Total quality management in Oman

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**Abstract.** A case study of two construction companies in the Sultanate of Oman has been considered in order to study the extent of the application of Total Quality Management (TQM) and to know the barriers that impede its application in the construction industry. TQM have been compared with the tolerable organizational cultural barriers that have been endorsed and documented by many authoritative literatures related to this topic. Quantitative and Qualitative analysis of questionnaire and interviews respectively are carried out from the construction industry sector in Oman in order to identify barriers to implementing the TQM concept. The results obtained showed that the two companies' models are still in their infancy in the application of TQM and there are many aspects of improvement that would overcome the barriers. Therefore, one of the most appropriate solutions is to allocate people who have experience in how to implement and benefit from the TQM concept, while giving them the powers to help them implement it within the organization. The results of this research presented can be used as a conceptual framework that helps in planning and proactive management to improve TQM accreditation, and these results can also serve as a guide for further academic research.

**Key words:** Total Quality Management (TQM), Quality, Construction Management, Oman

1. Introduction
The vast majority of workers in the commercial field who care about customer satisfaction, especially in the construction industry, care about quality because they know how important it is in maintaining the performance of organizations and even working on their progress and development. In addition to the importance of quality in private institutions; it has also become a requirement of governments. From here comes the drive towards quality management in an integrated manner and in its general concept, which includes all aspects related to work in any organization as it is concerned with a culture of quality. Al-Qayoudhi, S. Hussaini, S. Khan, F. (2017) confirm that total quality management is a management philosophy that follows to obtain the best results in terms of profits, performance and organizational image [3]. With the increasing complexity of the construction industry and its customers in terms of quantity and quality; the definition of total quality management has kept pace with this development, with a difference in its definition in different regions of the world [1]. Today it has become of importance for organizations that provide distinguished services to customers and are concerned with customer, supplier and client satisfaction to follow the total quality management approach [11]. Therefore, organizations that seek to benefit from TQM must reduce the gap that prevents the application of this concept, which is represented in the lack of acceptance of change and the lack of confidence in this concept, as well as the lack of giving employees training courses that help them to implement this concept and thus not involving them in decision-making.
2. TQM in General

After the increase in the rate of improvement in the performance of companies and organizations that follow the total quality management approach; many large companies operating in various sectors have already begun to apply this concept [1]. Total Quality Management is found in the standards followed by many assessment institutions such as the ISO 9000 standard, Deming Prize and Malcom Baldrige National Quality Award [14]. Total Quality Management aims to make every person in the organization responsible for his performance and interested in quality; therefore, experience and knowledge are required for each person and must be continuously developed [1]. Previously, companies operating in the Sultanate of Oman relied on experienced western employees; but now the situation has changed. Many HR experts have realized the importance of project management rather than relying on expatriate experts, to maintain their continuity on a permanent basis and to compete globally [4].

3. TQM Elements

There are eight elements that underpin TQM, the first of which is the focus on the customer, as the customer is the one who decides if the performance achieves his demands. Second, the involvement of all employees at their various levels and functions to contribute to quality management. The third element is the centralization of the processes that are presented to the customer; in order to facilitate its evaluation and development. The fourth element is to operate a horizontal system within the organization to improve the process. Fifthly, follow a well-thought-out plan aimed at achieving the organization’s vision, mission and strategy. The sixth element is to continue to develop processes to accommodate quality and to obtain innovations. Seventh, making decisions based on facts obtained from data collected on an on-going basis. Finally, activating positive and effective communication in order to increase transparency, while developing work ethics among employees [14]. The Figure 1 depicts the TQM for construction industry [15].

![TQM for Construction Industry](image)

**Figure 1.** TQM for Construction Industry [15]
4. The important and feasibility of TQM:
Quality management and assurance systems are one of the topics that the world has begun to pay more attention to recently [1]. According to Al-Nadabi (2020), the feasibility of implementing TQM is validated by following the established guidelines, standards and objectives to ensure that the outputs comply with the required quality standards. By following these standards, organizations can detect and prevent any deviation that may hinder the company from achieving its goals, as well as contribute to improving the operations and outputs of the organization, improving its image and public view, and thus increasing the number of customers and increasing profit.

