

Total Quality Management and Its Impact on Green Building in the Yemeni Architectural Industry

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Abstract: This study has been developed for the purpose of proposing a conceptual framework that identifies the potential factors that influence green building in the Yemeni architectural industry. The proposed framework for this study is established based on two main theories, which are the theory of the development of TQM and the TQM theory of Deming. In line with the previous studies that investigated this type of influence, this study recommended a conceptual framework that contains several factors, which are top management commitment, human resources, and customer focus, to find out their effect on green building in the Yemeni architectural industry. This study contributes to the body of green building development.

Keywords – Total Quality Management, Green Building, Architectural Industry, and Yemen.

I. INTRODUCTION

The Yemeni architectural industry is seen as a key driver of the country's overall economic and sociological development, and as such, it must play a key role as a substantial supplier in the local market in order to achieve long-term success. This should lead to increased exports and have a beneficial impact on Yemen's economic status (Sultan, 2018). However, the difficulty for Yemen is competing successfully in a global market in order to maintain economic competitiveness. To be successful in the architectural industry in Yemen, the country's industrial sector must follow in the footsteps of successful enterprises throughout the world and use quality management (QM), while also taking Yemeni customs and Islamic values into account. In order to compete in a free market setting and increase their overall performance, Yemeni architectural businesses must improve their organisational performance (OP) and supply high-quality items. It's vital to employ a tried-and-true method to improve operational efficiency and product quality. There has been a long time since Yemen's architectural industry has been able to compete effectively in the market. They need to come up with a good quality management system.

Yemen can learn from the experiences of numerous Japanese and Western businesses that have built their competitiveness on TQM principles (Almaamari, 2018; Al-Amri & Abdullah, 2019; Almaamari, Abdulrab, Al-Jamrh, & Al-Harasi, 2019; Habtoor & Alharbi, 2020).

TQM has been demonstrated to be an efficient and successful management strategy in all aspects of a company, including processes, products, staff, and relevant customer and shareholder satisfaction (Al-Dhaafri&Alosani, 2021). Companies and organisations in Yemen could consider using this positive method for achieving high-quality results in management and product development. To pursue Total Quality Management as a competitive strategy, it must first be recognised by a large number of researchers; second, TQM values must be consistent with Islamic cultural and ethical principles; and third, TQM must be implemented across a large number of architecture firms in Yemen, which has already occurred in many cases (Dahmas& Ahmad, 2020).

Since the 1970s, however, the environmental movement and signs of a looming energy crisis have fueled research into renewable energy sources and energy efficiency methods. As a result, in the 1990s, the green building (GB) idea was established to enhance buildings that are built to use as little power, energy, materials, water, and natural resources as possible, and then to improve environmental performance and human health during their entire lifespan (Wuni, Shen & Osei-Kyei, 2019). As a result, green buildings have emerged as a feasible building option for addressing rising environmental and energy consumption problems (Wuni, Shen & Osei-Kyei, 2019). Efficient green building is defined as "the process of designing and employing healthier, more resource-efficient models of construction and restoration, as well as models of operations, maintenance, and demolition" (Lu et al., 2019; P. 2). The notion of performance includes the environment, the economy, and social well-being; these three factors may be looked at as the three pillars of long-term development.

The aim of this study is to propose a conceptual framework for the impact of total quality management on green building in the Yemeni architectural industry. This research will provide a comprehensive literature review of the research variables.

II. ARCHITECTURE IN YEMEN

Yemen, unlike the rest of the region, has a unique history of structures, urban methods, and common construction processes that have stayed untouched for hundreds of years. Yemenis utilised locally available materials to mix and create their expressions until a few decades ago. The expanding trend of modernity, along with Yemen's urgent demand for firm development and hosting, has resulted in a continual change from conventional to avant-garde building forms. History has demonstrated that the Yemeni neighbourhood building sector could not change and improve its appealing, administrative, and specialised abilities quickly enough to keep up with today's rapid expansion and enormous desire for these expensive sorts of construction. Cost savings are regularly achieved by reducing quality across the board. Regardless of how the outside influences came up with design ideas, they didn't agree with these common traits, the neighbourhood boundary, or the near-far-reaching needs.

