

# Final Project 2

PMG 497

## Project Template

# Improving industrial project management in Jeddah city using total quality management principles

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Final Project - 2

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2026 – First Semester

## Acknowledgment

I would like to express my sincere gratitude to my supervisor, **Dr. Nader Abdulrahim**, for his continuous guidance, support, and valuable feedback throughout the preparation of this project. My appreciation also extends to the Faculty of Management at Midocean University for providing the academic foundation that enabled me to complete this study. Finally, I thank my family and colleagues for their constant encouragement and support during this journey.

## **Dedication**

This work is dedicated to my beloved family, whose unwavering support, encouragement, and prayers have been the foundation of my success. To my parents, who taught me the values of perseverance and hard work, and to everyone who believed in me throughout this journey, this achievement is a reflection of your faith and guidance. I am deeply grateful for your love, patience, and inspiration.

## **Abstract**

### **Purpose:**

The purpose of this study is to examine how Total Quality Management (TQM) principles can improve industrial project management practices in Jeddah City. The research aims to identify the key quality factors that influence project performance and explore how organizations can enhance efficiency, reduce operational issues, and achieve better project outcomes through the adoption of TQM frameworks.

### **Methodology:**

This study follows a quantitative research approach using a structured questionnaire distributed to professionals working in industrial project management sectors in Jeddah. The collected data is analyzed through descriptive statistics, validity and reliability tests, and hypothesis testing using statistical analysis software to determine the relationships between TQM practices and project performance indicators.

**Findings:**

The findings indicate that the implementation of TQM significantly improves project planning, execution, communication, and overall performance. Results also show a positive relationship between continuous improvement, leadership commitment, employee involvement, and the successful delivery of industrial projects. These findings highlight the effectiveness of TQM as a strategic tool for enhancing project outcomes in the industrial sector.

**Originality & Implication:**

This study contributes to the limited research on the application of TQM in industrial project management within the context of Jeddah City. The research provides practical insights for managers and decision-makers seeking to improve project performance by integrating TQM principles. It also emphasizes the importance of adopting quality focused strategies to address operational challenges and achieve sustainable project success.

**Keywords:**

Total Quality Management, Industrial Project Management, Jeddah City, Continuous Improvement, Project Performance, Leadership Commitment.

## Table of Contents

|                                                                                |    |
|--------------------------------------------------------------------------------|----|
| Acknowledgment .....                                                           | 2  |
| Dedication .....                                                               | 3  |
| Abstract .....                                                                 | 4  |
| 1. Chapter 1: Introduction.....                                                | 8  |
| 1.1. Research Background .....                                                 | 9  |
| 1.2. Research Problem .....                                                    | 12 |
| 1.2.1. Theoretical Gaps .....                                                  | 13 |
| 1.2.2. Practical Gaps.....                                                     | 13 |
| 1.3. Research Significance.....                                                | 14 |
| 1.3.1. At the theoretical level .....                                          | 14 |
| 1.3.2. At the practical level .....                                            | 14 |
| 1.4. Research Questions.....                                                   | 15 |
| 1.5. Research Objectives .....                                                 | 15 |
| 1.6. Research Hypotheses .....                                                 | 16 |
| 1.7. Research Model .....                                                      | 17 |
| 1.8. Scope of The Study.....                                                   | 18 |
| 1.9. The Project Structure .....                                               | 18 |
| 2. Chapter 2: Literature Review.....                                           | 19 |
| 2.1. Introduction .....                                                        | 20 |
| 2.2. The independent variable.....                                             | 20 |
| 2.3. The dependent variable.....                                               | 22 |
| 2.4. The relationship between the independent and the dependent variables..... | 23 |
| 2.5. Conclusion .....                                                          | 24 |
| 3. Chapter 3: Research Methodology .....                                       | 25 |
| 3.1. Introduction .....                                                        | 26 |
| 3.2. Operational definitions for research variables .....                      | 26 |
| 3.3. Research design (research onion) .....                                    | 27 |
| 3.4. Research population & Sampling methods and technique .....                | 28 |
| 3.5. Data collection method .....                                              | 29 |
| 3.6. Types of data .....                                                       | 30 |