Construction companies that follow the requirements of total quality management in their projects, they focus on customer satisfaction and thus achieve greater gains and these projects will not be a waste of resources. User satisfaction for these projects can be used as a measure of the level of quality that the project will achieve. In addition to the quality management that provides satisfaction to customers; it also works to improve the relationship with suppliers, which results in the provision of high quality products to the company's projects. Following TQM requirements provides the company with flexibility, scalability, and member participation from decentralization. For the success of the project, the implementation staff must be committed to the quality of the project so that planning does not fail [11].

Through the application of the concept of total quality management in contracting companies; it can be observed a record increase in the percentage of customer satisfaction, a high percentage of the organization's share in the market, as well as an improvement in the quality of products. This is in addition to improved teamwork, efficiency, and productivity, and significant progress in performance indicators [1]. The investment in total quality management allows the development of the human capital capabilities of the organization, and thus it can compete globally despite the developments and changes in the economy and technology [4].

In addition to the above, one of the advantages of total quality management is that it provides rapid and continuous strengthening of the internal and external affairs of the organization, and the work of a clear plan for the employees of the institution that dictates to them the standards and objectives [9]. Companies succeed in TQM whenever they combine high-level members with low-level members, in order to focus on improving quality [2]. One of the indirect goals of total quality management is to familiarize the safety management department with the master plan for each project, which will help reduce the incidence of injuries by following a safety plan for all stages of construction projects and identifying types of risks and hazards [6].

5. TQM implantation ways:
There is no perfect way to implement total quality management that can apply to all organizations, as each organization has its own specific in managing its business and the quality of work it provides as well as the type of target customers. However, there are a number of basic steps to implementing TQM. As senior management must learn and apply TQM, and include it as one of the organization's strategies. Second, evaluate the quality of work and the extent of customer satisfaction. The top management should also know the core value of all employees. Fourth, the development of a basic plan for total quality management. Fifthly, knowing the customer's requirements and needs and prioritizing them. Services and products must be included. Planning critical operations to meet customer needs. Pushing the total quality management plan towards progress by appointing a steering committee. Providing training and coaching to implement the total quality management system. Implementation and standardization of daily operations management. Finally, the Steering Committee reviews the progress of the work and amends the plan if necessary [14].

Al-Nadabi (2020) says the primary goal that TQM works to achieve is to understand the needs of customers, and accordingly organizations design and direct all processes to meet the requirements of customers and make them happy, and any process that does not focus on customer satisfaction is excluded in order to reduce costs. The desires of customers differ from one customer to another, so there are many ways in which one can know what the customer wants, the most important of which is to create a website that enables customers to provide their feedback.
Al-Nadabi (2020) believes that total quality management is linked to ethical behavior and organizations must activate social responsibility and maintain the environment to ensure the sustainability of their institutions. For organizations to ensure their success in implementing TQM, they should consider it a routine work to be followed and not just a task to be carried out. As well as planning for quality management and follow-up implementation of plans. Despite the many solutions proposed, many gaps in the management of construction projects still exist [5]. Al Azemi, W. (2012) believes that through his doctoral thesis, senior management must commit to providing resources for the education and training of employees, and providing the necessary resources to prevent quality problems and work to fix them [12].

6. Difficulties and barriers that limit the application of TQM:

It is known that the construction industry is very complex, and the supply chain of the construction process is very fragmented; therefore, many companies operating in the construction industry are having difficulty satisfying their customers [1]. These organizations may face many barriers that limit the application of the concept of total quality management in their policy, and one of these obstacles is the cost of training and qualifying employees [11]. The shortage of trained and qualified human capital is one of the obstacles faced by companies and organizations operating in the construction industry in the Sultanate of Oman. Therefore, many companies seeking to expand globally sought to qualify and train their employees [5]. Al-Nadabi (2020) mentioned some categories of problems that prevent the application of total quality management, and one of these problems is social problems, as he mentioned that one of the reasons for the lack of productivity of some employees is due to their dissatisfaction with the workplace or the way the manager deals with them or their lack of access to incentives, compensation, lack of training, or lack of full knowledge of their duties. Also, these problems may result in a change in the behavior of employees with customers and a decrease in development.