According to Zulkefli&Zainon (2020), the architectural and building industries in industrialised nations rely heavily on material imports, which account for 50–60% of

overall construction output. Yemen's building and materials industries, like those of other creative nations, are underdeveloped and unable to meet demand. The growing gap between the demand for construction materials and the ability to supply them will inevitably increase reliance on imports. Peach et al. (2020) noted that the building industry in Yemen is heavily reliant on imports, with materials accounting for 60% to 70% of construction expenditures in the most sophisticated areas.

According to Sultan and Kajewski (2003), some of the specific challenges in Yemen's architecture and building sector are mostly ambiguous, with none meeting the progress and construction procedures and criteria that regulate the construction process. As a result, the task's owners have been tempted to cut building expenses by removing or reducing specialised and construction support with structure and monitoring. This proclivity has only resulted in excessive planning, excessive usage and misuse of building supplies, and poor-quality cement that is not produced on time due to poor management of the activity.

Furthermore, according to Sultan and Kajewski (2004), unjustifiable construction waste is caused, in large part, by ineffective execution and a lack of management or oversight of site activities. Imported materials and building waste were also identified as major contributors to the high construction expenses. Furthermore, the company's troubles have been exacerbated by flaws in the designs that do not align with the demands of the area, as well as the absence of national standards or approved building models. Surprisingly, research participants regarded neighbourhood materials and specialised construction difficulties as irrelevant. According to the creator's (2007) continual investigation of avant-garde and traditional structures, the fundamental segments in advanced and traditional structures are the genuine supporters of the overall building cost in the quality record of the entire pieces.

III. LITRATURE REVIEW

1. THEORETICAL DISCUSSION

- Theory development of TQM

To grasp the roots of Total Quality Management, it is vital to comprehend the contributions made by quality gurus, whose ideas, practices, and tools have endured and become the norm (Thao & Tu, 2021). Although many quality gurus did not invent the phrase Total Quality Management (TQM), their contributions have had a huge influence on the globe as a result of their efforts, which are now recognised as the foundation for understanding the TQM movement and practices. The following subsections cover the key concepts, methodologies, and principles of total quality management (TQM) as provided by the world's most notable quality pioneers.

William Edwards According to the majority of writers, Deming is the guy who gave the contemporary business world its quest for quality (Thao & Tu, 2021). Total Quality Management (TQM) was defined by Deming as a management approach that promotes continuous quality improvement of products and services by motivating all employees to

participate in the change process and find fulfilment in meeting customers' expectations in order to ensure the company's long-term viability. According to Deming, TQM is a management technique that promotes continuous product and service quality improvement by inspiring all workers to engage in the change process and find fulfilment in being a part of it (Parsamand, 2021).

Despite Deming's affiliation with the PDCA (Plan, Do, Check, and Act) cyclical problem-solving technique, other writers attribute the PDCA cycle to Walter Shewhart. As a consequence, in order to apply the PDCA cycle for continuous quality improvement, top management must get deeply engaged in the organization's internal operations (Boaden, 2017). Managers, he believes, have been tasked with the task of creating a culture that views errors and flaws as undesirable. Managers were given responsibility for quality improvement by Deming. The goal was to go above and beyond the customer's expectations. As a consequence, employees were encouraged to speak out about any problems they were having without fear of being blamed. The final product's quality would be checked using statistical methods (Elabd&Elabd, 2021).

