

Total Quality Management Frameworks: A Comparative Analysis in Construction Companies

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Abstract:- An increased demand for quality within the construction industry has spurred the exploration of novel systems and the formulation of purpose-fit frameworks. Construction companies worldwide are striving to enhance both productivity and quality indices, undertaking research and development to devise innovative methodologies. However, the inherent nature of innovation defies easy categorization as entirely advantageous or detrimental, making it challenging to assess its net impact. Within this context, the management framework and innovation processes in the construction industry have garnered significant attention. While specific emphasis has been placed on Total Quality Management (TQM) implementation, other aspects, including the amalgamation of technologies, life cycles of construction companies within communities, and regulatory processes, have been meticulously examined.

This research endeavor delves into critical issues associated with the incorporation of TQM in the construction sector. The main aim is to demonstrate the development and development of new models that will not only improve companies' understanding of TQM, but also contribute to the improvement of all aspects of the company's processes, procedures and operations by adopting the TQM framework. Therefore, a model is being prepared according to the existing and new quality management framework in the construction industry. Additionally, this study incorporates information from various official studies and research studies in the construction industry to provide a comprehensive overview of materials, technologies, technology, process management and innovation. The aim is to provide a theoretical model applicable to existing and emerging management systems where the business is referred to as "customers".

The purpose of this study is to analyze the current situation and highlight the current challenges faced by construction companies in the integration of Total Quality Management (TQM) ideas. The results of the study

demonstrate the potential effectiveness of Total Quality Management. Conclusions and recommendations have been taken from Total Quality Management implementation guides to provide guidance to construction companies wishing to implement Total Quality Management principles. Moreover, the principle refers to the actions taken by the company to develop and implement all quality control systems, increase efficiency, improve processes and improve the quality of services and products provided by the company.

Keywords:- Total Quality Management, TQM Philosophy, Construction Company, Clients.

I. INTRODUCTION

The construction industry has developed and implemented many quality control measures. The word "good" comes from the Latin word "quail" and means "how good." A good definition has proven difficult, even impossible, due to its different content and meaning, and has therefore been labeled an "elusive concept". According to the American Society for Quality, quality includes characteristics of a product or service that indicate its ability to meet specifications or requirements. The situation of the people involved in the desired outcome depends on their lifestyle, interests, culture, leadership and education. Good construction management meets consensus for each phase of construction as determined by stakeholders. This demonstrates that good governance is implemented through planning, safety and quality improvement.

Project Quality Management (PQM) affects construction results, and all aspects of project management knowledge relate directly or indirectly to this important area. The real estate project is the heart of urban transformation and contributes to the local economy and culture. Increasing competition in the global economy has emphasized the importance of quality for organizations and made PQM an important operational issue. Usually quality issues are addressed by the employer at the end of the design period,

when major decisions of the construction phase must be made. The employer's reaction at this stage indicates the level of satisfaction and poor design will lead to customer dissatisfaction and conflict. The next section examines quality issues during implementation and design. Therefore, quality issues must be addressed regularly at various levels of the project to increase customer satisfaction, thereby ensuring compliance with standards, product quality, approval of materials, time, cost and risk information on selected materials and comparison rules. Analysis of construction companies in terms of compliance with management.

A unified information system for identifying, reporting and correcting operational errors does not currently exist. Additionally, no effective method has been developed for updating information about the location of defects and the progress of remedial measures. In recent years, emerging information technologies such as cyber-physical systems, Internet of Things, augmented reality, point cloud and block chain have continued to advance, promoting the advancement of service products. This technology has increased the amount of information available in the construction industry.

Customer satisfaction often determines the quality of construction. Therefore, the investigation of new technologies as performance management tools should be supported by an understanding of the factors affecting customer satisfaction. Since the design-build project is the most common use in real estate projects, performance evaluation must continue throughout the design and construction phases. Therefore, research focuses on designing and building systems. The Framework notes that access to and better use of additional information can reduce the risk of design and construction errors. This also includes analysis of variance, literature review, research methodology, data analysis, and introduction of the two constructs.

II. METHODOLOGY

Significant improvements in processes, procedures and policies have led to Total Quality Management (TQM) being viewed as a significant advancement in management. Total quality management (TQM) emerged in the United States around 1980 in response to growing concerns from companies. Many manufacturing companies now recognize TQM as a valuable asset, especially in the modern business context where innovation plays an important role in ensuring effectiveness (Tushman, M. and Nadler, D., 1986). Therefore, this research aims to investigate the relationship between TQM and innovation.

