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The impact of the triangle (quality, cost, time) on project management in the steel sector in Riyadh

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Abstract:

This study focuses on measuring the impact of the triangle of quality, cost and time on project management in the steel sector in the industrial zone in Riyadh, as there are basic elements that affect project management, which are quality, cost and time, and therefore this impact will be measured to reach important results that benefit those in charge of project management in Kingdom of Saudi Arabia.

Chapter one

Introduction:

The Urban renaissance and project development have benefited greatly from the application of one of the modern and advanced sciences, project management. The three most important factors that determine the path of construction must be considered in order to achieve the best possible form of construction. These factors are quality, time, and cost, together they have been dubbed the project management triangle due to their perceived influence.

In terms of what constitutes a project, one definition would be any work that has a defined beginning and end point and needs to be finished. It is a collection of tasks connected by reciprocal relationships in which a number of people collaborate to complete a given task within a set time frame (Al-Muzaini, 2020).

The project is finished within the allocated budget. When deciding whether or not to finish a project, evaluating its economic viability is thought to be crucial. The main factor that determines resources is cost. It is important to note that some businesses compete solely on the basis of cost, meaning that they differ in terms of high efficiency and resource optimization, whereas other businesses compete on the basis of quality and are distinguished by high capabilities geared toward excellence and innovation (Lazhar, 2019).

Project management has become widely used in business over the past few decades, having emerged from its origins in sectors like construction and defense. Today, it is a crucial component of many successful strategies across a wide range of industries, most notably the service sector. Numerous studies have been conducted to investigate a wide range of factors that impact project management, thereby attesting to the growing significance of project management (Kádárová, 2019).

Cost behavior is valuable in predicting future cost when creating budgets or planning future activities such as production or projects. Some activities affect cost in different ways, as it has been discovered that a fixed setup cost and a variable machine time cost for making prototypes can result in very different costs than originally anticipated (Kádárová, 2019).

The study Problem:

The 2030 Plan report, which confirms that the government of the Kingdom of Saudi Arabia is supported in implementing projects, indicates support for all contracting projects. The Kingdom of Saudi Arabia is working hard to carry out projects throughout the Kingdom in accordance with the directives of the 2030 Plan, which was approved by King Salman, as the government encourages the private sector to put in place procedures that can lead to the completion of the project very soon and reduce the cost.

In order to improve the efficiency of performance, which is reflected in the implementation of projects, the Saudi government also monitors the project program and pushes the private sector to move forward in completing projects on time without any delay. However, these measures alone will not improve project quality, save costs, or shorten project completion time.

The problem of the study was crystallized after reviewing a number of studies regarding project management in the Kingdom of Saudi Arabia, where the researcher found that there are a group of factors that led to project management not fully achieving its goals. These factors represented a noticeable decline in the level of quality, due to the speed in completing project implementation. In a way that affects quality, or increases the cost beyond the planned level due to the desire to implement the project at the agreed upon time.

In addition, the business planning and implementation of these projects was incomplete and inaccurate, there was a clear lack of effort expended, and there was little innovation to reach the required efficiency in quality level, all of which had a negative impact on the level of projects in the Kingdom of Saudi Arabia.

The research' drawbacks revealed that, in addition to the projects' failure to meet the required quality standard, there were issues with considerable time waste, indicating that time management did not meet objectives. Moreover, poor project planning resulted in a large rise in project budget expenses. Additionally, a lackluster project prioritization has limited the projects' benefits.

Research Questions:

What is the effect of the triangle of quality, cost and time on project management in steel sector in Riyadh?

Regarding the main question, the research can include the following sub-questions:

1. What is the impact of the quality factor on project management in steel sector in Riyadh?
2. What is the impact of the cost factor on project management in steel sector in Riyadh?
3. What is the impact of the time factor on project management in steel sector in Riyadh?

Research Variables:

The research seeks to reach its objectives through the following variables:

1. Independent Variable:

- 1.1. Quality.
- 1.2. Cost.
- 1.3. Time.

2. Dependent Variable: Project Management.

Research Model:

Based on the literature review, the research model can be developed to link the impact of s. Figure 1 below shows the correlation between independent variables and dependent variable.