2. Total Quality Management and Green Buildings

The term "Total Quality Management" (TQM) was coined by the United States Department of Defense (Evans & Lindsay, 2019). It is the fourth stage of quality development in the United States, and it was originally employed to help American corporations compete successfully with their Japanese counterparts in the 1980s (Talha, 2016). Japan had emerged as a crucial competitor in the 1980s owing to its superior technology, lower labour costs than the United States, and, most critically, its work ethic. Because US businesses were limited by labour rules and government rules, Japan was able to get a good start in the US market (Mele & Colurcio, 2016).

When it came to Japanese competitiveness, the TQM concept was seen as a reaction, and it was largely embraced owing to its more sophisticated procedures and focus on all company stakeholders, including both internal and external consumers. TQM was utilised to enhance manufacturing processes and service delivery, as well as supplier relationships, and provide customers with high-quality service (Dale et al., 2015). Total Quality Management (TQM) was established in the 1990s as a new management strategy for dealing with the problems brought by the prevailing market competition of the time (Mangelsdorf, 1999). According to Lau and Tang, many modern organisations have adopted total quality management (TQM) because they are willing to employ new technology to satisfy their consumers' demands (2019). Changing management styles involves a fundamental departure from the previous approach, as well as a clearer understanding of the role of the organization's culture in change. Total Quality Management (TQM) has become crucial for a company's long-term existence and sustainability, since it requires the commitment of all employees at all levels of the organization. According to Harris et al. (2018), for TQM to be successful, enterprises' goods and services must meet three conditions.

1. Be suitable for the task at hand on a constant and dependable basis.
2. Provide the consumer with an excellent service experience in addition to supplying a product.

3. Give customers a superior product or service at a lower price than competitors.

Total quality management (TQM) is a continuous process, according to Almaamari (2018) and Talha (2016), with the purpose of improving all processes and activities in the organisations to which it is applied. To put it another way, it aims to develop an efficient and consistent management system and organisational culture in order to improve the organization's operations, including customer satisfaction, via continuous improvement. Furthermore, Parsamand (2021) said that overall quality management is a way to make sure that the company always meets and exceeds customer needs and expectations. This is a management strategy.

- Top Management Commitment and Green Building

According to Olusanjo (2019), top management is a practical, goal-oriented act concerned with the creation and implementation of a unique vision. Subordinates must emulate their leaders' dedication in order to effect significant changes and, as a result, instil cultural growth activities and high-quality cultural determination. Amir and Chaudhry, 2019, say that employees will see their leaders as role models if their views encourage quality and long-term improvement that helps the organisation meet its goals.

According to Gherbal et al. (2017), the leadership process is the process of transforming an organisation from what it is now to what the leader wants it to be, with top managers expected to contribute to quality and customer happiness and handle any quality-related concerns. As Amir and Chaudhry (2019) note, leaders are expected to be able to effectively lead organisations to achieve their objectives in an environment where businesses are evolving at a fast rate and fighting against an increasing number of rivals. Competent leaders also develop procedures with the purpose of allowing the organisation to accomplish its goals and inspiring people to pay full attention to their tasks, while ensuring that all stakeholders are included.

To attain a higher level of performance via sustainable construction practices, organisational leadership must take significant actions to go beyond efficiency, compliance, or merely being green. Green construction is now widely recognised as a crucial component of a long-term plan for architecture firms' survival and development (Huggins, 2020). Green building practises should be included in architectural and organisational operations, and sustainable development should be a part of a company's overall business plan (Ofori and Toor, 2018). Avery (2015) emphasises the relationship between leadership and sustainable construction practices, stating that "leadership is a vital component of attaining sustainability." Without it, sustainability in government, business, or any other setting would fail miserably (Avery, 2015, p. 89).

As a result, businesses must fundamentally alter their operations, shifting away from short-term shareholder wealth maximisation and instead focusing on the economic, social, and environmental consequences of their activities (Quinn and Baltes, 2017). The construction industry is one of the important industries that must take the lead in this endeavour because of the enormous negative consequences that building activities may have on the environment. It's important for leaders in the construction industry to play an important

role in the sector's important role in efforts to build more sustainable buildings (Ofori and Toor, 2018).

