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The Mediating Role of Innovation in the Impact of TQM Practices on Corporate Performance in The Construction Industry in Saudi Arabia

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ABSTRACT

The contracting industry in Saudi Arabia continues to have a major problem with project completion delays, despite the importance of the sector and the large expenditures made in project development. Such delays incur additional costs and may disrupt the country's strategic initiatives, slowing the progress of economic, social, and developmental objectives. This study addresses this issue by examining how Total Quality Management (TQM) influences innovation (INO) and corporate performance (COP) within Saudi construction firms. Data was gathered from 272 participants through a structured questionnaire. Findings indicate that TQM positively and significantly enhances both innovation (INO) and corporate performance (COP) in construction companies. Furthermore, innovation (INO) not only directly improves performance but also serves as a positive mediator between TQM and corporate outcomes in construction. The study underscores that adopting TQM practices can strengthen innovation and elevate the overall performance of the Saudi construction sector. Limitations and directions for future research are also discussed.

INTRODUCTION

The competitive landscape among firms has intensified in recent years, driven by factors such as globalization, environmental shifts, economic changes, and advancements in technology. As a result, companies are increasingly prioritizing quality management principles to navigate these competitive hurdles and enhance their performance. Over the past few decades, the philosophy of TQM has been successfully integrated into various sectors, including services (Brah *et al.*, 2000; Iqbal *et al.*, 2017; Wall, 2021; Shaikh *et al.*, 2024; Aboalghanam *et al.*, 2024). Consequently, scholars have proposed that the construction industry could derive similar advantages from TQM implementation as those witnessed in other fields (Andrewis *et al.*, 2018; Jabi *et al.*, 2024; Ibrahim *et al.*, 2024). Oakland and Aldridge (1995) argue that "if ever any industry needed to take up the concept of TQM, it is the construction industry."

The advantages of applying TQM within the construction sector are significant, including INO, reduced costs associated with first-time quality and defect-free operations, enhanced efficiency, and minimized waste of resources and time (Jimoh *et al.*, 2019; Faeq *et al.*, 2021; Tajouri & Lakhali, 2024; Ibrahim *et al.*, 2024; Ahinful *et al.*, 2024). TQM promotes INO and superior performance among employees by prioritizing training, fostering teamwork, and employee effectiveness. enhancing workplace relationships, and ensuring that tasks are completed correctly on the first attempt (Moreno-Luzon *et al.*, 2013; Tajouri & Lakhali, 2024; Lehyani *et al.*, 2024). Moreover, TQM contributes to elevated customer satisfaction through the delivery of high-quality products and services (Agus & Selvaraj, 2020; Isnaini *et al.*, 2021;

Ming, 2023; Alrefaei *et al.*, 2023), resulting in increased market share, competitive advantages, and an enhanced reputation (Ele *et al.*, 2023; Karakasnakı & Gerou, 2024; Al-refaei *et al.*, 2024). Several construction firms have reported progress in their operations following the adoption of TQM practices (Faeq *et al.*, 2021).

Construction firms, particularly in regional contexts, continue to face numerous obstacles in their pursuit of achieving targeted objectives. TQM aims to foster an organizational culture where every member is committed to fulfilling customer needs and expectations at the lowest possible cost, with minimal effort and time (Tajouri & Lakhali, 2024). This underscores the growing significance of TQM for organizations, as it contributes to increased profitability and productivity, enhanced customer satisfaction, competitive advantage, and higher returns (Fernandes, 2017). Given the intensifying global competition, construction firms in developing countries must adopt TQM practices. Although TQM has been widely acknowledged for its benefits in developed nations, it remains uncertain whether similar advantages will be realized in the context of construction projects in developing countries. The study's findings, however, suggest a positive correlation between TQM practices and the quality performance of construction projects, highlighting its potential for improving outcomes in these regions (Owino & Makokha, 2021).