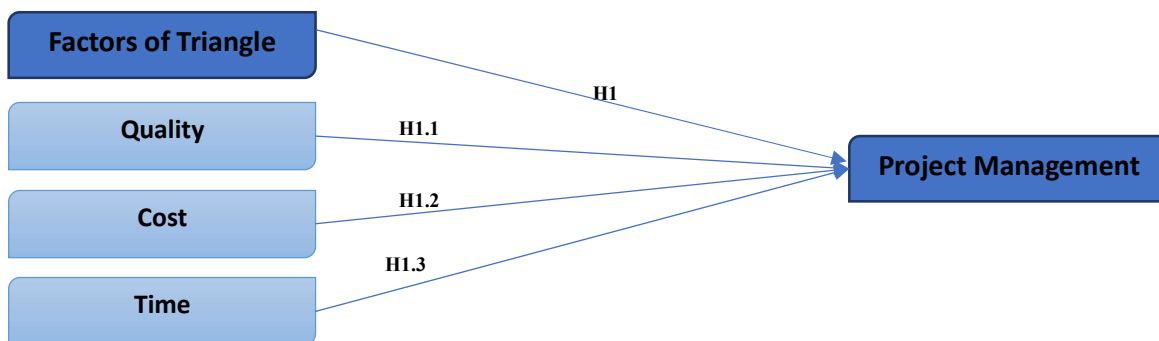


Figure 1: Study Model

Source: Developed by the Researcher

The importance of study:

This research is important from different perspectives, as follows:

- 1. Theoretical Importance:** This research will help enrich the scientific library, and is considered an additional resource that researchers can benefit from during their research. Moreover, it will contribute to the literature in different ways because after reviewing the literature, it was shown that there is little research that examines the impact of quality, cost and time as factors combined in one research and their impact on project management, specifically in steel sector in the industrial area of Riyadh, in the Kingdom of Saudi Arabia. This research will be considered an important reference in the factors affecting project management and understanding how to improve levels of quality, cost and time.
- 2. Practical Importance:** This research will enable steel sector in the Kingdom of Saudi Arabia to better deal with quality, cost and time factors in project management, and to adopt effective strategies to improve the levels of these factors. This will enable those responsible for project management to perform better, increase the level of quality, reduce the level of cost, and reduce time as well. Aside from the benefit related to the recommendations of this research, the general public will benefit from the study by improving the handling of quality, cost and time. This will also lead to the ability to complete projects effectively and efficiently. This study will also be useful to the government in developing regulations related to how to manage projects. Government projects as well, and preserving the Kingdom's resources necessary to implement various projects. Also, highlight how the research aligns with Saudi Arabia's 2030 Vision to underscore its practical relevance and contribution to broader societal goals.

Finally, the researcher hopes that this study will contribute to increasing his scientific and practical knowledge. This research is also a basic requirement for obtaining a master's degree in project management.

The Objectives of the study:

This research aims to achieve the following objectives:

1. Evaluate the impact of these three factors on project management in general.
2. Clarify the impact of strict quality standards on project timelines, budgets, and overall success in Riyadh's steel sector.
3. Distinguishing between the three study variables and clarifying their impact on project management.
4. Investigate the connection between timely project completion, scheduling accuracy, and the cost-effectiveness of steel construction projects in Riyadh.
5. Generate data-driven recommendations for optimizing quality, cost, and time management in Riyadh's steel sector to improve project outcomes.

The Study questions (hypotheses):

Based on the research framework, the main hypotheses can be formulated and moreover, three sub-hypotheses can be extracted based on each variable on Project Management: -

H1: The quality of materials and workmanship, cost management, and timely project completion significantly impact project management in the steel sector in Riyadh.

The main hypothesis is divided into the following sub-hypotheses: -

H1.1: Higher quality standards positively influence project management in steel sector in Riyadh.

H1.2: Effective cost management practices in steel projects reduce project management challenges in Riyadh.

H1.3: Meeting project deadlines in steel projects enhances project management effectiveness in Riyadh.

The Previous studies:

Project management science has become increasingly popular over the past few decades as a means of implementing projects as efficiently as possible and achieving organizational goals. This is because project management science offers useful tools that help organizations become more adept at organizing, carrying out, and monitoring their project activities, as well as optimizing the use of their material and human resources (Atkinson, 2020).

In order to meet the expectations of the client and project owners while ensuring that the project's anticipated goals are met, project quality management refers to the methods and procedures used to monitor and attain the quality of project outputs and results (Dashti, 2021).

Since the late 1980s and early 1990s, project quality management has grown in significance and become an integral component of project management in general. Since then, it has developed further. As a result, every ongoing project needs to meet strict requirements for functional performance, degree of suitability, reliability, and compatibility. Each of these criteria is chosen based on the specifics of the project as well as organizational standards. beginning at the outset and continuing until the final delivery (Aarthipriya, 2020).

Project management is considered one of the most important fields that administrators and academics alike are interested in. It is considered a science that helps those interested in how to manage projects correctly and soundly, and thus provides those in charge of project management with important tools and necessary skills that help them in how to manage projects effectively. Projects depend mainly on Three elements fundamentally affect project management, and these three elements are quality, cost, and time. Any person responsible for project management clearly cares about these three elements, and his success depends on his ability to commit to completing the project on time, while adhering to the agreed upon cost level, and at the same time deliver the project with the planned quality (Simanjuntak, 2018).