Architects often believe that, regardless of their maturity level, their capacity to pursue the sustainable construction agenda is determined by the amount of devotion and conviction that their leadership approach to green building holds. Leaders must explain the value of green building and foster an atmosphere in which green building is incorporated into day-to-day management choices (Avery, 2015). As a result, strong leadership is required in architectural organisations in order to provide a collective vision, strategy, and direction toward the shared objective of a greener built environment in the future.

Quinn and Dalton (2019) conducted exploratory qualitative research in which they conducted structured interviews with executives from organisations that have officially implemented sustainable practises as part of an exploratory qualitative study. They said that all businesses need to make sure that social, economic, and environmental issues are incorporated into their vision, values, and operations in order to be sustainable.

Leadership in the architectural sector will be needed to rebuild and reorganise their organisations in order to embed sustainability ideals into the fabric of their organisations and reduce negative consequences. On the other hand, Ofori and Toor (2018) feel that leadership is the most significant aspect in attaining sustainable success. Instead, they suggest that the answer lies in self-aware, dedicated, and effective leadership capable of gaining the support of all stakeholders while also guiding their activities toward a shared project-related objective of sustainable development. This result was reached after an inquiry that included interviews with 32 important figures in the Singapore building sector. When the next generation of leaders is in charge, they need to learn how to combine their own vision of sustainability with the ability to help others reach it so that they can achieve sustainability.

Architects who wish to adopt a commercially successful sustainability plan must be able to comprehend the motivations of diverse stakeholders and engage and cooperate with management to weave sustainability into the fabric of their business's operations. Leaders must also be able to recognise and overcome challenges or impediments that may develop when putting sustainable practises into practise (Meng, Xue, Liu & Fang, 2015). Sustainability leaders must work cooperatively to design and execute activities, adjusting to unanticipated changes in the environment over time via adjustment as needed (Ferdig, 2017). Finally, the leaders of an organisation play a big role in teaching and raising awareness about sustainability issues among its other employees (Quinn and Baltes, 2017).

- Human Resources and Green Building

A multitude of ideas underpin human resource management practice. The resource-based View and Ability theories, as well as Motivation and Opportunity theories, are the most frequently used theoretical frameworks in research that explores the relationship between human resource management and organisational success. According to the Resource-Based View (RBV) theory, which incorporates concepts from organisational economics (Siagian, Jade, & Tarigan, 2020) and strategic management (Nyaberi & Lumumba, 2020), human resource management (HRM) adds value to an organisation by strategically developing the

organization's rare and valuable human resources, which are imperfectly replicable and difficult to substitute. The RBV establishes that competitive advantage is no longer based on natural resources, technology, or economies of scale, which are easily imitated; rather, competitive advantage is based on the valuable, rare, and expensive resources found in an organization's human resources, which are difficult to imitate and replicate. Human resource management is in charge of making sure that the organization's human resources meet those needs.

Human resource managers are people who work for businesses (HRMs). HRM is a phrase that refers to a deliberate, comprehensive, and unified approach to employee employment, growth, and well-being. According to Boxall et al., it is the management of labour and people in order to achieve desired goals (2017). According to Som (2016), human resource management (HRM) is a group of activities that are carefully planned to improve organisational effectiveness and, as a result, performance results.

According to Othman, Norfarahhanim, and Woon (2020), corporations transfer authority and responsibility to lower-level workers by guaranteeing the availability of essential resources and tools to conduct their operations and benefit the company via employee empowerment. According to Alawag et al. (2020), employees' commitment to TQM practises controls their engagement in organisational matters. Employee empowerment and engagement, according to Plsek (2018), encourage employees to be innovative and provide constructive feedback. This will allow management to get the most out of its workers.