Also, among the main obstacles are the non-compliance of those in charge of the implementation of the total quality management programs with the recommendations that reach them, as well as the discrepancy in their views and the lack of focus on a common vision. There is also a divergence in the views of analysts as to whether the TQM policy should comply with the company's culture or should contradict it. (Al-Nadabi 2020) In the study presented by John, J. Jegan, M. and Al Mutawa, A. (2018), they mentioned that one of the reasons for not applying total quality management is because of the lack of competitors among construction companies [8].

Nouban, F. and Abazid, M. (2017) identified a number of obstacles that would hinder the implementation of comprehensive quality management, including the seriousness of the commitment and participation of the management, and the strong knowledge of customer requirements. The incompatibility of human resources work with the total quality management approach to achieve participatory management. Also, failure to translate total quality management plans into reality and apply them effectively may cause disruption of the concepts of total quality management. Lots of unnecessary paperwork that is inconsistent with construction work. Not to involve field staff, claiming that they are not related. The transitional nature of the workforce, which characterizes many construction workers. Difficulty in tracking and measuring the results obtained. Subcontracting with contractors with the lowest bid value. Lack of interest of suppliers and subcontractors to achieve the objectives of total quality management [9].

One of the problems that exist in the lack of application of total quality management is the multiplicity of goals set by the different departments in the project, which distracts the focus of managers and engineers from achieving the goals set [6]. Al-Sabahy (1999) mentions that most companies operating in developing countries have production jobs that are not related to the quality function, and employees are often not involved in quality improvement [13].

7. TQM framework:

According to Al-Nadabi (2020), the TQM framework consists of three main parts: participatory management, use of teams, and continuous improvement. Organizations seek through total quality management to reduce expenses while maintaining production quality and this is achieved by
monitoring the external and internal environment, and establishing strong and permanent horizontal and vertical communication between all members of the organization. Gowda, S. Nayaka, R. Murthy, S. and Kumar, S (2015) believe that total quality management is not concerned with quality management, but rather focuses on the quality of management systems, and on the continuity of improvement of all features of the organization [7]. The pyramid of TQM is depicted in Figure 2 [10].

![Pyramid of TQM](image-url)

**Figure 2. Pyramid of TQM [10]**

8. Methodology
A quantitative analysis in the form of results of questionnaire consisting of ten questions has been analysed related to Total Quality Management in the Sultanate of Oman. Of a total of 200 questionnaires distributed only 150 people participated in it, and the results varied according to the location and nature of the job occupied by each person who answered the questionnaire. The questionnaire results are depicted in the Figure 3. Questions from the first to the fourth were aimed at knowing the whereabouts’ of the respondent for example the nature and place of work and also to know if the respondent is a decision-maker in the entity in which they work. The response helped us to know the extent of respondents relationship with the application of the concept of Total Quality Management, and if this concept is applied, if applied, then if it’s in the correct manner. The response indicated that the proportion of employees in the public sector is equal to 63.31 percent, of whom only 44.68 percent have the authority to make decisions in their institutions, while 36.69 percent of those who answered the questionnaire work in the private sector, and the percentage of those who can make decisions in their institutions exceeded 55 percent. The fifth question was to understand if the respondents knew Total Quality Management concept. Of them, only 50.66 percent respondents had knowledge about Total Quality Management. The sixth question was to know if the respondents know and has knowledge of Total Quality Management. 69.33 percent response shows that the participants are familiar with the principles and requirements of Total Quality Management. The seventh question aims to find out if the organization in which the participant works applies the concept of Total Quality Management in the work environment, 62.66 percent answered that their organization apply total quality management. While the eighth question focused on knowing the participants' opinion on the extent of the prevalence of the concept of Total Quality Management in Oman, and whether Government and private institutions apply Total Quality Management in their work or not. The answers were scattered, with neutrality being the most preferred choice, followed by “somewhat disagree” with 27.86 percent. It was found that the percentage of those who trust that their employers apply the concept of total quality management does not exceed 2.2 percent. The ninth and tenth
questions were aimed at finding out if the participants knew the benefits of following the requirements of Total Quality Management and what are the barriers and obstacles that limit its use. It was found that most of the participants have the same optimism in the ability of the Total Quality Management system to improve the performance and quality of work in organizations, as well as reduce risks and increase customer satisfaction. It was also found that 27.69 percent expect that the lack of training and knowledge is the most important obstacle that prevents the application of the concept of total quality management in Oman. The lowest estimate of the barrier of lack of money was less than 7 percent.

