



FINAL PROJECT PROPOSAL

The Impact of the Application of Total Quality Management on Construction Projects in Saudi Arabia

أثر تطبيق إدارة الجودة الشاملة على مشاريع البناء في المملكة العربية السعودية



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Dedication

To our mothers, fathers, brothers, and sisters

To our dear wives

To our lovely sons & daughters

Allah bless them all

For their support, encouragement, and constant assistance in bringing this work to light.

With love and respect

(To be completed)

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Declaration

(In progress)

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List of abbreviations

TQM Total Quality Management

ISO International Organization for Standardization

QA Quality Assurance

QC Quality Control

QM Quality Management

QSM Quality Management System

QS Quality Systems

SA Saudi Arabia

FIDIC Federation International of Consulting Engineers

SPSS Statistical Package for Social Science

PMBOK Project Management Body of Knowledge

BS British Standards

CSFs Critical Success Factors

SPSS Statistical Package for Social Sciences

ICT Information and Communication Technologies

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English abstract

(In progress)

Keywords: Total Quality Management, Construction projects, Saudi Arabia

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Arabic abstract

(In progress)

الكلمات المفتاحية: إدارة الجودة الشاملة، المشاريع الانشائية، المملكة العربية السعودية

1. Introduction

Enhancing work excellence and performance is crucial for companies and project managers to gain strategic advantages and stay competitive. Total Quality Management (TQM) is crucial for Saudi construction projects to be completed successfully and to the satisfaction of all parties involved.

TQM has been recognized as a management concept that empowers systems and processes to meet increasing customer demands through a relentless pursuit of continuous improvement, emphasizing teamwork and the ethical application of management techniques (Abazid, Gökçekus & Çelik, 2019). TQM concepts were first employed in the manufacturing sector in Japan and have more recently been adopted in the United States. These concepts have increased productivity, decreased product costs, and increased product reliability (Stasiowski & Burstein, 1994).

Quality Management (QM) offers an effective means to accomplish this aim. The International Organization for Standardization (ISO) and TQM are only two examples of Quality Management Systems (QMS) that businesses are working hard to embrace and apply (Al-Musleh, 2010).

The construction industry in Saudi Arabia (SA) has grown significantly during the last ten years. It should be highlighted that building developments are regarded as one of the most fruitful investment stages globally. Construction projects today focus on traditional outcomes and quality, cost-effectiveness, cost reduction, time and resource conservation (Abazid & Harb, 2018).

Engineering construction initiatives in Saudi Arabia have experienced production deficiencies and flimsy execution phases in the past and up until this day. The developments also suffer from a lack of planning, leading, observing, and evaluating. This is the outcome of insufficient quality standards and a marked lack of interest on the part of the higher department in applying the concepts of quality, which focus on generating quick profits.

The lack of responsibility on the part of the highest management of corporations and establishments in the construction industry to use the necessary efforts for manipulating the quality theories goes along

with their principles that the application of quality necessitates additional justified time and effort. The lack of effective coordination and communication among the key players in a construction project, such as the owner, designer, executor, and supervisor, led to a lack of standards and specifications, which hampered the project's implementation process. Additionally, the reliance on unqualified or inexperienced subcontractors violated the project's specifications and requirements (Wheaton & Schrott, 2018).

This research highlights several serious problems that have arisen from implementing TQM in the Saudi construction sector. Despite disparities in economic development, most countries share the same challenges of inadequate design, defective products, and shoddy construction (Metri, 2005). However, Bryde & Robinson (2005) state that the vast majority of contractors have fallen short of their stakeholders' expectations in terms of cost, quality, and timeliness.

While numerous studies have been published on the subject of TQM's use in other sectors, very few have zeroed in on the building industry. According to Metri (2005), this is because the construction sector is notoriously slow to adopt TQM-inspired reforms. Therefore, it has been identified as important to develop strategies to promote coordination between concept, design, and implementation by shifting from a culture of conflict to one of collaboration in order to boost productivity, reduce costs, and boost customer satisfaction.

As such, the purpose of this study is to assess how well the overall quality theories have been implemented in practice during the delivery of Saudi building projects. As the construction industry is currently facing the significant challenge of implementing TQM. Thus, TQM emphasizes process improvement, teamwork, customer and supplier involvement, and training and education to achieve customer satisfaction, cost-effectiveness, defect-free projects, and a culture and environment conducive to innovation and technology advancement (Arditi & Gunaydin, 1997). In light of this, the present research will be conducted to address the following fundamental question: What is the impact of applying TQM to construction projects in Saudi Arabia?