One of HR management's responsibilities is to transform the organization's goals and values into HR practises and policies. From a competitive standpoint, human resource practises must be created and aligned with the NRBV strategy in order for businesses to have a competitive advantage from an environmental standpoint. Environmental considerations should also be addressed throughout the recruiting and selection procedures (Dubois & Dubois, D.A., 2012; Parkes & Borland, 2015). In addition, HR systems may provide training and incentives for addressing environmental challenges, which can help the organization's long-term viability. So, HR management systems could be changed to make them more in line with the company's goals and strategy (Ulrich and Brockbank, 2019).

- Customer Focus and Green Building

According to Moon (2019), many organizations put a high emphasis on customer satisfaction in order to acquire competitive advantages and separate themselves from their rivals. The fact that various strategies for creating and monitoring goods, as well as providing services, may be employed to increase overall quality, is also advantageous.

Because every company is reliant on its customers, it is critical for the organization to recognize current and future consumer needs, meet customer expectations and seek to exceed them (Evans, 2017). "In a complete quality setting," Goetsch and Davis (2016) write, "the customer is the driving force." The organization must satisfy the needs and expectations of its customers in order to achieve customer satisfaction (Ahmad et al., 2019). Customer focus is becoming more important for an organization's success since it

serves as the beginning point for every quality endeavor. As a result, it is suggested that research be conducted in the service industry and that the long-term influence of customer attention on other areas of organizational performance be specified (Sousa, 2017). When it comes to analyzing customer happiness, the most important thing to examine is service quality, since it is the most important component in determining a company's longevity (Endara et al., 2019). In all, four TQM components contribute significantly to financial and operational success. One of these elements is customer attentiveness (Abusa and Gibson, 2017). Customers are the focus of this study, with organizational customer orientation, customer interaction behaviors, and customer satisfaction serving as markers of customer focus (Cai, 2019).

According to Jim and Chen (2017), when it comes to buying a new apartment, Chinese people in Guangzhou prioritize the price of the property and the security features, with the environment and social aspects ranking in third and fourth place, respectively. According to the United States Green Building Council, despite the fact that proximity to places of employment and shopping centers is only marginally associated with green building accreditation elements, the Chinese public does not place a high value on the environment when making personal investment decisions.

One of the most important challenges with green technology is engineers' lack of understanding of human preferences. The consumer's lack of knowledge has a significant role in determining how much he or she is willing to pay for a property's green dimension. According to page 23 of the book, 3,592 Canadian families adapt their property selection strategy in response to changes in time and circumstance. Customers are prepared to pay for the following qualities, in this order: efficient energy consumption, natural light, excellent insulation, anti-allergic materials, airtight, outside noise proof, interior noise proof, and forced ventilation materials.

IV. PROPOSED FRAMEWORK

Leadership in the architectural sector will be needed to rebuild and reorganise their organisations in order to embed sustainability ideals into the fabric of their organisations and reduce negative consequences. On the other hand, Ofori and Toor (2018) feel that leadership is the most significant aspect in attaining sustainable success. Instead, they suggest that the answer lies in self-aware, dedicated, and effective leadership capable of gaining the support of all stakeholders while also guiding their activities toward a shared project-related objective of sustainable development. This result was reached after an inquiry that included interviews with 32 important figures in the Singapore building sector. When the next generation of leaders is in charge, they need to learn how to combine their own vision of sustainability with the ability to help others reach it so that they can achieve sustainability.

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HR practices, according to Buller & McEvoy (2016), identify organisational capabilities, individual skills, knowledge, and abilities, as well as group capabilities, and are a useful tool for improving organisational performance. According to Delery&Roumpi (2017), HR management and long-term competitive advantage are linked by two factors. The first concern is with HR procedures, which are seen as a system. As a result, if a business has a well-defined system, it will be able to match the RBV criteria of being valuable, uncommon, difficult to copy, and ambiguous. The second point to consider is the organisational workforce, which is unique, uncommon, and non-replaceable. So, human capital is thought to be the most important factor in giving businesses a long-term advantage over their rivals in the business world.

