.486 ^a	.236	.218	.720

a. Predictors: (Constant), Owner-related causes: Efficiency (Dep. V1)

Table 45: Regression Analysis for Variable (B)

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.893	1	6.893	13.288	<.001 ^b
	Residual	22.307	43	.519		
	Total	29.200	44			

a. Dependent Variable: All Parties-related causes: Efficiency (Dep. V1)

b. Predictors: (Constant), Owner-related causes: Efficiency (Dep. V1)

Table 46: Cont. Regression Analysis for Variable (B)

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.193	.543		4.040	<.001
	Owner-related causes: Efficiency (Dep. V1)	.488	.134	.486	3.645	<.001

a. Dependent Variable: All Parties-related causes: Efficiency (Dep. V1)

Table 47: Cont. Regression Analysis for Variable (B)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.486 ^a	.236	.218	.720

a. Predictors: (Constant), Owner-related causes: Efficiency (Dep. V1)

Table 48: Regression Analysis for Variable (C)

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.893	1	6.893	13.288	<.001 ^b
	Residual	22.307	43	.519		
	Total	29.200	44			

a. Dependent Variable: All Parties-related causes: Efficiency (Dep. V1)

b. Predictors: (Constant), Owner-related causes: Efficiency (Dep. V1)

Table 49: Cont. Regression Analysis for Variable (C)

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.193	.543		4.040	<.001
	Owner-related causes: Efficiency (Dep. V1)	.488	.134	.486	3.645	<.001

a. Dependent Variable: All Parties-related causes: Efficiency (Dep. V1)

Table 50: Cont. Regression Analysis for Variable (C)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.474 ^a	.224	.206	.841

a. Predictors: (Constant), External-related causes: Efficiency (Dep. V1)

Table 51: Regression Analysis for Variable (D)

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.792	1	8.792	12.432	.001 ^b
	Residual	30.408	43	.707		
	Total	39.200	44			

a. Dependent Variable: Consultant/designer-related causes: Efficiency (Dep. V1)

b. Predictors: (Constant), External-related causes: Efficiency (Dep. V1)

Table 52: Cont. Regression Analysis for Variable (D)

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.807	.597		3.026	.004
	External-related causes: Efficiency (Dep. V1)	.509	.144	.474	3.526	.001

a. Dependent Variable: Consultant/designer-related causes: Efficiency (Dep. V1)

Table 53: Cont. Regression Analysis for Variable (D)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.530 ^a	.281	.264	.810

a. Predictors: (Constant), Owner-related causes: Efficiency (Dep. V1)

Table 54: Regression Analysis for Variable (E)

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.016	1	11.016	16.807	<.001 ^b
	Residual	28.184	43	.655		
	Total	39.200	44			

a. Dependent Variable: Consultant/designer-related causes: Efficiency (Dep. V1)

b. Predictors: (Constant), Owner-related causes: Efficiency (Dep. V1)

Table 55: Cont. Regression Analysis for Variable (E)

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.414	.610		2.317	.025
	Owner-related causes: Efficiency (Dep. V1)	.617	.150	.530	4.100	<.001

a. Dependent Variable: Consultant/designer-related causes: Efficiency (Dep. V1)

Table 56: Cont. Regression Analysis for Variable (E)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.491 ^a	.241	.223	.832

a. Predictors: (Constant), Resources-related causes: Efficiency (Dep. V1)

Table 57: Regression Analysis for Variable (F)

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.441	1	9.441	13.642	<.001 ^b
	Residual	29.759	43	.692		
	Total	39.200	44			

a. Dependent Variable: Consultant/designer-related causes: Efficiency (Dep. V1)

b. Predictors: (Constant), Resources-related causes: Efficiency (Dep. V1)

Table 58: Cont. Regression Analysis for Variable (F)

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.230	.725		1.697	.097
	Resources-related causes: Efficiency (Dep. V1)	.638	.173	.491	3.694	<.001

a. Dependent Variable: Consultant/designer-related causes: Efficiency (Dep. V1)

Table 59: Cont. Regression Analysis for Variable (F)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.618 ^a	.382	.367	.858

a. Predictors: (Constant), Owner-related causes: Efficiency (Dep. V1)

Table 60: Regression Analysis for Variable (G)

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.547	1	19.547	26.555	<.001 ^b
	Residual	31.653	43	.736		
	Total	51.200	44			

a. Dependent Variable: Contract-related causes: Efficiency (Dep. V1)

b. Predictors: (Constant), Owner-related causes: Efficiency (Dep. V1)

Table 61: Cont. Regression Analysis for Variable (G)

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.533	.647		.824	.414
	Owner-related causes: Efficiency (Dep. V1)	.821	.159	.618	5.153	<.001

a. Dependent Variable: Contract-related causes: Efficiency (Dep. V1)