Despite efforts to adhere to quality standards, the construction industry in Arab countries faces numerous challenges that adversely impact the outcomes of construction companies. A significant contributor to these issues is inadequate strategic approaches and management practices (Othman, 2014). Additionally,

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there remains a lack of clarity regarding the willingness of these construction firms to acknowledge the significance of TQM outcomes (Patya *et al.*, 2020; Faeq *et al.*, 2021; Jabi *et al.*, 2024). As a result, construction companies must prioritize the adoption of TQM practices while integrating INO into their strategic approaches to ensure long-term survival and success (Faeq *et al.*, 2021; Tajouri & Lakhali, 2024; Ibrahim *et al.*, 2024). In particular, construction companies should recognize their responsibility to promote sustainable performance and mitigate their environmental impact throughout project execution (Ibrahim *et al.*, 2024; Al-refaei *et al.*, 2024b). This includes addressing key issues such as resource consumption, and the implementation of environmentally detrimental construction methods (Jabi *et al.*, 2024; Nasser *et al.*, 2024). A review of existing literature indicates that research on the relationship between INO and COP in construction firms through the implementation of TQM within the Saudi context remains limited. Enhancing INO and corporate performance through management philosophies such as TQM, and mediating the role of INO between TQM and performance may align with governmental initiatives and provide a framework applicable to construction firms of varying scales and types. Consequently, this study seeks to address this gap by investigating the impact of TQM on INO and COP, as well as the mediating role of INO between TQM and COP in Saudi Arabia's construction sector.

LITERATURE REVIEW

TQM and Corporate Performance (COP)

Measuring performance is crucial for the successful and efficient management of any organization (Demirbag *et al.*, 2006; Abdulsamad *et al.*, 2020; Abdulsamad *et al.*, 2021; Tajouri & Lakhali, 2024). It plays a vital role in assessing the implementation of TQM and their influence on COP (Demirbag *et al.*, 2006). Many researchers recognize the application of TQM as a powerful strategy for improving COP and achieving better results (Faeq *et al.*, 2021; Tajouri & Lakhali, 2024; Jabi *et al.*, 2024). A review of existing literature highlights that the relationship among TQM and COP is a prevalent topic of discussion. Numerous empirical studies have explored how TQM affects COP. While a handful of papers have not confirmed positive outcomes for companies (Tajouri & Lakhali, 2024), and other studies confirmed insignificant or negative effects of TQM on performance (e.g. Khalfallah & Lakhali, 2021; Khalfallah *et al.*, 2022), the majority of research demonstrates its beneficial effects.

Implementing TQM can significantly enhance overall quality and boost business performance (Alghaseb & Alshmlani, 2022). Improvement initiatives in organizations typically aim to enhance processes directly or improve occupational safety indirectly (Balon & Roszak, 2020). Extensive research indicates that the advantages of TQM include increased customer satisfaction, superior product quality (Al-refaei *et al.*, 2023), and a greater market share for construction companies (Aichouni *et al.*, 2014; Way *et al.*, 2016; Alghaseb & Alshmlani, 2022). For instance, a study examined the TQM-employee performance link in a

rapidly evolving technological landscape in Pakistan (Iqbal & Asrarul-Haq, 2018). Furthermore, Panuwatwanich and Nguyen (2017) found that TQM's positive effect on the COP of construction firms in Vietnam.

Researchers have delved into the TQM influence on COP (Press, 2017; Abu-Mahfouz, 2019). Prior studies have examined how TQM practices relate to COP, particularly through the mediating effect of employee satisfaction. Findings indicate that various TQM elements significantly correlate with both employees' satisfaction and overall performance. Notably, effective leadership and a strong customer focus are crucial for boosting employee satisfaction and enhancing organizational outcomes (Press, 2017). In a study focused on the manufacturing sector in Jordan, Abu-Mahfouz (2019) investigated the impact of TQM practices and discovered that these practices positively influence COP. Tajouri and Lakhali, (2024) explore the direct impact of TQM practices on COP as well as the indirect influence of these practices through organizational learning as a mediating factor. Additionally, it considers company size as a contextual element affecting the relationship between TQM and the outcomes in small and medium-sized industries (SMIs) in Tunisia, the findings indicate that TQM positively and significantly affects COP. Therefore, the present study presupposed, according to the prior dissection that:

H1

TQM positively affects COP in Saudi Arabia's construction sector.