2. Research problem

TQM is becoming more and more popular in the Kingdom of Saudi Arabia's construction sector, yet little is known about its practical effects on project outcomes. The effectiveness of TQM in raising project quality, lowering costs, and increasing customer satisfaction in the context of building projects in the Kingdom of Saudi Arabia, therefore, requires a thorough investigation. This research should also examine the particular TQM techniques that are most successful in the Saudi construction sector and pinpoint any obstacles that might stand in the way of efficient TQM application there. The findings of this study can ultimately help the Saudi Arabian construction industry create best practices for TQM adoption, which will help the region's construction project outcomes overall.

Nimra et al., (2022) have focused on TQM in Pakistan and its effects on various aspects of performance have been analyzed. These include firm supply performance, export performance, innovation performance, corporate green performance, organizational performance, business performance, and public sector university performance. However, there is a lack of data on the impact of TQM on the local construction sector. Existing studies have focused on certain topics including structural collapse, ISO certifications, and information and communication technologies (ICT) based modeling.

Previous literature reviews have shown that there are few papers discussing quality management at a public level. It is difficult to examine quality because of lax regulation and a lack of implementation of quality measures in all regions and buildings (Vijayabanu, et al., 2021).

Syaj (2015) focused on examining how TQM adds value to construction projects in Palestine. They found that TQM can add value by improving quality, reducing costs, increasing productivity, and enhancing customer satisfaction.

This investigation seeks to answer the fundamental question of how TQM impacts construction projects in Saudi Arabia. The findings of this study will have implications for construction companies, engineering consultant offices, and project managers in Saudi Arabia who are implementing TQM and attempting to increase the value of their projects.

The principal outcome of this study is the development of a management model for the introduction of TQM in Saudi construction firms, consulting engineering offices, and project management positions. This model will serve as a tool for measuring TQM and evaluating a company's quality management strengths and deficiencies. The application of this model will result in the continuous enhancement of construction project performance, leading to higher quality outcomes, increased productivity, and increased customer satisfaction and other factors.

3. The importance and objectives of the research

Following a review of relevant prior research, the researchers aimed to accomplish the following with the current study:

- **Improve construction project outcomes:** This research can help to identify the factors that contribute to successful implementation of TQM practices in the construction industry in Saudi Arabia. The outcomes of this research can lead to improved project quality, reduced costs, and enhanced customer satisfaction, ultimately improving construction project outcomes.
- **Enhance the competitiveness of the construction industry by identifying the TQM practices that promote long-term adoption and competitiveness.** The outcomes of this research can help construction companies in Saudi Arabia to stay competitive in the global market.
- **Contribute to the development of best practices:** This research can contribute to the development of best practices for TQM implementation in the Saudi construction sector, help to improve project outcomes and enhance the reputation of the industry.
- **Support government initiatives:** This research can support government initiatives aimed at improving the quality and efficiency of construction projects in Saudi Arabia by providing evidence-based insights into the impact of TQM practices on project outcomes.

3.1 Study questions

This research will address the following questions:

Question 1: How does the application of TQM practices in construction projects in Saudi Arabia impact project quality, and what are the specific TQM practices that are most effective in improving quality?

Question 2: How does the application of TQM practices in construction projects in Saudi Arabia impact project costs, and what are the specific TQM practices that are most effective in reducing costs?

Question 3: How does the application of TQM practices in construction projects in Saudi Arabia impact customer satisfaction, and what are the specific TQM practices that are most effective in enhancing customer satisfaction?

Question 4: To what extent does the level of employee involvement in TQM practices in construction projects in Saudi Arabia affect project success, and what are the specific TQM practices that promote employee involvement?

Question 5: What factors (Top Management Commitment, Process Management, Continuous Improvement and etc..) influence the adoption of TQM practices in construction projects in Saudi Arabia, and how do these factors impact the successful implementation of TQM practices?

3.2 Objectives

The primary objective of this study is to shed light on the application of TQM concepts in the building sector, which improve the quality, timeliness, and cost-effectiveness of project delivery. In order to accomplish this, we need to accomplish the following goals:

Objective 1: To evaluate the effectiveness of TQM practices in improving project quality, reducing costs, and enhancing customer satisfaction in construction projects in Saudi Arabia.

Objective 2: To identify the specific TQM practices that are most effective in the Saudi construction industry and explore how these practices can be implemented to achieve the desired outcomes.

Objective 3: To identify the barriers to successful TQM implementation in the Saudi construction industry and develop strategies to overcome these barriers.