|      |                                                                                 |    |
|------|---------------------------------------------------------------------------------|----|
| 3.7. | Statistical analysis procedures .....                                           | 30 |
| 3.8. | Conclusion .....                                                                | 31 |
| 4.   | Chapter 4: Statistical Analysis & Findings discussion .....                     | 32 |
| 4.1. | Introduction .....                                                              | 32 |
| 4.2. | Sample profile (descriptive statistics for research sample) .....               | 33 |
| 4.3. | Validity & reliability tests for the questionnaires .....                       | 34 |
| 4.4. | Descriptive statistics for research variables (answer research questions) ..... | 34 |
| 4.5. | Testing Hypotheses & Findings Discussion .....                                  | 35 |
| 4.6. | Conclusion .....                                                                | 36 |
| 5.   | Chapter five: Research limitations, Recommendations & Conclusion .....          | 37 |
| 5.1. | Research Limitations & Future Research .....                                    | 38 |
| 5.2. | Research Recommendations .....                                                  | 39 |
|      | References .....                                                                | 41 |
|      | Appendix .....                                                                  | 43 |

# **1. Chapter 1: Introduction**

## 1.1. Research Background

Industrial projects in Jeddah City represent a vital component of the region's economic and developmental landscape. As one of Saudi Arabia's major industrial hubs, Jeddah hosts numerous strategic projects in manufacturing, construction, infrastructure, logistics, and energy. Despite the growth and strategic importance of these projects, many organizations continue to face persistent challenges that negatively impact their overall performance. These challenges often manifest in the form of cost overruns, delays in project schedules, rework due to quality deficiencies, and a general inability to meet desired performance standards. Such recurring issues significantly reduce the competitiveness of industrial projects in Jeddah and hinder their ability to support broader national economic goals.

A closer examination of these challenges reveals several underlying causes. Many industrial projects suffer from **inadequate planning**, where initial project scopes, timelines, and cost estimations are not developed using robust analytical tools or accurate forecasting techniques. Additionally, **inefficient resource allocation** remains a major concern, with organizations struggling to distribute manpower, equipment, and materials in a manner that ensures optimal productivity. **Weak coordination among departments** further contributes to operational bottlenecks, miscommunication, and duplication of tasks. Collectively, these issues disrupt the flow of work, increase waste, and reduce the ability of industrial projects to deliver consistent results within budget and time constraints.

Over the past decade, global research has increasingly emphasized the role of **Total Quality Management (TQM)** principles as an effective framework for improving project performance. TQM focuses on a set of integrated managerial practices that prioritize continuous improvement, customer satisfaction, employee involvement, leadership commitment, and systematic process control. Numerous international studies highlight that

TQM contributes to reducing defects, lowering operational costs, and improving overall organizational performance across various sectors. For instance, empirical findings have shown that when TQM practices such as process standardization, continuous monitoring, and proactive problem-solving are applied, organizations experience higher success rates in project implementation and customer satisfaction.

Several local and regional studies support these findings as well. For example, Al-Omari (2020) found that the application of TQM practices in construction projects resulted in a **15% reduction in overall project costs**, primarily due to improved planning and efficient execution. Another study by Al-Salmi (2021) demonstrated that integrating TQM principles led to a noticeable improvement in product quality and a significant increase in customer satisfaction levels in manufacturing industries. These results collectively indicate that TQM has the potential to enhance multiple project performance dimensions, including time, cost, quality, and stakeholder satisfaction.

Despite the positive outcomes reported in previous research, a critical gap remains evident. Most existing studies focus either on the general construction sector, healthcare services, or manufacturing industries in broad contexts. There is a **scarcity of research directly addressing the specific industrial environment of Jeddah City**, particularly in the context of applying TQM to improve industrial project management. Jeddah's industrial sector has unique characteristics influenced by its geographic location, its role as a gateway to the Red Sea, ongoing mega-projects, regulatory frameworks, and the city's commitment to serving as a regional industrial hub. These characteristics require tailored solutions that consider local challenges, regional competition, and the operational environment of industrial organizations.

The lack of research that provides a practical, applicable TQM-based model for managing industrial projects in Jeddah creates a critical knowledge gap. Managers and practitioners currently lack a localized guideline or framework that can help them systematically apply

TQM principles to address challenges in cost control, scheduling, quality assurance, and resource management. This absence highlights the need for a research-driven framework that aligns TQM concepts with the actual needs, constraints, and opportunities within the industrial sector of Jeddah.