TQM and Innovation (INO)

Innovation refers to the development of valuable and applicable novelty that enhances an organization's products and services (Jandab *et al.*, 2029; Abdi & Singh, 2022; Al-Sharif *et al.*, 2023). Creativity encompasses generating new ideas, alternatives, and possibilities. INO serve as essential strategic and operational tools for building sustainable competitive advantage (Jandab *et al.*, 2020), especially in research and development across sectors. Increasing consensus highlights that INO is crucial for an organization's long-term sustainability. Recent studies indicate a considerable gap between organizations' INO targets and the actual outcomes achieved from their INO investments (Abdi & Singh, 2022).

Empirical research on the link between TQM practices and INO has yielded inconsistent results (Elmanzani *et al.*, 2019; Ershadi *et al.*, 2019). While some studies dismiss a positive relationship between TQM practices and INO, others substantiate it through theoretical frameworks and empirical analysis. This divergence has spurred considerable academic interest, prompting scholars to theorize explanations for these conflicting findings. In their work, Tajouri and Tunisia (2024) highlighted favorable and unfavorable correlations between TQM practices and INO, with continuous improvement viewed as a potential driver for fostering new ideas and applications. However, it is also critiqued as a routine activity that may only lead to minor enhancements.

A thorough literature review on the TQM-INO relationship emphasizes the significance of TQM practices across various contexts (Ershadi *et al.*, 2019; Thuy & Hue, 2023). Multiple analyses underscore the impact of effective TQM implementation on INO outcomes. Numerous studies have specifically assessed how TQM influences INO (Thuy & Hue, 2023; Honarpour *et al.*, 2018). Further, research by Khalfallah *et al.* (2022), Abdi and Singh (2022), and Ahinful *et al.* (2024) explored the extent to which INO is influenced by TQM practices, revealing TQM's role in driving INO. The present study presupposed, according to the prior dissection that:

H1

TQM positively affects INO in Saudi Arabia's construction sector.

Innovation (INO) and Corporate Performance

Innovation is pivotal in driving COP, contributing to long-term sustainability by harnessing existing and new technologies to navigate complex business settings (Al-refaei *et al.*, 2014b). Ausat *et al.*, 2022; Ateeq *et al.*, 2024b) reported that INO among organizations substantially and positively affects business outcomes. Similarly, Ateeq *et al.* (2024) observed that INO plays a crucial role in securing sustainable solutions for organizations. Companies thus strive to cultivate a work environment that actively supports INO within the workforce to enhance overall performance (Shanker *et al.*, 2017). However, limited knowledge exists regarding how the adoption of INO influences the success of firms compared to those that do not pursue such INO (Becker, 2023). This distinction is critical, as firms embracing INO strategies may achieve greater success than those that do not, potentially due to their development of sustainability-focused INO capabilities (Demirel & Kesidou, 2019; Becker, 2023). According to Anwar *et al.* (2020), process INO significantly improves COP. Accordingly, Ho *et al.* (2018) discovered a positive correlation between financial success measures and INO.

These conclusions are supported by Antunes *et al.* (2017), who found that organizations that use process INO methods see both financial advantages and considerable increases in operational efficiency. Similarly to this, Maistry *et al.* (2017) emphasized how INO may improve an organization's overall performance. Additionally, according to Sahoo (2019), quality management procedures favor financial results. Furthermore, INO serves not only as a direct driver of performance but also acts as an intermediary link, enhancing the relationship between TQM and performance outcomes (Thuy & Hue, 2023). The present study presupposed, according to the prior dissection that:

H3

INO positively affects COP in Saudi Arabia's construction sector.