Objective 4: To explore the factors that influence the adoption of TQM practices in the Saudi construction industry and develop recommendations for promoting the adoption of these practices.

Objective 5: To assess the long-term impact of TQM practices on the competitiveness of construction companies in Saudi Arabia.

4. Research hypotheses

The following hypotheses will be tested in order to complete the objectives of the research successfully:

Hypothesis 1: The application of TQM in construction projects in Saudi Arabia will lead to an improvement in project quality.

Hypothesis 2: The implementation of TQM practices in construction projects in Saudi Arabia will result in a reduction in project costs.

Hypothesis 3: The adoption of TQM principles in construction projects in Saudi Arabia will lead to an increase in customer satisfaction.

Hypothesis 4: The use of TQM in construction projects in Saudi Arabia will improve project completion time.

Hypothesis 5: The application of TQM practices in construction projects in Saudi Arabia will lead to an increase in employee engagement and motivation.

5. Literature review

TQM is being developed in a variety of other fields, including manufacturing, marketing, strategy, and engineering. TQM also helps in sub-functional domains like construction.

Various studies in the literature define TQM from various perspectives; for example, the Deming approach, 1986 emphasized the importance of top management responsibilities while Juran's approach, 1993 emphasized QC circles and self-managing teams. In addition, Feigenbaum's approach emphasized setting quality standards while Ishikawa's approach, 1985 studied cause and effect relationships using statistical approaches.

TQM has been largely regarded as a winning management philosophy that can be successfully implemented in the construction business (Elghamrawy & Shibayama, 2008). The TQM technique should be emphasized in the construction industry to increase quality and productivity while eliminating waste (Harrington et al., 1992). Significant economic gains can be obtained by applying and quantifying TQM procedures (McIntyre et al., 2000).

According to Ngowi (2000), TQM is an integrated strategy that takes into account cultural values and assumptions in a way that allows cultural values to be successfully hosted by organizational practices. Improvements in commitment, quality strategy planning, customer focus, project management, and quality data analysis are among the most important steps (Liao et al., 2018).

Additionally, Al-Tayeb (2008) researched TQM to identify critical success criteria and create a model for incorporating TQM into the planning, design, and construction of a variety of projects in the Gaza Strip. The questionnaire served as a means of gathering information. The research uncovered 8 primary components and 81 secondary factors. In this study, the Pareto principle was utilized to determine which aspects of TQM adoption on construction projects in the Gaza Strip needed more attention. According to the findings, 7 Critical Success Factors (CSFs) and 38 essential subfactors are required for TQM to be effectively implemented.

Based on AL-Sehali (2001) study, the overarching goal of the research was to create a framework for implementing TQM in the construction industry in Bahrain through the creation of a dynamic specifications model to enhance construction performance, enhance the relationship between consultants, clients, builders, and suppliers, keep costs under control, and lessen the number of disputes, claims, and variations that occur during construction.

Landin (2000) examined how QM is used in Swedish construction and its effects. To cover the entire construction process, many companies were studied from different categories. Interviews, key-factors, and ISO 9001 data sorting were the main methodologies. QM was found to boost efficiency and competitiveness. Inspections started most QMs, likely because of customer needs.

Companies had trouble sourcing resources for these examinations, making them useless. Over time, ISO 9001 acceptance increased. Companies didn't use all components of ISO 9001 because they didn't value them equally. In conclusion, ISO 9001-based quality systems in construction were utilized to varied degrees and were gaining acceptability.

Many firms' QM implementations fail due to implementation challenges (Yusoff et al., 2006). Poor management and staff attitudes, limited resources, training, and surroundings hinder implementation (Willar, 2012).

Yusoff et al., (2006) listed QM's challenges as high cost, especially initial cost, resistance to change, loss of productivity due to learning the new system, management interference, limited ability of personnel, remote job sites that are hard to control, and communication issues within the workforce.

Abdul-Rahman and Tan (2005) identified several barriers to implementing TQM on construction sites: too much paperwork, transient workforce, field employees view TQM as irrelevant, difficulty measuring results, low bid, and subcontractors and suppliers not interested in TQM.

TQM implementation requires identifying key elements. Saraph et al., (1989) identified eight TQM CSFs in their QM instrument. Their study influenced further studies, which developed distinct frameworks based on diverse views (Zhang, 2000).

Although these frameworks have distinct TQM techniques, they all emphasize leadership, strategic planning, customer and market focus, human resources focus, process management, continuous improvement, and supplier management (Dale, 2003).