In the construction industry, the construction manager's or site superintendent's decision to adopt a quality management system (QMS) requires the use of performance measurements. Researchers use the app as a method to achieve these measures, highlighting the need for high standards of compliance. Although some studies have used multivariate

methods such as correlation and effect analysis to examine effectiveness, the relationship between these conditions has not yet been examined in the literature and the results are good. Previous analyzes have demonstrated differences in the conditions, contexts, and research topics studied. It is worth noting that everything directly affects the principles of different quality control models. Most analyzes showed significant differences between study groups and subjects; this highlights the need to develop better models to measure the impact of these factors and identify critical success factors (CSFs). Results can support the documentation of successful implementation, thereby improving knowledge of implementation and making it easier for organizations to record the positive outcomes of performance management.

There is no empirical evidence regarding design and quality control in this area of research. The relationship between cause and effect. There is therefore an urgent need for modern research based on a better understanding of quality control and best practice analysis. The aim of this study is to create a useful framework and a good analysis of the relationship between these factors, ultimately creating a general framework with features and benefits.

III. TOTAL QUALITY MANAGEMENT

Many studies have been done to clarify the concept of Total Quality Management (TQM). Through the implementation of Total Quality Management, the organization believes in the process of continuous process improvement, which includes understanding customer needs, reducing labor costs, encouraging employee cooperation, improving processes, building relationships with suppliers, evaluating results and participating in evaluations. Total Quality Management advocates believe that companies that successfully implement Total Quality Management can achieve many benefits, including increased productivity, reduced costs, increased customer and employee satisfaction, and improved financial performance (Prakash J Singh and Alan J.R. Smith, 2010). According to the literature review, TQM means continuous improvement of operations. Therefore, to improve performance, people need to understand what TQM is, how to use it, have the necessary tools, carefully evaluate performance and receive performance level feedback. As stated by Kanji and Asher (1993), Total Quality Management demonstrates several principles:

- Satisfying customers;
- Management by facts;
- People management;
- Continuous improvement.

All the above principles can be used for development. For this purpose, strategies are proposed to transform the above results into new strategies. These points are:

- Customer satisfaction;
- Customer house is real;

- Every job is a learning experience;
- Evaluation;
- Human performance;
- Continuous Improvement (Gopal K. Kanji 1996).

IV. TQM APPROACHES

The principles of total quality management (TQM) have been proposed by leading figures in quality management such as Juran (1988), Crosby (1979) and Deming (1986). This process formed the basis of later research in the field of TQM, including Kaynak (2003), Flynn et al. (1994), Powell (1995), and Saraf, Benson, and Schroeder (1989). In addition, valuable awards and certificates in the sector such as the Malcolm Baldrige National Quality Award (MBNQA) and the European Foundation for Quality Management (EFQM) are also affected by this process. Saraf et al. (1989) was one of the pioneers who suggested that the evaluation of the TQM approach should be enhanced by empirical research. They

conducted a literature review covering twenty companies and proposed eight TQM certification methods.

There are some studies in the literature that investigate the connection between TQM and innovation and mostly focus on the relationship between the two. This shortcoming can be attributed to different types and dimensions of TQM and different types of innovation. In today's business world, the basis of competitive advantage has risen to a higher level as innovation plays an important role. Innovation enables organizations to protect their assets in the face of uncertainty and adapt to changes in the business world, resulting in significant gains in revenue and business performance for new companies. Considering that Total Quality Management is a necessary method to improve quality processes and innovation, companies that want to be successful in innovation must comply with quality standards. Previous studies have produced mixed and inconsistent results; While some have shown a positive relationship between Total Quality Management and innovation, other studies have shown a positive relationship.

Table 1 TQM Approaches

<p style="text-align: center;">TQM</p> <ul style="list-style-type: none"> • Management of the system • Management of Product and Process • Management of clerks • Management of Relation Supplier • Top Management Leadership • Factual Approach to Decision Making • Customer Focus • Continual Improvement • Strategic Planning • People Management • Communication/Information Systems 	Quality Performance
	Innovation Performance
	Process Innovation

Many examples of this model have led to many discoveries. Proponents of this relationship cite business management, customer focus and continuous improvement as key characteristics. These researchers believe that TQM fosters innovation by encouraging employees to share new ideas, solve problems, and create new products. Customer focus is considered beneficial due to changing customer needs and challenges. Additionally, continuous improvement encourages creativity, which improves performance. Therefore, according to Sadikoğlu and Zehir (2010), there is a positive relationship between TQM features and innovation. The religious study conducted by Hong et al. (2011) further confirmed the relationship between total quality management and innovation.

➤ *Research Design and Environment*

This study aims to evaluate the impact of quality management system (QMS) implementation on construction projects using description. Initially, a comprehensive literature

review was conducted to gain a deeper understanding of the topic and research context. The purpose of this step is to guide the creation of an appropriate survey to collect construction-related information. The research questions were carefully formulated based on the results of the literature review and previous research.