H4

INO positively mediates the effects of TQM on COP in Saudi Arabia's construction sector.

MATERIALS AND METHODS

This study adopted a descriptive-analytical method to investigate the influence of TQM on the INO and performance of contracting firms within Saudi Arabia. This approach is effective for exploring and interpreting phenomena by gathering and analyzing data to derive objective insights. The research targeted employees from SALCO Saudi Contracting Company, a prominent contracting organization in the Kingdom with around 1,200 employees. Due to the challenges associated with reaching the entire population, the study applied Krejcie and Morgan's table to determine an appropriate sample size, resulting in a representative sample of 291 employees. Data collection was conducted through a cross-sectional survey, with random sampling used to select participants. The survey questionnaire was distributed to employees via social media platforms.

The questionnaire design was informed by prior research and literature on the topic, incorporating established sources relevant to the field. It consisted of two parts: the first section gathered demographic information from the participants, while the second section focused on the study variables. TQM was assessed using 20 items developed from previous research, including works by Idris and Abu al-Rus (2022), Al-Harthy and Hammouri (2022), and Al-Anzi (2022). The TQM measure was structured into three dimensions: commitment of senior management to quality (8 items), employee participation (5 items), and continuing improvement (7 items). INO was measured by 5 items developed by Hung *et al.* (2011), and modified by Khalfallah *et al.* (2022). COP was evaluated using 7 items adapted from Al-Harthy and Hammouri (2022) and Al-Anzi (2022).

RESULTS AND DISCUSSIONS

Result

Sample Profile Description

The sample of this study consisted of employees working in SALCO Saudi Contracting Company. Analysis showed that 234 participants (88%) were male, while 38 (14%) were female. In terms of age distribution, 16 employees (22.1%) were under 30 years old, 84 (30.9%) were between 30 and 40 years, 68 (25%) were aged 40-50, and 60 (22%) were over 50. Educational qualifications also varied: 81 employees (29.8%) held a diploma, 86 (31.6%) had a bachelor's degree, 66 (24.3%) possessed a master's degree, and 39 (14.3%) held a Ph.D. Regarding work experience, 50 employees (18.4%) had less than 5 years of experience, 87 (32%) had 5 to 10 years, 58 (21.3%) had between 10 and 15 years, and 77 (28.3%) had more than 15 years of experience.

Assessment of Measurement Model

The measurement model, comprising TQM, INO, and COP, generated satisfactory results. The model fit indices showed indicated a good fit: $\chi^2 = 731.145$, $DF = 3457$, $CMIN/DF = 1.60$ ($p < 0.000$), $CFI = 0.950$, $TLI = 0.946$, and $RMSEA = 0.047$. These findings demonstrate a good fit, as presented in Table (1) of the model fit assessment. Moreover, reliability, convergent validity, and divergent validity results summarized in Table (1) indicated that all factor loading exceeded the cut-off of 0.50, it was between 0.60 and 0.85 for all the items, composite

reliability (CR) ranged from 0.877 for INO, 0.913 for corporate performance to 0.957 for TQM, exceeding the recommended threshold of 0.70 (Alsamawi *et al.*, 2019). The average variance extracted (AVE) surpassed 0.50, as suggested by prior research (Fornell & Larcker, 1981; Alsamawi *et al.*, 2019; Nasser *et al.*, 2024). Average shared variance (ASV) was higher than the maximum shared variance (MSV) thresholds (Nasser *et al.*, 2024; Zumrah *et al.*, 2021), confirming the model's reliability and validity according to Table 1.