An exhaustive analysis of TQM literature from quality leaders, quality award models, and QM studies in the construction industry yielded the following 26 important factors: Management / Leadership, Quality Department Role, Training, Employee Relations, Information & Analysis, Supplier Quality Management, Product/Service Design, Process Management, Customer Management, Teamwork, Continuous Improvement, Planning, Employee Involvement, Benchmarking/ Deliverables, Vision and

Plan Statement, Evaluation, Communication, Statistical Process Control, Learning, Recognition and Reward, Contract Documents, Materials & Equipment, Financial Issuance.

The study reorganized all of the factors so that those that dealt with the same difficulties will be grouped together. The final list of CSFs for implementing TQM on construction projects will be as followed: Top management commitment and leadership, Human resource management, External Customer Focus, Supplier quality management, Process management, Information Analysis and Evaluation, Continuous Improvement, Contract Documents, Materials & Equipment, Financial Issues, Site Layout, Systems Used, and Surrounding Environment. These factors are essential for the successful implementation of TQM on construction projects.

6. Research methodology

The methodology adopted for the study on the introduction of TQM in construction companies in Saudi Arabia involves a three-phase approach. This study uses a cross-sectional approach to examine how TQM will influence construction projects in Saudi Arabia.

The target sample comprises Saudi construction professionals (Contractors, Consultants, Engineers, and Project Managers). Purposive sampling will be used to choose people who are working in the same field of construction. The sample size will be selected based on practicality and suitability factors, and a total of at least 50 participants will be included in the study.

Participants will be recruited by using a combination of convenience and snowball sampling methods. Professional networks, social groups for engineering, and construction sector contacts will be used to find the participants. They will then be invited to refer to other potential individuals who satisfy the criteria for inclusion. Efforts will be made to ensure gathering information on project types, sizes, and geographic locations in Saudi Arabia.

The questionnaire will address several aspects of TQM and its impact on construction projects, such as quality improvement, project performance, client satisfaction, cost control, and employee engagement. On a Likert scale, participants will be asked to score their agreement or disagreement, and they will also be given a chance to contribute additional comments and observations.

The study will be conducted in accordance with ethical standards. Participants will be informed about the research objectives, their voluntary involvement, and the confidentiality of their responses. All participants will be asked to provide their informed consent before beginning the questionnaire. Personal identifying information will be kept confidential, and data will be anonymized and aggregated for analysis.

- The first phase is the preliminary phase, which presents different sources of information. This phase will involve a comprehensive literature review of previous studies on TQM in construction projects in Saudi Arabia and other countries to identify best practices and key factors affecting project performance.
- The second phase involves the development of a questionnaire. The questionnaire will be designed to gather information on the current use of TQM practices in construction projects in Saudi Arabia. The questionnaire will include questions on various aspects of TQM, such as quality management, continuous improvement, customer focus, leadership, and employee involvement.
- The third phase involves data collection, and statistical analysis. The data collected through the questionnaire will be analyzed using Statistical package for Social Sciences (SPSS) to identify the relationship between the adoption of TQM practices and project outcomes such as quality, costs, customer satisfaction, completion time, and employee engagement.

The main outcome of this study is to develop a model for the introduction of TQM in construction companies in Saudi Arabia. The methodology adopted for the study will be designed to gather comprehensive information on the current state of TQM practices in construction projects in Saudi Arabia, identify areas for improvement, and develop a model or a set of guidelines for the introduction and implementation of TQM practices. Overall, the methodology involves a combination of literature review, questionnaire development, data collection, and statistical analysis.

The questionnaire will gather information on TQM practices in construction projects. The study will use the results to identify areas for improvement and develop guidelines for introducing TQM practices.

7. Research limits

In this study, we will evaluate the impact of the application of TQM on construction projects in Saudi Arabia by analyzing several influencing factors, such as communication and Top Management Commitment & Leadership, Training and Process Management & Execution ..etc. by targeting a group of at least 50 individuals working in the construction sector and contracting companies, consultant engineering offices, and project management offices including (Project Managers, Quality Managers, Engineers, Inspectors) in Saudi Arabia through an electronic questionnaire that will be distributed between July and August of 2023.

8. The general perception of the research structure

This research investigates how TQM influences construction projects in the Kingdom of Saudi Arabia by stating the key components of TQM and evaluating the key factors that will impact the implementation of the TQM within construction projects in Saudi Arabia. The questionnaire will evaluate each factor from Project Office Perspective and their experiences in the project, which can make the research conclude the problems and their solutions from the same perspective.

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