Methodology and research methods:

Quantitative research employs the descriptive analytical method, which describes the phenomenon and looks for patterns in the data to answer questions about who, what, where, when, and to what extent, because it is the process of gathering, analyzing, interpreting, and presenting study results. Because it presents the known information in a way that is pertinent to the research question about capabilities, requirements, technologies, activities, regulations, people, and contexts, it is also regarded as fundamental to practically every research project.

The quantitative method used in this study is predicated on the statistical interpretation of phenomena in order to arrive at rational solutions for the study's problem. The impact of the triangle of quality, cost, and time on project management in steel sector in the Riyadh industrial zone is described and analyzed in this study using a descriptive and analytical approach. It should be mentioned that the descriptive approach helps to describe events and phenomena in order to determine the underlying causes of their emergence as well as the possibility of describing them and coming up with workable solutions for them. The primary tool used by the researcher will be SPSS, along with the survey.

Study tools (data collection tools):

Design: This study uses a quantitative approach to analyze the impact of the quality, cost, and time triangle on project management in Riyadh's steel sector.

Data Collection: A survey will be conducted with 200 participants, including project managers and stakeholders. The survey uses a 5-point Likert scale to measure quality, cost, time, and project management.

Analysis: Data will be analyzed using SPSS software. Multiple regression analysis will determine the relationships between quality, cost, time, and project management.

Ethics: Informed consent will be obtained from participants, and data privacy will be ensured throughout.

Validation: The survey instrument will be tested through validity and reliability indicators of the questionnaire through SPSS to verify the validity and reliability of the data.

Conclusion: This methodology will provide valuable insights into the relationships within the quality, cost, and time triangle in project management in Riyadh's steel sector.

Statistical Analysis Tools:

SPSS will be used to analyze the questionnaire, and the following statistical instruments will be used:

1. **Frequency and Descriptive Analysis:** To ascertain the mean, mode, and median—the three measures of central tendency. The researcher can assess the outcomes with the aid of these metrics.
2. **Cronbach's Alpha for Reliability Statistics:** To assess the questionnaire's reliability and make sure it accurately measures the intended objectives.
3. **Pearson Correlation Coefficient for Validity:** This coefficient assesses how well two variables are correlated.
4. **One-sample T-test:** To assess how well the sample mean matches a predetermined value. It needs independent, normally distributed data, and a random sample.
5. **Separate Samples T-test:** Used with two independent samples and when the population mean is unknown to ascertain the differences between two sets of data.
6. **Analysis of Variance (ANOVA):** To ascertain the differences between multiple variables, compare their means. Determining whether to accept or reject the null hypothesis is helpful.
7. **Multiple Linear Regression Model:** To elucidate the correlation between the dependent variable and a number of the independent research variables.

Fields of study (human, spatial, temporal):

- 1. Locational Limits:** This research will cover all the steel sector in industrial zone in Riyadh.
- 2. Time Limits:** This research will address the period between Oct 2023 and Nov 2023.
- 3. Objective Limits:** This research will be limited to knowing the impact of Quality, Cost and Time on the Project Management in industrial zone in Riyadh.

Summary:

In this research, the impact of the triangle of quality, cost and time on project management in the steel sector in the industrial zone in Riyadh, the Kingdom of Saudi Arabia, is discussed. These three factors were chosen for their clear importance and their direct effects on project management.

In order for this research to be carried out in this way in application to the steel sector in the industrial zone in the city of Riyadh in the Kingdom of Saudi Arabia, it was necessary to rely on an appropriate tool for collecting data. The questionnaire tool was chosen as an appropriate tool to collect data regarding the impact of these three factors, namely quality, cost and time, on project management. The steel sector was chosen to apply the questionnaire in the city of Riyadh.

The SBSS statistical program will also be used to analyze the data collected from the application of the questionnaire, and use the various statistical indicators necessary to determine the extent of the impact of quality, cost, and time on project management. Then arriving at results that can be generalized to other sectors, thus benefiting researchers, academics, and those in charge of project management as a practical aspect.

This research will lead to important results regarding measuring the impact of the triangle of quality, cost and time on project management in the steel sector in the industrial zone in Riyadh. The researcher reviewed previous studies that dealt with project management and the factors affecting it, and a special focus was placed on three factors: quality, cost, and time.

Recommendations:

The researcher aims to come up with a number of important recommendations that will mainly benefit those in charge of project management, as these recommendations will be reached after distributing the questionnaire form to the research sample, and analyzing the results to reach important recommendations in this field.

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