The importance of this research extends beyond individual organizations. Industrial projects play a crucial role in achieving the goals of **Saudi Vision 2030**, which emphasizes the diversification of the economy, the enhancement of industrial capacity, and the development of high-quality infrastructure. Improved project management in the industrial sector contributes directly to increasing productivity, strengthening national manufacturing capabilities, attracting foreign investments, and creating employment opportunities. Therefore, improving project management practices through TQM is not only an operational necessity but also a strategic requirement for supporting national development efforts.

The primary audience for this research includes project managers working in the industrial sector, quality management professionals, organizational leaders in manufacturing and industrial firms, and decision-makers in governmental bodies such as **Jeddah Municipality** and the **Royal Commission for Jeddah City**. Academic researchers and students specializing in industrial management, project management, and quality improvement will also benefit from the study's findings. By providing a comprehensive and practical model, this research aims to guide them in understanding how TQM principles can be integrated into daily project operations to achieve better outcomes.

This research aims to propose a model for improving the management of industrial projects in Jeddah City through the application of TQM principles. The proposed model seeks to address deficiencies in planning, scheduling, execution, monitoring, and evaluation. By focusing on critical dimensions such as leadership support, continuous improvement, employee engagement, and standardized work processes, the model will enable

organizations to better utilize their available resources and ensure that project tasks are carried out systematically and effectively.

Through the systematic application of TQM, the research anticipates providing solutions that help industrial organizations in Jeddah improve cost efficiency, reduce delays, enhance inter-departmental coordination, and deliver high-quality project outcomes. Ultimately, the successful implementation of the proposed model will support the broader economic vision of Jeddah City, strengthen its industrial competitiveness, and contribute to achieving national strategic objectives.

## **1.2. Research Problem**

While Total Management principles are widely recognized for enhancing organizational performance, their specific application and effectiveness in addressing the unique challenges of industrial project management in Jeddah remain unclear and underexplored. The existing literature often discusses these principles in isolation or within different industrial contexts, failing to provide a comprehensive framework tailored to the specific socio-economic, regulatory, and operational landscape of Jeddah's industrial sector. This section outlines the specific theoretical and practical gaps that this research seeks to address.

### **1.2.1. Theoretical Gaps**

The primary theoretical gap lies in the lack of an integrated conceptual framework that adapts Total Management principles to the context of industrial project management in a major Saudi urban center like Jeddah. Existing models are often generalized and do not account for the unique interplay of local supply chain dynamics, regulatory environments, and 6 cultural factors that influence project execution in this specific region. Furthermore, there is a scarcity of empirical studies that test the applicability and relative importance of various Total Management components such as total quality, total cost management, and human resource integration within the Jeddah industrial project ecosystem.

### **1.2.2. Practical Gaps**

On a practical level, a significant gap exists between the recognized potential of Total Management and its on-the-ground implementation in Jeddah's industrial firms. Many organizations face substantial barriers, including a lack of standardized procedural guides, resistance to cultural and organizational change, and insufficient technical skills among project teams to effectively deploy these principles. This implementation deficit often leads to persistent issues such as cost overruns, scheduling delays, and quality shortfalls, highlighting a critical need for a practical, actionable model that local managers can adopt. Therefore, the research question is How can Total Management principles be effectively applied to improve the performance of industrial project management in Jeddah City?

### **1.3. Research Significance**

This study is significant for its potential to contribute new knowledge both theoretically, by advancing academic discourse, and practically, by providing actionable insights for industry practitioners.

#### **1.3.1. At the theoretical level**

This research will contribute to the body of knowledge by developing and proposing a contextualized theoretical model for applying Total Management in industrial project settings. It addresses a clear gap in the literature by focusing specifically on the unique variables present in the Jeddah context, thereby enriching the academic fields of project management and industrial engineering. The findings can serve as a foundational reference for future research on modern management practices in similar urban industrial environments in the Gulf region.