Table 1: Overall reliability and validity of all constructs

Construct	CR	AVE	MSV	MaxR(H)
TQM	0.957	0.530	0.262	.964
Corporate Performance	0.913	0.638	0.262	0.924
Innovation	0.877	0.590	0.262	0.885

The second approach employed for the assessment of discriminant validity was the Heterotrait-Monotrait Ratio (HTMT), as recommended by previous studies (Henseler *et al.*, 2015; Al-refaei *et al.*, 2024; Alshuhumi *et al.*, 2024). While the Fornell-Larcker Criterion (FLC) is traditionally regarded as an effective method for assessing discriminant validity (DV), it sometimes fails to detect a lack of DV in

certain research contexts (Al-refaei *et al.*, 2023). Henseler *et al.* (2015) proposed HTMT as a new method to address this issue, suggesting that the HTMT value for constructs should be below 0.85. In the current study, the HTMT values for all constructs were below the recommended threshold of 0.85, establishing DV for all constructs as indicated in Panel B of Table 2.

Table 2: FLC and HTMT

Variables	Panel A: FLC			Panel B: HTMT		
	TQM	INN	OP	TQM	INN	OP
TQM	0.942			-		
Innovation (INN)	0.436***	0.874		0.687	-	
Performance (OP)	0.512***	0.724		0.539	0.735	-

After verifying the reliability, convergent validity, and discriminant validity, the structural model was employed to assess the impact of TQM on INO and COP in construction companies in Saudi Arabia. The hypothesized structural model indicated TQM's positive and significant effect on INO and COP, and INO positively affects COP. The path coefficients showed $\beta = 0.342$, $t = 3.342$, and $P = 0.000$, the findings show that the t-statistics is higher than (1.96), and the p-value is less

than 0.05. H2 of the effect of TQM on INO showed $\beta = 0.665$, $t = 8.200$, and $P = 0.000$. H3 of the effect of INO on COP showed $\beta = 0.558$, $t = 7.209$, and $P = 0.000$. the statistics result indicating the direct hypotheses are significantly supporting (al-refaei *et al.*, 2024b; Al-Refaei *et al.*, 2019; Ghumiem *et al.*, 2022) the hypothesis regarding the direct effects of TQM on INO and COP at construction companies in Saudi Arabia. As shown in the table 3.

Table 3: Standardized regression estimation of direct effects

Path	Standardized	t-Value	P-Value	Result
TQM → Performance	0.242	3.342	0.000	Supported
TQM → Innovation	0.665	8.200	0.000	Supported
Inn → Performance	0.558	7.209	0.000	Supported

The bootstrapping approach was used to examine TQM's indirect effect on corporate performance via INO, and the results confirmed that INO mediates the relationship between TQM and performance ($\beta =$

0.371; $p = 0.001$). Given the p-value was less than 0.05, these findings supported Hypothesis 4 (H4). Detailed results of the indirect impact of INO are shown in Table 4.

Table 4: Indirect Effect

No	Path	SD	SE	Lower	Upper	P-value	Disunion
H4	TQM→ Inn→ OP	0.371	0.06	0.272	0.470	0.001	Accepted

Note: SD = Standardized, S.E = Standard Error

Discussion

The research findings indicate that implementing TQM significantly benefits Saudi construction companies, enhancing both INO and overall performance. Key factors contributing to this impact include senior management commitment, employee involvement, and a focus on continuous improvement. Senior management’s dedication to TQM supports strategic alignment and effective coordination across the organization, fostering a culture of quality and INO (Alshuhum *et al.*, 2024; Al-Refaei *et al.*, 2024). Additionally, promoting employee participation in decision-making and quality-related processes was shown to boost motivation and commitment, driving employees to perform tasks with INO, precision, and efficiency (Al-Refaei *et al.*, 2021). Continuous refinement of work procedures further supports operational INO, improves efficiency, and minimizes time and resource wastage.