Moisander et al. (2015), p. 75, emphasise the significance of governing body knowledge and abilities in developing a successful marketing strategy. This information and expertise may be gathered via surveys, studies, and green research. The third concept is "government methods and processes." It is important to remember that government policies and practises contribute to consumer demand, which has an influence on the market. As a consequence, purchasers who are exposed to successful innovations are more likely to anticipate latent wishes rather than just comply with well-established demands. An update or change must be made in order for the consumer to fulfil particular criteria. Finally, in marketing, it is vital to understand the ideas of identity and forms of identification. The writers devised the idea of developing customer desire from the bottom up. Being a green or an environmentalist might be said to be a kind of identity development. To attract customers, the marketing plan must address both their ethical and reputational concerns.

According to Akehurst, Afonso, and Goncalves (2012), in order for a project to flourish, it must contain four key green marketing elements. Customer happiness, product safety, societal acceptability, and long-term product sustainability are the four criteria. According to the authors, the greater the general population's literacy level, the more likely purchasers are to purchase environmentally friendly items. At the end of the day, green marketing must be an important element of the project's entire green management strategy. According to Jim and Chen, marketing is all about persuading people to do

something (2017). In order to properly explain the green philosophy, it is important to include both well-supported facts and new ideas.

According to Rehm and Ade (2017), addressing critical issues such as natural resource depletion and water scarcity has a significant impact on the promotion of green building solutions. According to scientific data, buildings are a significant source of pollution. As a consequence, decreasing the negative impacts of construction via the use of environmentally friendly technology greatly helps the collective effort to conserve the environment. In Brazil, a similar strategy is being proposed for the treatment of critical socioeconomic concerns (Levin, 2018, p. 36). People who live in densely populated and poor areas have to deal with poor water quality, poor ventilation, dangerous building materials, and insect infestations.

Based on the theoretical discussion proposed by the related theories that the TQM model by Deming and the resource-based view theory, the current study has proposed the following conceptual framework that is shown in figure 1.

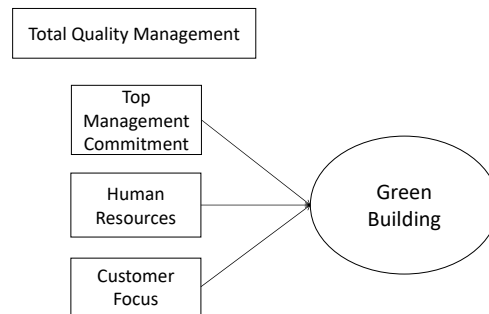


Figure 1: Proposed conceptual framework

V. CONCLUSION

One of the primary motivations for doing this research was a dearth of empirical research into the adoption of Total Quality Management (TQM) in Yemen's architectural sector. The architectural sector has become considerably tougher globally, and organisations that wish to remain must concentrate on increasing operational efficiency (Alaghbari, Al-Sakkaf, & Sultan, 2019). It is also required if Yemen is to have a more hopeful economic future in the coming years. Despite having one of the world's fastest-growing economies, Yemen is still considered a developing country in terms of its economy, with the architectural industry providing the bulk of its people with their main source of income. As a consequence, the deployment of quality initiatives like quality strategies, models, or frameworks like total quality management (TQM) will have a positive influence on the performance of this nation's architectural industry. Even though this study is the most important one yet to use Total Quality Management in Yemeni architectural businesses, if the results are repeated, the findings could be used in other countries with similar economic situations, like other Middle Eastern countries.

Based on the previous studies that investigated total quality management on green building in the Yemeni architectural industry, this study has proposed a conceptual

framework that constructs several factors, which are top management commitment, human resources, and customer focus to find out their effect on the green building in the Yemeni architectural industry.

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