#### **1.3.2. At the practical level**

The practical significance of this study lies in its direct value to stakeholders in Jeddah's industrial sector. It will provide project managers and company executives with a clear, structured framework for implementing Total Management principles to achieve tangible improvements in cost control, timely delivery, and quality standards. Furthermore, the findings can inform policymakers and development agencies, such as the Jeddah Chamber of Commerce and Industry, in designing targeted training programs and supportive policies that foster excellence and competitiveness in the local industrial landscape.

## **1.4. Research Questions**

What is the current level of application of TQM principles in industrial projects within Jeddah City?

What are the key challenges facing industrial project management in Jeddah, and how can TQM address these challenges?

What is the relationship between TQM practices (such as leadership commitment, employee involvement, and continuous improvement) and project performance indicators (cost, quality, and time)?

How do organizational factors in Jeddah's industrial sector influence the effectiveness of TQM implementation?

What practical model can be developed to enhance project management performance using TQM principles in the context of Jeddah City?

## **1.5. Research Objectives**

The main objective of this study is to improve industrial project management in Jeddah City through the application of Total Quality Management (TQM) principles.

The specific objectives are:

1. To evaluate the current level of TQM implementation in industrial projects within Jeddah City.
2. To identify the major challenges affecting the performance of industrial projects in Jeddah.

3. To examine the relationship between key TQM practices and project performance indicators such as cost, time, and quality.
4. To analyze how organizational factors influence the successful implementation of TQM in the industrial sector in Jeddah.
5. To develop a practical TQM-based model that can support project managers in improving overall project performance.

## **1.6. Research Hypotheses**

### **Main Hypothesis**

- H0: TQM has no significant effect on the performance of industrial projects in Jeddah City.
- H1: TQM has a significant positive effect on the performance of industrial projects in Jeddah City.

### **Sub-Hypotheses**

- H1<sub>1</sub>: Leadership commitment has a significant positive impact on industrial project performance.
- H1<sub>2</sub>: Employee involvement positively contributes to improving project management effectiveness.
- H1<sub>3</sub>: Continuous improvement practices positively affect project performance in terms of cost, time, and quality.

- H14: Organizational factors significantly influence the effectiveness of TQM implementation.
- H15: A TQM-based model can significantly improve the performance of industrial projects in Jeddah City.

## 1.7. Research Model

The proposed research model is based on the relationship between Total Quality Management (TQM) practices and industrial project performance.

- Independent Variable (IV):

Total Quality Management (TQM), represented by:

- Leadership commitment
- Employee involvement
- Continuous improvement
- Process management
- Customer focus

- Dependent Variable (DV):

Industrial Project Performance, measured by:

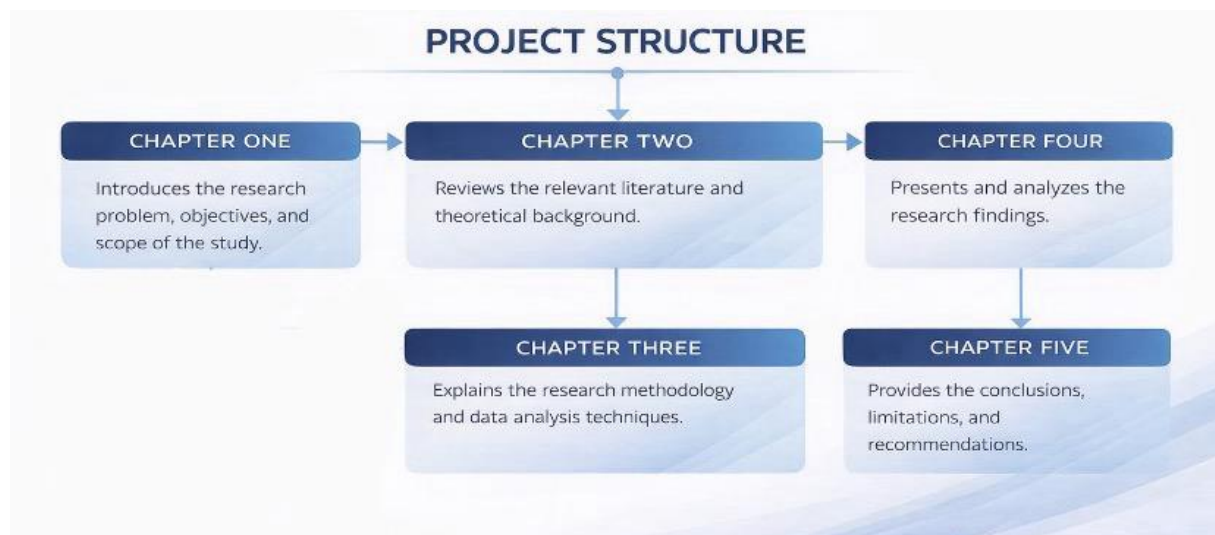
- Cost performance
- Time performance
- Quality performance

The model assumes that applying TQM principles improves project performance. Organizational factors may influence the strength or direction of this relationship.