The findings underscore the collaborative effort required across organizational levels to achieve strategic TQM outcomes and confirm that TQM is a powerful tool for improving COP. The measurable improvements in INO and performance observed in contracting firms reinforce the value of TQM in Saudi Arabia’s construction sector. These results align with prior studies that highlight TQM’s positive influence on organizational outcomes. For instance, Alghaseb and Alshmlani (2022) found that TQM implementation generally elevates product and service quality, mirroring this study’s focus on the role of management commitment, employee engagement, and continuous improvement in enhancing performance in Saudi construction companies. Similarly, Balon and Roszak (2020) reported that continuous improvement initiatives are crucial for process optimization and worker safety, resonating with this study’s findings on the role of TQM in minimizing errors and increasing efficiency.

These results also concur with research by Aichouni *et al.* (2014) and Way *et al.* (2016), which demonstrated that adopting TQM enhances operational performance. Further supporting evidence comes from Iqbal and Asrarul Haq (2018), who highlighted the connection between TQM practices and employee performance in Pakistan, reinforcing this study’s emphasis on employee participation in improving organizational outcomes. Additionally, Panuwatwanich and Nguyen (2017) observed a positive impact of TQM on construction firms’ performance in Vietnam, aligning with this study’s findings on the substantial benefits of TQM for Saudi construction companies, particularly in reducing project delays and enhancing overall efficiency.

The findings of this study regarding the impact of TQM on INO align with prior research that has demonstrated

a positive relationship between TQM practices and INO. For example, Tajouri and Tunisia (2024) observed that continuous improvement within TQM can stimulate new ideas and applications, enhancing INO. This study’s results are also consistent with previous investigations that examine the role of TQM in fostering INO, such as those conducted by Thuy and Hue (2023) and Honarpour *et al.* (2018).

Furthermore, our findings are supported by studies from Khalfallah *et al.* (2022), Abdi and Singh (2022), and Ahinful *et al.* (2024), which explored how TQM practices contribute to INO, revealing TQM’s significance in promoting innovative developments. Implementing TQM not only enhances product and service quality but also encourages the generation of new ideas that contribute to incremental and even radical improvements in processes. This study emphasizes TQM’s role in fostering INO within the context of Tunisia, aligning with Khalfallah and Lakhel (2021), who found that TQM practices influence both product and process INO. These results underscore TQM’s value for the construction industry and its compatibility with emerging market environments. However, contrary to the generally positive findings, some empirical studies report that TQM practices have limited or no effect on successful INO outcomes. Research by Elmanzani *et al.* (2019) and Ershadi *et al.* (2019) highlights inconsistencies in the relationship between TQM practices and INO, suggesting that the impact of TQM on INO may vary across different contexts.

A key finding from this empirical study is the mediating effect of INO in the relationship between TQM and COP. The results from the full sample indicate that INO acts as a bridge, strengthening the connection between TQM implementation and improved organizational outcomes. This suggests that the TQM practices identified in this study should be viewed as catalysts that foster INO, ultimately leading to better COP. This outcome aligns with prior research, such as Thuy and Hue (2023), which demonstrated that INO not only directly drives performance but also plays an intermediary role that reinforces the impact of TQM on performance results. These findings highlight the value of INO as both a performance driver and a mechanism that amplifies the benefits of TQM practices.

CONCLUSION

This study explores the impact of TQM on INO and COP within a Saudi Arabian construction company, specifically SAPCO. However, it has several limitations. First, the research was confined to assessing TQM components such as senior management commitment, employee involvement, and continuous improvement in

a single construction firm, excluding other companies in the sector. Future research could broaden the scope to include various construction companies across Saudi Arabia to enhance the generalizability of findings. Secondly, the study collected data at a single point in time, providing a cross-sectional snapshot. Conducting a longitudinal analysis by gathering data at multiple time intervals may reveal similar patterns while improving the applicability of results over time. Lastly, this research did not investigate potential mediating variables, such as employee satisfaction, commitment, organizational citizenship behavior (OCB), and organizational identification. Including these mediators in future studies could deepen the understanding of how TQM influences employee attitudes, behaviors, and overall COP.

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