Table 62: Cont. Regression Analysis for Variable (G)

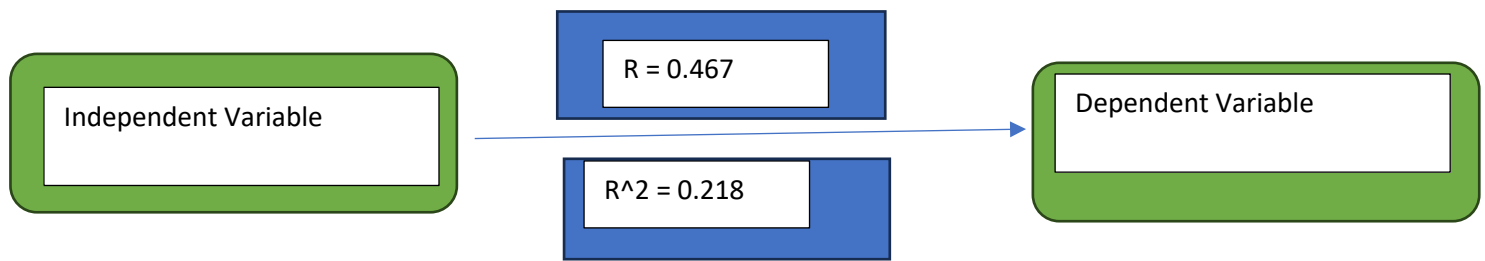


Figure 93: Testing Validity Var # One

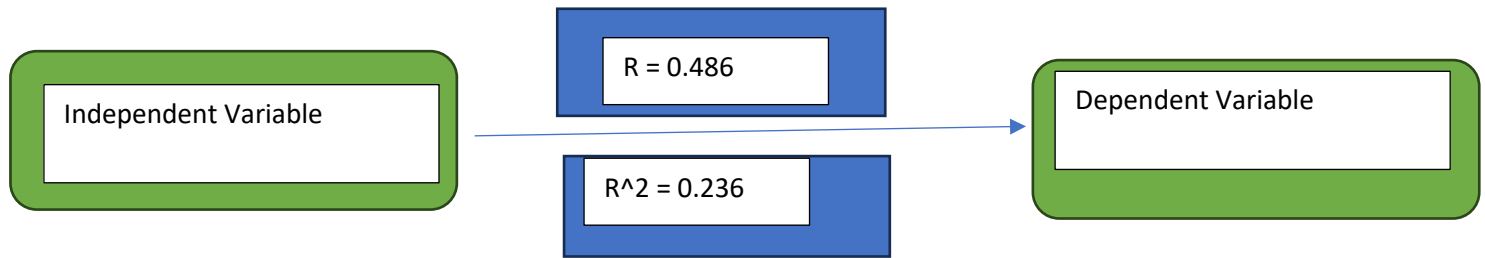


Figure 94: Figure 93: Testing Validity Var # Two

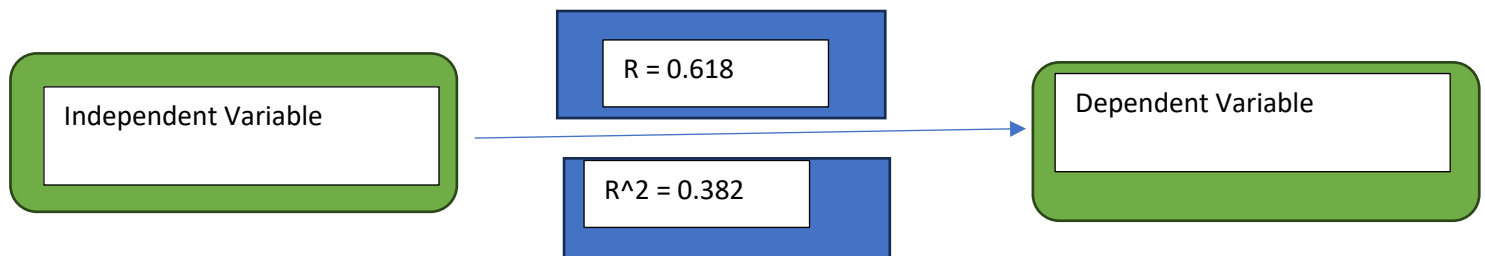


Figure 95: Figure 93: Testing Validity Var # Three

4.6. Conclusion

From the results of the previous statistics, it is clear that:

There is a **positive** relationship with statistical significance between the independent variable and the dependent variables.

This is supporting the initial hypothesis we have made at the beginning of this research.

5. Chapter 5: Research limitations, Recommendations & Conclusion

5.1. Research Limitations & Future Research

This chapter addresses the theoretical contributions and practical applications of the research, as well as recommendations, limitations, future studies, and the conclusion.