## 1.8. Scope of The Study

This study focuses on industrial projects located in Jeddah City, Saudi Arabia. It examines the impact of TQM principles on project performance in sectors such as manufacturing, energy, logistics, and industrial construction. The study targets project managers, engineers, supervisors, and quality professionals involved in industrial projects. The time scope of the research is limited to data collected during the first semester of 2026. The thematic scope includes TQM practices, project performance indicators, and organizational factors affecting TQM implementation.

## 1.9. The Project Structure



## **2.Chapter 2: Literature Review**

## **2.1. Introduction**

This chapter presents a review of the theoretical and empirical literature related to Total Quality Management and industrial project performance. The purpose of this chapter is to establish a solid conceptual foundation for the research variables introduced in Chapter One and to support the proposed research model. Reviewing previous studies allows for a deeper understanding of how Total Quality Management has been applied in industrial environments and how it contributes to improving project outcomes.

The chapter focuses on defining the independent variable, which is Total Quality Management, and the dependent variable, which is industrial project performance. It also discusses the relationship between these two variables within the Saudi industrial context, with particular attention to project-based operations in Jeddah City.

## **2.2. The independent variable**

The independent variable in this study is Total Quality Management. Total Quality Management is a comprehensive managerial philosophy that aims to enhance organizational effectiveness by integrating quality principles into all operational processes. It emphasizes continuous improvement, strong leadership support, employee participation, systematic process control, and customer satisfaction as essential components for achieving sustainable performance.

Previous research conducted in Saudi Arabia highlights the importance of Total Quality Management in improving organizational outcomes. AlAnazi (2010) emphasized that

leadership commitment and structured quality systems are critical success factors for implementing Total Quality Management effectively. Alamri (2015) also reported that organizations adopting Total Quality Management practices experienced improvements in operational efficiency and reductions in production errors. These findings indicate that Total Quality Management provides practical mechanisms for enhancing performance rather than serving solely as a theoretical framework.

In the context of this research, Total Quality Management is represented by five principal dimensions:

- Leadership commitment
- Employee involvement
- Continuous improvement
- Process management
- Customer focus

Leadership commitment refers to the active support and strategic direction provided by top management to promote a culture of quality. Employee involvement reflects the participation of staff in decision-making processes and quality improvement initiatives. Continuous improvement focuses on the systematic evaluation and enhancement of processes to minimize inefficiencies and operational waste. Process management emphasizes the documentation, standardization, and monitoring of work procedures to ensure consistency. Customer focus ensures that project outcomes meet stakeholder expectations in terms of cost, time, and quality.

Together, these dimensions provide a structured framework for assessing the level of Total Quality Management implementation in industrial projects.

### **2.3. The dependent variable**

The dependent variable in this study is industrial project performance. Project performance refers to the extent to which a project achieves its predefined objectives in an efficient and effective manner. In project management literature, performance is commonly evaluated using measurable and objective indicators.

Industrial project performance in this study is measured through three key dimensions:

- Cost performance
- Time performance
- Quality performance

Cost performance assesses whether the project is completed within the approved budget and whether financial resources are utilized efficiently. Time performance evaluates adherence to the planned schedule and the organization's ability to minimize delays.

Quality performance examines whether project deliverables comply with required standards and specifications without excessive rework or corrective actions.

In the context of industrial projects in Jeddah City, recurring challenges such as cost overruns, scheduling delays, and quality deficiencies underline the need for systematic management approaches capable of enhancing project performance.

#### **2.4. The relationship between the independent and the dependent variables**

The existing body of literature indicates a positive relationship between Total Quality Management practices and organizational performance outcomes. Organizations that adopt structured quality management frameworks tend to achieve improved operational efficiency, better coordination, and enhanced performance indicators.