The researcher used random sampling as the sampling method. Information sources are divided into primary sources and secondary sources. Principles provided the original data for this study. Study participants were selected using purposive and convenience sampling. This structure consists of managers and experts at different levels and in different fields in construction companies. A total of 17 valid surveys were collected. The data collected included details such as gender, age group, year of quality management implementation (QMS), and QMS experience level of the participants. This content was used for analysis. In addition, secondary sources consisting of manuscripts, books, articles

and publications were also examined in order to obtain more information about the research topic and to conduct further research.

V. RELIABILITY AND VALIDATION

In this study, the literature review shows that the use of quality management systems (QMS) can be a good strategy to achieve goals in business development. This is achieved through a process based on the “PDCA” (Plan-Do-Check-Act) approach, which aims to increase efficiency and solve problems. The document also emphasizes that completion of the work is important for the evaluation of projects in construction. Researchers said that customer satisfaction is the main goal of the business and the iron triangle of price, time and quality, which affects the success of construction the most, has gained importance.

Confidence tests will compare the difference between different or different statistics given in the survey. Exploratory Factor Analysis (EFA) and Cronbach Alpha were used to refine the final criteria. EFA is an integrative process designed to identify the basic structure of factors and group them appropriately. It is used to analyze the proposed structure and, if necessary, create new products from the project. The EFA process includes multiple models to be efficient and robust. The project is organized as a model based on integration in the project research model (Table 1). Assuming that the items belonging to the same main group were included in the same model, separate EFA models were created for each main item group. For example, projects related to contract management, management training and strategic planning are integrated into a management and planning-oriented model.

VI. RESULTS

The findings show that the quality management system (QMS) has a particularly significant impact on customer satisfaction. This can be attributed to the importance of customer needs and satisfaction in the process for the management of the process, which is considered the main input and result of the organization. Quality control has a direct and indirect impact on project cost and duration, with minimal impact on quality/scope. Unfortunately, the results show that many managers focus mainly on the use of ISO 9001 certification for quality management and often ignore the use of other quality management standards.

This research aims to investigate issues related to quality management and examine quality management processes. Manage business process in a customer-ready Total Quality Management (TQM) mission. Increasing competition in products and services requires the development of a framework whose main purpose is to produce quality products. Given the important role of effective marketing, organizations associate the revenue generation process with the pre-production process. It is important to be able to meet

customer needs. Adhering to all quality management processes has the potential to increase efficiency/effectiveness, reduce costs and project costs, and increase customer satisfaction. Therefore, the study confirms that good management is an important tool for business management and business and helps improve and improve the performance of the organization. It is recommended to use quality control methods in projects to improve the performance of the organization.

VII. DISCUSSION

Increasing competition in products and services has led to the creation of many jobs. However, the main purpose of these models or life models should be to facilitate the production of good products. With intense competition and increasing product and service quality, the process of generating revenue has become a relationship that cannot be ignored if organizations want to control their own culture. The customer's first concern is to receive quality products and services with assurance.

In recent years, everyone has worked together to create a mature and effective process for writing needs. Customer characteristics play an important role in the process, and experience shows that needs are collected more easily when customers are similar. As the customer profile diversifies, integration becomes more difficult and the quality of the product or service is affected. This challenge highlights the need for a Total Quality Management (TQM) framework well suited to different customer needs. Therefore, the current system should be reviewed and if it is not a "holistic concept" that is effective, it should be sent to all departments and divisions and drug process control should be implemented for continuous improvement.

This study supports the use of total quality management in construction companies. There is an urgent need to present important studies for the advancement of the construction industry based on the findings obtained. The highlights of the research presented are:

- A comparative study on the use of total quality management in construction companies.
- Create effective training programs for construction companies.
- Explain the benefits of general management and the concept of employee personal care in construction companies.
- Analyzing and solving communication problems of construction companies.
- Develop strategic plans for recruitment based on the concept of total quality control.

VIII. SUMMARY

This study introduces the principles of quality management and measures the methods of managing quality processes within the framework of Total Quality Management (TQM) as a customer. Increasing competition in goods and services requires the creation of a framework. But the importance of this model or lifestyle should be around creating the best products. As competition intensifies and product and service quality becomes more important, revenue generation processes become increasingly system-dependent.

Ignoring such standards is a luxury that organizations whose goal is to dominate the market cannot afford. Customer satisfaction depends on quality delivery and the full use of Quality Management Systems (QMS) has the potential to increase efficiency/capacity, reduce costs and campaigns and increase customer satisfaction.

The conclusion of the research is that good management is a necessary tool for business management and business and helps improve and improve the performance of the organization. Therefore, it is recommended to use quality control methods in projects as a way to improve organizational performance.

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