5.2. Theoretical Contribution

The researcher mentioned that the method of selecting the research variables was based on the fact that the variables had not been linked in a single research model before, or that there were few previous studies linking the two variables. As a result, the researcher's current study aimed to build a theoretical framework to enhance knowledge of the research variables. The study also aimed to determine the dimensions of the variables and identify the most appropriate methodology to achieve its objectives. The researcher used questionnaires as the proper tool for collecting data from the research sample.

5.3. Practical Applications

The research is important because it can be practically applied to benefit Saudi Aramco. For example, the company can improve its operational efficiency, product quality, and meet international consumer needs based on the research results. Additionally, investing in artificial intelligence technology can enhance operations and management processes, reducing costs and improving product quality. Saudi Aramco can also form partnerships with technology startups to adopt the latest technologies and enhance its key performance indicators (KPIs).

5.4. Research Recommendations

Based on the research results, the researcher suggests the following recommendations for Saudi Aramco:

- Increase awareness about the concept of efficiency in projects and its impact on both internal and external customers.
- Encourage managers to use enhanced processes for pre-job evaluations in their current and future projects.
- Provide accurate information and timeframes, and address any challenges within project teams to help Saudi Aramco managers adopt the right project management approach.
- Continuously monitor the process and improve various variables that can influence the final project goals and outcomes.

5.5 Research's limitations

5.5.1 Objective Boundaries:

The research is focused on outlining the management reality, including the dimensions of the first and second variables.

5.5.2 Human Boundaries:

The research is limited to directors, managers, engineers, and administrative and support teams within the Saudi Aramco branch. in the eastern province of Saudi Arabia, specifically in Dharan city.

5.5.3 Spatial Boundaries:

The research is limited to the geographical scope of the Saudi Aramco branch in the Eastern Province of Saudi Arabia, particularly in Dhahran city.

5.5.4 Temporal Boundaries:

The research was conducted during the 2024 academic year.

5.6 Future studies

Based on the findings of this research, which demonstrated the strong correlation between the first variable and its dimensions, the second variable and its dimensions, and the third variable and its dimensions, along with an emphasis on these dimensions, the researcher suggests that future studies in the same area should consolidate these results in work environments and concentrate on one of the sub-hypotheses and its connection to the research questions posed by the researchers.

5.7 Conclusion

The aim of this research is to investigate the impact of the first variable on the second and third variables and to provide more detailed results. The study revealed a positive relationship between efficiency and the utilization of project budgets. Additionally, it showed a positive relationship between efficiency and cost awareness among team members, suppliers, and stakeholders. Based on these findings, it is recommended that Saudi Aramco invest more in project management, preparation, and lessons learned before starting new projects to improve their goal achievements. It is also suggested to conduct future studies to evaluate the impact of efficiency on a fourth variable— inflation and changes in service prices and project budgeting—based on current global business conditions and how to improve it through localization initiatives, like the In Kingdom Total Value Add (iktva) program.

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Appendix

Questionnaire Introduction

Questionnaire about the Impact of Optimization on Reducing Construction Costs in the Oil and Gas Sector in Dhahran, Saudi Arabia: A Case Research of Saudi Aramco's Projects

I am conducting a complementary research as part of my project management degree program. The research is entitled "The Impact of Optimization on Reducing Construction Costs in the Oil and Gas Sector in Dhahran, Saudi Arabia: A Case Research of Saudi Aramco's Projects." As part of this research, I aim to explore the contribution of social responsibilities to:

- A) Improving the efficiency of operations within the Oil and Gas sector in Saudi Aramco.**
- B) Improving the budget and economy within the Oil and Gas sector in Saudi Aramco.**
- C) Improving the cost-consciousness within the Oil and Gas sector in Saudi Aramco.**

I kindly request your cooperation in answering the following questions clearly and objectively. Your input will help in obtaining valid results for my research topic. Your response will be used for scientific research purposes and will be handled with complete confidentiality.

Thank you for your support and cooperation.

Personal and Professional Information:

Note: to answer by placing mark (x), in the right box.

1- Gender:

Male

Female

2- Age:

Less than 20 years

20years- 30 years

31years- 40years

41years-50years

51years- 60years

3- Marital status:

Single

Married

Divorced

Widower

4- Qualification:

Diploma

High School

Bachelor's

Master's

Ph.D.

5- Function:

Employee

Administrative

Engineer

Manager

Director

6- Years of Experience:

Less than one year

From 1 year to 4 years

From 5 years to 10 years More than 10 years

Questionnaire number one:

Information about the efficiency of operations within the Oil & Gas sector in Saudi Aramco.