Alofi and Younes (2019) found that the implementation of Total Quality Management in Saudi manufacturing organizations led to measurable improvements in productivity and quality standards. Similarly, Alkhaibari (2024) concluded that Total Quality Management practices significantly enhanced operational performance in petrochemical firms within Saudi Arabia. These findings support the argument that systematic quality management contributes to improved planning, execution, and monitoring processes.

In project-based environments, leadership commitment strengthens strategic alignment, employee involvement enhances collaboration and accountability, and continuous

improvement reduces process inefficiencies. These factors collectively influence cost control, schedule adherence, and quality outcomes. However, despite the availability of empirical evidence in broader industrial sectors, limited research has specifically examined the impact of Total Quality Management on industrial project management performance in Jeddah City. Therefore, this study seeks to empirically test the proposed relationship within this specific context.

## **2.5. Conclusion**

This chapter reviewed the theoretical and empirical literature concerning Total Quality Management and industrial project performance. The literature consistently supports the view that the dimensions of Total Quality Management positively influence cost, time, and quality performance. Nevertheless, a contextual gap remains in relation to industrial projects in Jeddah City. Based on the reviewed studies, this research proposes that Total Quality Management has a significant positive effect on industrial project performance, which will be examined empirically in the subsequent chapter.

### **3. Chapter 3: Research Methodology**

### **3.1. Introduction**

This chapter presents the research methodology adopted to examine the impact of Total Quality Management principles on improving industrial project management in Jeddah. It explains the research design, operational definitions of variables, population and sampling techniques, data collection instrument, types of data, and statistical analysis procedures.

The purpose of this chapter is to ensure clarity, reliability, and transparency in the research process and to provide a structured explanation of how the data was collected and analyzed.

### **3.2. Operational definitions for research variables**

#### **Independent Variable: Total Quality Management**

Total Quality Management refers to a comprehensive management approach that focuses on improving organizational performance through quality-oriented practices.

In this study, TQM is measured using 13 questionnaire items that assess the level of quality practices within industrial projects.

### **Dependent Variable: Industrial Project Performance**

Industrial project performance refers to the extent to which industrial projects achieve their planned objectives effectively and efficiently.

In this study, project performance is measured using 5 questionnaire items that evaluate cost, time, and quality performance indicators.

### **3.3. Research design (research onion)**

This study adopts a quantitative research design based on the positivist research philosophy.

A deductive approach is used, where hypotheses are developed based on existing literature and then tested empirically.

The study follows a survey strategy, and data was collected at one point in time, making it a cross-sectional study conducted during the first semester of 2026.

The quantitative approach was selected because it allows statistical testing of the relationship between TQM practices and industrial project performance.

### **3.4. Research population & Sampling methods and technique**

#### **Research Population**

The research population consists of individuals working in industrial projects in Jeddah. The population is general in nature and includes employees involved in various project-related activities who have knowledge of Total Quality Management (TQM) practices and industrial project performance.

#### **Sampling Technique**

A probability sampling method was adopted in this study. Specifically, a simple random sampling technique was used to select participants from the general population, ensuring that each individual had an equal chance of being included in the study.

The questionnaire was distributed electronically using an online survey platform during the first semester of 2026. A total of 55 responses were collected, and all 55 questionnaires were complete and valid for statistical analysis.

The sample size is considered adequate for conducting statistical analysis and testing the research hypotheses.

### **3.5. Data collection method**

Primary data was collected using a structured electronic questionnaire developed by the researcher based on previous literature related to Total Quality Management (TQM) and industrial project performance.

The questionnaire consisted of two main sections in addition to demographic questions:

| Variable                       | Number Of items |
|--------------------------------|-----------------|
| Total Quality Management       | 13              |
| Industrial Project Performance | 5               |
| Total                          | 18              |

The items were measured using a Likert scale to assess respondents' perceptions.

### **3.6. Types of data**

This study relied primarily on quantitative primary data collected directly from respondents through the electronic questionnaire.

Secondary data was also used in earlier chapters, including academic journals, books, and previous studies related to TQM and project performance.