![Total Quality Management](image)

**Figure 3.** TQM questionnaire results

On the other hand, interviews were conducted with a project manager in company A and a general manager in company B, and it was found that company A does not apply the concept of total quality management, but they have other foundations they follow in order to reach the quality they seek. It also turns out that employees who are at the lower levels are often not involved in making decisions or even expressing their opinion. One of the obstacles that company A faces that prevent the implementation of the concept of Total Quality Management is the high cost of qualifying and training employees, as well as their contentment with the projects they carry out with the government and therefore they do not want to search for other clients (at the present time).

While in company B, it was found that the company is interested in applying the concept of total quality management; but it turned out that there are some aspects that need actual implementation, for example, they do not have a person or a team that monitors the company’s commitment to implementing this concept. It was also found that the senior management has the desire to involve the rest of the employees in making decisions and expressing opinions, but not in everything, but there are limitations in that. The good and most important aspect is that the company allocated a part of the budget annually for the purpose of training and qualifying employees.

9. **Summary:**

By tracking and analyzing the information contained in the answers of the participants in the questionnaire, it was found that there is no significant application among the organizations operating in the Sultanate of Oman of the concept of Total Quality Management. On the other hand, there are some organizations that apply the concept of Total Quality Management but it is possible that the application is not correct, by focusing on some aspects and leaving other aspects that are considered integrated, which is caused by a lack of complete knowledge of the requirements of total quality management. This is what leads to the ineffectiveness of what these organizations are doing, and may have a negative rather than a positive effect in the construction field.

On the other hand, and through the interviews conducted, it was found that the companies that are satisfied with the projects they have do not care much about applying the concept of Total Quality Management.
Management because they are not looking for other customers. It is likely that this is caused by the fear of the owners of companies to expand their business and increase capital so as not to lose control of their companies. Also, training, which some consider to be financially costly, may be one of the barriers to implementing the concept of TQM. It is also noted that companies that apply Total Quality Management do not apply it correctly, but according to what the senior management deems appropriate, and this is explained by the lack of specialists who follow up on the application of this concept in the proper manner.

10. Conclusion:
This research dealt with the collection and analysis of many data related to total quality management, starting from the literature review, through the publication of a questionnaire and analysis of its results, and ending with interviews with representatives of two model companies (A & B) specialized in the construction industry in the Sultanate of Oman. Where the results concluded that there is a compatibility in the challenges and barriers in total quality management documented in the external literature with the existing models in the Sultanate, and these barriers are the desire of the top management and their commitment to the application of TQM, the involvement of all employees, teamwork, customer focus, qualification and training, systems the quality.

Accordingly, the researcher concluded that it is important for organizations tasked with total quality management to provide appropriate training for their employees in order to obtain impressive results in the future. The senior management must also accept the principles of TQM as approved by the studies, as well as accept the involvement of its employees at various levels, and appoint a specialized team to monitor the organization's commitment to the requirements of TQM.

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