#	Improving the efficiency of operations within the Oil and Gas sector in Saudi Aramco	Strongly agree	Agree	Neutral	Dis agree	Strongly disagree
<u>A</u>	<u>All Parties-related causes:</u>					
	Incompetent project team					
	Personality clash between two or more members/service companies from different parties					
	Poor planning and scheduling of the project.					
<u>B</u>	<u>Consultant/designer-related causes:</u>					
	Design errors					
	Inadequate cost estimating approach / inaccurate material estimation					
	Inadequate quality control/assurance					
	Inadequate management of contractor's schedule by consultant					
	Unforeseen conditions and structural modifications					
	Weak and insufficient technical studies					
<u>C</u>	<u>Contract-related causes:</u>					
	Poor communication among the parties					
	Discrepancies in contract documents					
	Poorly defined payment milestones					
	Lack of communication with suppliers in the engineering and procurement phases					
	Poor project implementation strategies					
<u>D</u>	<u>External-related causes:</u>					
	Impact of weather conditions on work					
	Impact of formation's stability on work					
	Impact of sea's condition on work					
	Impact of onshore/offshore' s location on work					
<u>E</u>	<u>Owner-related causes:</u>					
	Deficient documentation and incomplete scope definition					
	Changing of design and scope by client during construction					
	Long project approval procedures					
	Many stakeholders					
	Poor definition of subsurface data					
<u>F</u>	<u>Resources-Related Causes:</u>					
	Labor's lack of skills and productivity					
	Lack of equipment					
	Manpower shortage					
	Material procurement issues					

Table 63: Questionnaire number one

Questionnaire number two:

Information about the budget & economy within the Oil and Gas sector in Saudi Aramco

#	Improving the project budget and economy within the Oil and Gas sector in Saudi Aramco	Strongly agree	Agree	Neutral	Dis agree	Strongly disagree
<u>A</u>	<u>All Parties-related causes:</u>					
	Incompetent project team					
	Personality clash between two or more members/service companies from different parties					
	Poor planning and scheduling of the project.					
<u>B</u>	<u>Consultant/designer-related causes:</u>					
	Design errors					
	Inadequate cost estimating approach / inaccurate material estimation					
	Inadequate quality control/assurance					
	Inadequate management of contractor's schedule by consultant					
	Unforeseen conditions and structural modifications					
	Weak and insufficient technical studies					
<u>C</u>	<u>Contract-related causes:</u>					
	Poor communication among the parties					
	Discrepancies in contract documents					
	Poorly defined payment milestones					
	Lack of communication with suppliers in the engineering and procurement phases					
	Poor project implementation strategies					
<u>D</u>	<u>External-related causes:</u>					
	Impact of weather conditions on work					
	Impact of formation's stability on work					
	Impact of sea's condition on work					
	Impact of onshore/offshore's location on work					
<u>E</u>	<u>Owner-related causes:</u>					
	Deficient documentation and incomplete scope definition					
	Changing of design and scope by client during construction					
	Long project approval procedures					
	Many stakeholders					
	Poor definition of subsurface data					
<u>F</u>	<u>Resources-Related Causes:</u>					
	Labor's lack of skills and productivity					
	Lack of equipment					
	Manpower shortage					
	Material procurement issues					

Table 64: Questionnaire number two

Questionnaire number three:

Information about the Cost-Consciousness within the Oil and Gas sector in Saudi Aramco

#	<u>Improving the project Cost-Consciousness within the Oil and Gas sector in Saudi Aramco</u>	Strongly agree	Agree	Neutral	Dis agree	Strongly disagree
<u>A</u>	<u>All Parties-related causes:</u>					
	Incompetent project team					
	Personality clash between two or more members/service companies from different parties					
	Poor planning and scheduling of the project.					
<u>B</u>	<u>Consultant/designer-related causes:</u>					
	Design errors					
	Inadequate cost estimating approach / inaccurate material estimation					
	Inadequate quality control/assurance					
	Inadequate management of contractor's schedule by consultant					
	Unforeseen conditions and structural modifications					
	Weak and insufficient technical studies					
<u>C</u>	<u>Contract-related causes:</u>					
	Poor communication among the parties					
	Discrepancies in contract documents					
	Poorly defined payment milestones					
	Lack of communication with suppliers in the engineering and procurement phases					
	Poor project implementation strategies					
<u>D</u>	<u>External-related causes:</u>					
	Impact of weather conditions on work					
	Impact of formation's stability on work					
	Impact of sea's condition on work					
	Impact of onshore/offshore's location on work					
<u>E</u>	<u>Owner-related causes:</u>					
	Deficient documentation and incomplete scope definition					
	Changing of design and scope by client during construction					
	Long project approval procedures					
	Many stakeholders					
	Poor definition of subsurface data					
<u>F</u>	<u>Resources-Related Causes:</u>					
	Labor's lack of skills and productivity					
	Lack of equipment					
	Manpower shortage					
	Material procurement issues					

Table 65: Questionnaire number three