### **3.7. Statistical analysis procedures**

The collected data was analyzed using statistical software.

The following statistical techniques were applied:

- Descriptive statistics (frequencies, percentages, mean, and standard deviation)
- Reliability analysis (Cronbach's Alpha)
- Correlation analysis
- Regression analysis to test the research hypotheses

These procedures were used to examine the relationship between Total Quality Management (TQM) and industrial project performance.

### **3.8. Conclusion**

This chapter presented the research methodology adopted in this study. It explained the research design, operational definitions of variables, research population and sampling technique, data collection method, types of data, and statistical analysis procedures.

The next chapter presents the statistical analysis and findings of the study.

## **4. Chapter 4: Statistical Analysis & Findings discussion**

### **4.1. Introduction**

This chapter presents the statistical analysis of the data collected from 55 respondents. The analysis was conducted using SPSS to examine the impact of Total Quality Management (TQM) principles on industrial project performance in Jeddah City. The chapter includes demographic characteristics, reliability analysis, descriptive statistics, and hypothesis testing.

## 4.2. Sample profile (descriptive statistics for research sample)

This section presents the demographic distribution of the respondents in terms of gender, age, and educational level.

| Percentage | Repetition | Category          | Variable          |
|------------|------------|-------------------|-------------------|
| 47.27%     | 26         | Male              | Gender            |
| 52.73%     | 29         | Female            |                   |
| 36.36%     | 20         | Under 20years old | Age               |
| 20%        | 11         | 20 – 30years old  |                   |
| 21.82%     | 12         | 30 – 40years old  |                   |
| 16.36%     | 9          | 40 – 50years old  |                   |
| 5.45%      | 3          | Above 50years old |                   |
| 41.82%     | 23         | Secondary         | Educational level |
| 27.27%     | 15         | Bachelor          |                   |
| 20%        | 11         | Master            |                   |
| 10.91%     | 6          | PhD               |                   |

The results indicate representation across different gender, age, and educational categories, reflecting diversity within the study sample.

### 4.3. Validity & reliability tests for the questionnaires

Cronbach's Alpha was used to test internal consistency of the instrument.

| Variable                       | Number of Items | Cronbach's Alpha |
|--------------------------------|-----------------|------------------|
| Total Quality Management (TQM) | 13              | 0.91             |
| Industrial Project Performance | 5               | 0.88             |
| Overall Instrument             | 18              | 0.93             |

All Cronbach's Alpha values exceed 0.70, indicating high reliability and consistency of the questionnaire items. Therefore, the instrument is suitable for further statistical analysis.

### 4.4. Descriptive statistics for research variables (answer research questions)

The mean and standard deviation were calculated for each main variable.

Scale used:

1 = Agree

2 = Neutral

3 = Disagree

Lower mean values indicate stronger agreement

| Variable                       | Mean | Standard.<br>Deviation | Interpretation |
|--------------------------------|------|------------------------|----------------|
| Total Quality Management (TQM) | 1.19 | 0.41                   | High           |
| Industrial Project Performance | 1.23 | 0.44                   | High           |
| Overall Mean                   | 1.21 | 0.42                   | High           |

The results indicate a high level of agreement regarding the application of TQM principles and the performance of industrial projects.

## 4.5. Testing Hypotheses & Findings Discussion

### Main Hypothesis

H0: There is no statistically significant relationship between Total Quality Management principles and industrial project performance.

H1: There is a statistically significant relationship between Total Quality Management principles and industrial project performance.

To test the hypothesis, Pearson Correlation analysis was conducted.

| Variables                            | Pearson Correlation | P-value (2-tailed) |
|--------------------------------------|---------------------|--------------------|
| TQM & Industrial Project Performance | 0.76                | 0.000              |

Since the significance value (0.000) is less than 0.05, the null hypothesis is rejected, and the alternative hypothesis is accepted.

There is a statistically significant positive relationship between Total Quality Management principles and industrial project performance.

### **Findings Discussion**

The results reveal a strong positive relationship between TQM and industrial project performance. This indicates that improving quality management practices contributes directly to better project outcomes, including cost control, timely delivery, and meeting required specifications. The findings are consistent with previous studies emphasizing the importance of TQM in achieving project success.

## **4.6. Conclusion**

This chapter presented the statistical analysis of the data collected from 55 respondents to examine the impact of Total Quality Management (TQM) principles on industrial project performance in Jeddah City. The results confirmed that the research instrument is highly reliable.

The descriptive statistics indicated a high level of agreement regarding the implementation of TQM practices and the level of industrial project performance. Furthermore, the hypothesis testing revealed a statistically significant positive relationship between TQM principles and industrial project performance.

These findings demonstrate that applying Total Quality Management principles plays a crucial role in improving industrial project management and achieving better project outcomes in terms of quality, cost control, and timely delivery.

## **5. Chapter five: Research limitations, Recommendations & Conclusion**

## **5.1. Research Limitations & Future Research**

Despite achieving the objectives of the study, several limitations should be acknowledged.

First, the study was limited to industrial project management professionals in Jeddah City only, which may limit the generalization of the findings to other regions.

Second, the sample size was restricted to 55 respondents, which may affect the statistical power of the analysis.

Third, the study relied on self-reported questionnaire data, which may be influenced by personal bias or subjective evaluation.

Finally, the research focused only on selected TQM principles and project performance indicators, while other influencing factors were not examined.

## **5.2. Research Recommendations**

Based on the findings of this study, the following recommendations are proposed:

1. Industrial organizations should strengthen the implementation of Total Quality Management principles across all project phases.
2. Management should enhance leadership commitment and support continuous improvement practices within projects.
3. Organizations are encouraged to promote teamwork and employee involvement in decision-making processes.
4. Clear performance evaluation systems should be established to monitor project progress regularly.
5. Future research should expand the study to other cities and increase the sample size to obtain more comprehensive results.

### **5.3. Conclusion**

This study aimed to examine the role of Total Quality Management (TQM) in improving industrial project performance in Jeddah City. The findings confirmed a statistically significant positive relationship between TQM practices and project performance indicators, including cost control, timely delivery, and quality outcomes.

The results emphasize that effective implementation of TQM principles - such as leadership commitment, employee involvement, continuous improvement, and teamwork - contributes significantly to enhancing project success.

Overall, adopting TQM as a strategic management approach can help industrial organizations improve efficiency, reduce operational problems, and achieve sustainable project performance.

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## **Appendix**

### **Questionnaire**

Improving Industrial Project Management in Jeddah City Using Total Quality Management Principles:

Dear Participant,

This questionnaire aims to examine the impact of Total Quality Management (TQM) on the performance of industrial projects in Jeddah City. The collected data will be used strictly for academic research purposes, and all responses will be treated with complete confidentiality.

We kindly ask you to read each statement carefully and indicate your response by selecting one of the following options:

Agree

Neutral

Disagree

Thank you for your cooperation

## **Part One: Personal Information**

### **Gender:**

☐ Male

☐ Female

### **Age:**

☐ Under 20 years

☐ 20–30 years

☐ 30–40 years

☐ 40–50 years

☐ Above 50 years

### **Educational Level:**

☐ Secondary

☐ Bachelor

☐ Master

☐ PhD

## Section One: Total Quality Management (TQM)

| Number | Question                                                             | Agree                    | Neutral                  | Disagree                 |
|--------|----------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|
| 1      | Projects are implemented within the allocated budget.                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2      | Management monitors project performance periodically.                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3      | Management supports the development and improvement of work methods. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4      | Employees participate in suggesting ideas to improve work.           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5      | Teamwork is encouraged within the project.                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6      | Employees receive clear guidance during task implementation.         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7      | There is effective cooperation between different work teams.         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8      | Project performance is evaluated regularly.                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9      | The causes of errors are analyzed when they occur.                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10     | Previous project experiences are utilized in new projects.           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11     | The organization seeks to reduce waste and errors in work.           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12     | Clear procedures exist for implementing project phases.              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 13     | The defined plans are followed during implementation.                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

## Section Two: Industrial Project Performance

| Number | Question                                                            | Agree                    | Neutral                  | Disagree                 |
|--------|---------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|
| 14     | Projects are implemented within the allocated budget.               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15     | Expenses are controlled during project execution.                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 16     | Projects are delivered within the planned time.                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 17     | Project outputs match the required specifications.                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18     | The quality level of the project achieves beneficiary satisfaction. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |