




# “Investigating factors affecting project performance moderated by project governance”

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# INVESTIGATING FACTORS AFFECTING PROJECT PERFORMANCE MODERATED BY PROJECT GOVERNANCE

## Abstract

The purpose of this study is to empirically examine the impact of total quality management, institutional pressure, and organizational citizenship behavior on project performance moderated by project governance in ongoing construction projects. Empirical data were collected from 162 respondents engaged in ongoing construction projects in Oman using a self-administered questionnaire. The partial least square structural equation modeling (PLS-SEM) technique was used to analyze the data. The findings show that TQM significantly impacts project performance. In contrast, organizational citizenship behavior did not mediate between total quality management and project performance. Project governance partially moderated the impact of total quality management on project performance. This study offers practical implications for the construction industry that wants to improve its project performance. This paper recognizes the significance of TQM practices by developing an industry-wide culture of successful project performance. It is vital to support the ongoing efforts of the project managers to promote and apply quality management principles, particularly in the construction industry.

## Keywords

TQM, project management, project performance, corporate governance

## JEL Classification

M11, L20, L15, L23

## INTRODUCTION

In the past few decades, organizations have been facing challenges to show their ability to sustain and acquire competitive advantage considering the technological, social, and political changes (Cancino et al., 2018). Customer awareness and high demand for quality products from the international market make it tough for companies to survive unless they deliver and uphold good quality products and services (Bajaj et al., 2018). In today's dynamic and demanding environment, organizations prefer to focus on many significant strategies simultaneously to achieve their business sustainability goal effectively and efficiently (Abbas, 2020).

Construction projects face hurdles like delays and defects that are unavoidable compared to the controlled manufacturing environment. A common feature of the construction industry is that it is highly project-based due to the building of most of its critical infrastructure (Flyvbjerg et al., 2003; Gil & Tether, 2011; Ruuska et al., 2011). The current economic status contributed by the construction industries in Oman is indeed up-and-coming but still not to its full potential. The most obvious challenge that can be determined is ensuring the construction industry is focused on quality improvement. Quality improvement with the implementation of TQM has been a significant strategy in the past decades for gaining a competitive advantage in

the construction industry. However, very little is known about the influence of TQM and its impact on performance. Project performance is impacted if an organization has incomplete project efficiency and quality and a limited probability of project success. Furthermore, project governance can influence project management from the individual's view, providing a concrete structure through which projects are set up, run, and reported.

## 1. LITERATURE REVIEW AND HYPOTHESES

The manufacturing companies first used the TQM concept to investigate its impact on firm performance, business performance, quality performance, and customer satisfaction (Ebrahimi & Sadeghi, 2013). Various quality management approaches then applied the TQM concept to meet the customer's requirements and the organization's objectives. Adem and Viridi (2021), Arumugam et al. (2008), and Sahoo and Yadav (2020) in manufacturing industries and Bouranta (2021), Ooi et al. (2011), and Talib and Rahman (2020) in service industries mentioned that TQM plays a crucial role in project improvement. However, Jong et al. (2019) stated that studies on TQM toward project performance are lacking, especially in GCC countries, and limited studies have been conducted on ongoing construction projects. However, Hoang et al. (2006) stated that quality is a very relevant concept that plays a crucial role in organizational success and project sustainability. Thus, emphasizing quality would enable the organization to address the needs and requirements of its customers and eventually put the organization in an appropriate competitive position and business success (Herzallah et al., 2014). During the past few decades, quality management has become widespread among organizations to meet customer requirements and achieve long-term success (Parast & Golmohammadi, 2019).

Numerous studies have shown that TQM elements improve the performance of organizations with high profits and customer satisfaction. For example, TQM improves the working ability and positive attitude of employees. Moreover, Firmansyah et al. (2014) found that TQM significantly impacted OCB and performance. They also confirmed that employees would perform better than their peers with TQM implementation. It has been demonstrated that both OCB and TQM affect organizations and that there is also a stronger reason why

TQM affects OCB (Buentello et al., 2008). OCB is expected to mediate the TQM performance relationship with such a strong relationship.

Moreover, Bouranta et al. (2017) indicated that TQM was able to meet customer requirements by encouraging continuous improvement and reducing waste and rework costs. Till today, TQM factors known for Deming's model are appreciated by research scholars due to its profound knowledge system (Kudtarkar, 2014). Table 1 provides an overview of previous studies in relation to TQM, OCB, and performance.

Lakhal et al. (2006) and Panuwatwanich and Nguyen (2017) stated that TQM plays an important role in minimizing cost, upgrading staff performance, and enhancing organizational performance and customer satisfaction. Furthermore, Pambreni et al. (2019) supported the empirical TQM-performance relationship and confirmed their positive association. In addition, Antunes et al. (2017) posited that TQM factors like top management commitment, supplier relationship, and employee involvement are highly associated with performance. Many studies have shown that TQM human resources factors have been influenced significantly by performance. Customer focus was shown to be an important structure to improve corporate performance (Arumugam et al., 2008).

Benchmarking as an important TQM strategy for business performance was confirmed by Agus and Selvaraj (2020) and Yaseen et al. (2018). TQM as a quality strategy was also confirmed as an essential factor in the service industry performance (Haque et al., 2014). Goetsch and Davis (2016) identified 11 key TQM elements critical for organizational performance. Thus, this study, considering the project performance, has used customer focus, continuous improvement, top management commitment, project strategy, and total employee involvement as the key TQM factors that would contribute to construction project performance.

**Table 1.** Previous studies on TQM, OCB, and performance

Source	Variables	Methodology	Results
Jimoh et al. (2019)	TQM practices, organizational performance, strategies for continuous improvement	Quantitative with PLS-SEM	TQM practices are related positively to continuous improvement and organizational performance
Phan et al. (2019)	TQM practices, just in time, flexibility performance	Regression and correlation analysis	TQM practices significantly impact flexibility performance. The relationship between just-in-time production practices and performance is stronger with higher TQM implementation
Lu et al. (2019)	Quality management practices, inter-organizational project performance, governance as moderator	Structural equation modeling	Governance magnifies the positive effect of quality management practices on project performance
Shieh and Wu (2002)	TQM, project performance	Empirical regression analysis	Leadership ability and management of suppliers have a positive influence on project performance
Bryde and Robinson (2007)	TQM, customer focus, project performance	Exploratory study	TQM and customer-based project performance are highly correlated
Yee (2018)	TQM practices, project performance	Multiple regression analysis using SPSS	Operation focus and workforce focus were perceived as dominant TQM practices in quality performance
Abazid and Gökçekuş (2019)	TQM practices, construction project performance	Exploratory analysis using SPSS	There is a weak implementation of the concept of total quality management in delivering construction projects
T.-H. Kuo and Y.-L. Kuo (2010)	TQM, corporate culture, and project performance	Structural equation modeling	Both corporate culture and TQM positively influence project performance directly
Sadikoglu and Zehir (2010)	TQM, firm performance	Structural equation modeling	TQM practices are significantly and positively correlated with all performance measures
Pambreni et al. (2019)	TQM, organizational performance	Regression analysis using SPSS	Customer focus, continuous improvement, strategic based, and total employee involvement have a positive and significant effect on organizational performance
Eniola et al. (2019)	Organizational culture, TQM, organizational performance	PLS-SEM	TQM may improve the OC dependent on the CVF in an organization, thus improving SME performance
Buentello et al. (2008)	TQM, OCB, performance	Exploratory factor analysis	Causal relationship exists between TQM and performance constructs
Firmansyah et al. (2014)	OCB, TQM, leadership technology, service quality, performance	PLS-SEM	Organizational citizenship behavior (OCB) had a significant effect on total quality management and performance
Jung and Hong (2008)	OCB, TQM, and performance	Structural equation modeling	The organizational culture represented by OCB significantly impacts how TQM is managed and implemented. Furthermore, the results point out that "soft TQM elements" have a more significant impact than "hard TQM elements" on firm performance
Mehrabi et al. (2013)	OCB, TQM practices, organizational performance	Exploratory analysis	OCB on TQM positive influence performance
Baird et al. (2011)	Organizational culture, TQM, and operational performance	Structural equation modeling	TQM practices are to enhance operational performance
Ul Musawir et al. (2017)	Project quality, project governance, project performance	Structural equation modeling	Effective project governance improves project success both directly and through an enhanced benefit management process
Sirisomboonsuk et al. (2018)	Project governance, information technology governance, project performance, quality	Regression analysis	IT governance and project governance have a positive impact on project performance
Haq et al. (2018)	Project governance, project performance, project quality, project management risk	Structural equation modeling	Project governance has a significant positive influence on project performance directly and through mediation, whereas moderation is insignificant
Haq et al. (2019)	Project governance, project performance, requirement risks, project quality	Structural equation modeling	Contractual and relational governances significantly influence project performance and are useful in reducing opportunism

The main objective of this study is to investigate the influence of TQM and institutional factors on project performance and to evaluate the impact of project governance on improving project performance.

Thus, the following hypotheses have been formulated:

- H1: *Total quality management (TQM) factors have a positive influence on the performance of ongoing construction projects in Oman.*
- H2: *There is a positive influence of institutional factors (coercive and normative pressures) on construction project performance in Oman.*
- H3: *There is a strong mediating effect of organizational citizenship behavior (OCB) between total quality management (TQM) factors and construction project performance in Oman.*
- H4: *There is a strong moderating effect of project governance between total quality management (TQM) factors and construction project performance in Oman.*

## 2. METHODOLOGY

The study emphasizes on the project performance for selected ongoing construction projects in Oman. As per the website from omanprojects.com, in total 19 different sectors were having ongoing construction projects in the form of new tenders. The survey questionnaire in this study was specific to the ongoing construction projects in Oman targeting key project participants like project managers, project consultants and contractors. This study used Statistical Package of Social Sciences (SPSS) version 25.0 and Partial Least Square Structural Equation Modelling (SEM) technique using SMARTPLS 3.0 to analyze the data. SEM ensures that the collected data achieve normality and is of adequate sample size. Adequate sample size must be ensured as “covariance and correlations are less stable when estimated from small sample sizes (Tabachnick & Fidell, 2013). Hair et al. (2014) recommended 100 as the minimum sample size for appropriate use of maximum likelihood estimation in SEM.”

Table 2 shows that 114 (70.4%) respondents were men. Additionally, most respondents were between the ages of 40 and 49. In terms of qualification, 81 respondents had bachelor's degrees, 37 had master's degrees, and 22 respondents had professional degrees. In terms of the experience of the respondents, it was found that 87 had more than 10 years of experience, followed by 49 had 5 to 10 years of experience, 24 had 1 to 5 years of experience, and 2 respondents had less than 1 year of experience. Furthermore, 141 projects had less than 50 employees engaged, 17 had 51 to 100 employees, and 4 had 101 to 250 employees working on the ongoing projects. Sector-wise, there were 28 oil and gas projects, 27 information technology-related projects, 23 engineering and seaports projects, 19 power and energy-related projects, and so on.

**Table 2.** Demographic profile of the respondents

Variable	Frequency	Percent
<b>Age</b>		
20-29	7	4.3
30-39	35	21.6
40-49	74	45.7
50 or above	46	28.4
<b>Gender</b>		
Male	114	70.4
Female	48	29.6
<b>Qualification</b>		
Diploma	17	10.5
Bachelor	81	50.0
Master	37	22.8
Ph.D.	5	3.1
Professional	22	13.6
<b>Number of employees</b>		
Less than 50	141	87.0
51 to 100	17	10.5
101 to 250	4	2.5
<b>Sector</b>		
Agriculture	20	12.3
Telecommunication	9	5.6
Food and Beverage	10	6.2
Oil and Gas	28	17.3
Information Technology	27	16.7
Engineering Works and Seaports	23	14.2
Municipal Services	13	8.0
Power and Energy	19	11.7
Building and Constructions	13	8.0
<b>Experience</b>		
Less than 1 year	2	1.2
1 to 5 years	24	14.8
5 to 10 years	49	30.2
Above 10 years	87	53.7
<b>Job role</b>		
Project Manager	80	49.4
Project Consultant	11	6.8
Project Contractor	66	40.7
Others	5	3.1

### 3. RESULTS AND DISCUSSION

This study seeks to investigate the influence of TQM and institutional factors on the performance of ongoing projects in Oman. The data collected through the questionnaires need to be confirmed for reliability for further analysis (Hair et al., 2012). Thus, Cronbach's alpha coefficients were tested as part of the reliability analysis, demonstrating whether the independent and dependent variables are reliable. Due to the possibility that they misinterpreted the questions, some survey respondents may have commented on the questions differently from other respondents. According to the study's reliability analysis, they are above the cutoff point of 0.70, or 70%, as shown in Table 3. PLS makes it challenging to evaluate reliability tests for formative constructs. The scale's dependability was evaluated in this way for the reflecting constructs.

In addition to examining the loadings of each indicator on a relevant factor, the composite reliability and variance extracted were assessed individually as part of the validity criteria. Finally, the convergent and discriminant validity of the measures were assessed using confirmatory factor analysis (CFA) and associated components. The convergent validity of the constructs is indicated by the average variance extracted (AVE). The AVE for every construct was greater than 0.5, indicating that the measurement scale has sufficient convergent validity and that latent constructs can explain at least 50% of the variance in items (Hair et al., 2012).

Construct validity was used in this study to demonstrate how well the results from using the measure matched the theories upon which it was built. Construct validity is verified via factor analysis and correlation analysis. Correlation analysis is

one technique for confirming concept validity in this study. Accordingly, it implies that the elements acting as indicators of a specific concept must converge or share a sizable fraction of their variation. In other words, it assesses how closely two measures of the same concept correlate with one another, with a high correlation indicating that the scale is measuring the concept it was intended to measure. To determine whether a construct has discriminant validity, the average variance retrieved for each construct should be greater than the squares of the correlations between the construct and all other constructs (Fornell & Larcker, 1981). In addition, Panigrahi et al. (2023) also confirmed that HTMT and Fornell-Larcker are considerable validity results for detecting multicollinearity and discriminant validity.

The correlations between the constructs must also be less than the square root of the average variance extracted. The discriminant validity of the model was also investigated to ascertain its external consistency. Cross-loading, the heterotrait-monotrait ratio of correlations (HTMT), and Fornell and Larcker's criterion are three factors that confirm the discriminant validity. The findings show a strong association between the constructs. At the 1% significance level, all components were confirmed to be moderately or strongly associated ( $p = 0.001$ ). Regression analysis was then used to determine which, if any, is the most significant driver of project performance among the manufacturing enterprises in Oman and to determine the extent to which all three components explain project success.

Figure 1 shows the generated model of TQM factors, institutional factors, organizational citizenship behavior, project governance, and project

**Table 3.** Reliability results

Constructs	Cronbach's alpha	(rho_a)	CR	AVE
Coercive Pressure (CP)	0.816	0.819	0.879	0.645
Customer Quality Improvement (CQI)	0.809	0.812	0.875	0.636
Customer Focus (CF)	0.822	0.826	0.875	0.584
Employee Involvement (EI)	0.859	0.861	0.895	0.587
Normative Pressure (NP)	0.807	0.807	0.886	0.721
Organizational Citizenship Behavior (OCB)	0.803	0.808	0.864	0.561
Project Performance (PP)	0.823	0.824	0.883	0.653
Project Strategy (PS)	0.829	0.829	0.886	0.661
Top Management Commitment (TMC)	0.831	0.849	0.874	0.539
Project Governance (PG)	0.802	0.822	0.863	0.560

**Table 4.** Discriminant validity using heterotrait-monotrait ratio (HTMT)

Variables	1	2	3	4	5	6	7	8	9	10
CP	1.00	–	–	–	–	–	–	–	–	–
CQ	0.768	1.00	–	–	–	–	–	–	–	–
CF	0.561	0.683	1.00	–	–	–	–	–	–	–
EI	0.727	0.834	0.747	1.00	–	–	–	–	–	–
NP	0.851	0.798	0.628	0.768	1.00	–	–	–	–	–
OCB	0.876	0.785	0.765	0.965	0.921	1.00	–	–	–	–
PP	1.028	0.876	0.684	0.849	0.989	1.05	1.00	–	–	–
PS	0.847	0.617	0.556	0.621	0.763	0.8	0.923	1.00	–	–
TMC	0.793	0.717	0.551	0.76	0.779	0.83	0.886	0.791	1.00	–
PG	0.744	0.710	0.604	0.625	0.674	0.684	0.814	0.77	0.714	1.00

Note: CP = Coercive Pressure; CQI = Customer Quality Improvement; CF = Customer Focus; EI = Employee Involvement; NP = Normative Pressure; OCB = Organizational Citizenship Behavior; PP = Project Performance; PS = Project Strategy; TMC = Top Management Commitment; PG = Project Governance.

**Table 5.** Fornell-Larcker criterion

Variables	1	2	3	4	5	6	7	8	9	10
CP	0.803	–	–	–	–	–	–	–	–	–
CQ	0.630	0.797	–	–	–	–	–	–	–	–
CF	0.470	0.564	0.764	–	–	–	–	–	–	–
EI	0.616	0.697	0.634	0.766	–	–	–	–	–	–
NP	0.691	0.647	0.517	0.644	0.849	–	–	–	–	–
OCB	0.713	0.636	0.625	0.804	0.743	0.749	–	–	–	–
PP	0.848	0.718	0.569	0.717	0.808	0.856	0.808	–	–	–
PS	0.702	0.509	0.466	0.527	0.625	0.654	0.763	0.813	–	–
TMC	0.678	0.603	0.473	0.657	0.658	0.699	0.761	0.672	0.734	–
PG	0.621	0.578	0.503	0.526	0.548	0.561	0.675	0.631	0.602	0.748

Note: CP = Coercive Pressure; CQI = Customer Quality Improvement; CF = Customer Focus; EI = Employee Involvement; NP = Normative Pressure; OCB = Organizational Citizenship Behavior; PP = Project Performance; PS = Project Strategy; TMC = Top Management Commitment; PG = Project Governance.

performance. The model includes the findings from each variable's CFA model fit for the proposed model. Without any modifications to the modification indices, the created model depicts the outcome of the hypothesized model. The standardized estimate is not considered fit because the model fit conditions are unmet. As a result, the model is assessed using the re-specified one to make it fit.

TQM and institutional factors considerably impact project success, as illustrated in Figure 1 (R square = 0.904,  $p < 0.000^{***}$ ). At a  $p$ -value between 0.05 and 0.01, the impact of institutional characteristics on project performance was also significant. Additionally, project governance plays an important role in improving project performance.

The substantial association between TQM elements, institutional factors, organizational citizenship behavior, project governance, and project success was confirmed through an interaction effect using a re-specified model. The considerable

level of factor loading interaction between factors substantiated the influence on project performance. Cohen (1968) assert that the study has proven the indicators are capable and significant in identifying the phenomena if the influence of predictors is greater than 40%. The direct relationship's factor loadings also demonstrate that institutional and TQM factors have a stronger impact on project performance.

Table 6 shows the structural model results of TQM and institutional factors with project governance and project performance. It is found that customer quality improvement ( $\beta = 0.101$ ,  $t = 2.082$ ), employee involvement ( $\beta = 0.101$ ,  $t = 1.882$ ), project strategy ( $\beta = 0.21$ ,  $t = 3.843$ ), top management commitment ( $\beta = 0.095$ ,  $t = 2.252$ ), project governance ( $\beta = 0.094$ ,  $t = 2.037$ ), and organizational citizenship behavior ( $\beta = 0.368$ ,  $t = 4.414$ ) have significant influence on project performance. Coercive pressure ( $\beta = 0.299$ ,  $t = 3.504$ ) and normative pressure ( $\beta = 0.221$ ,  $t = 3.387$ ) significantly impact project performance

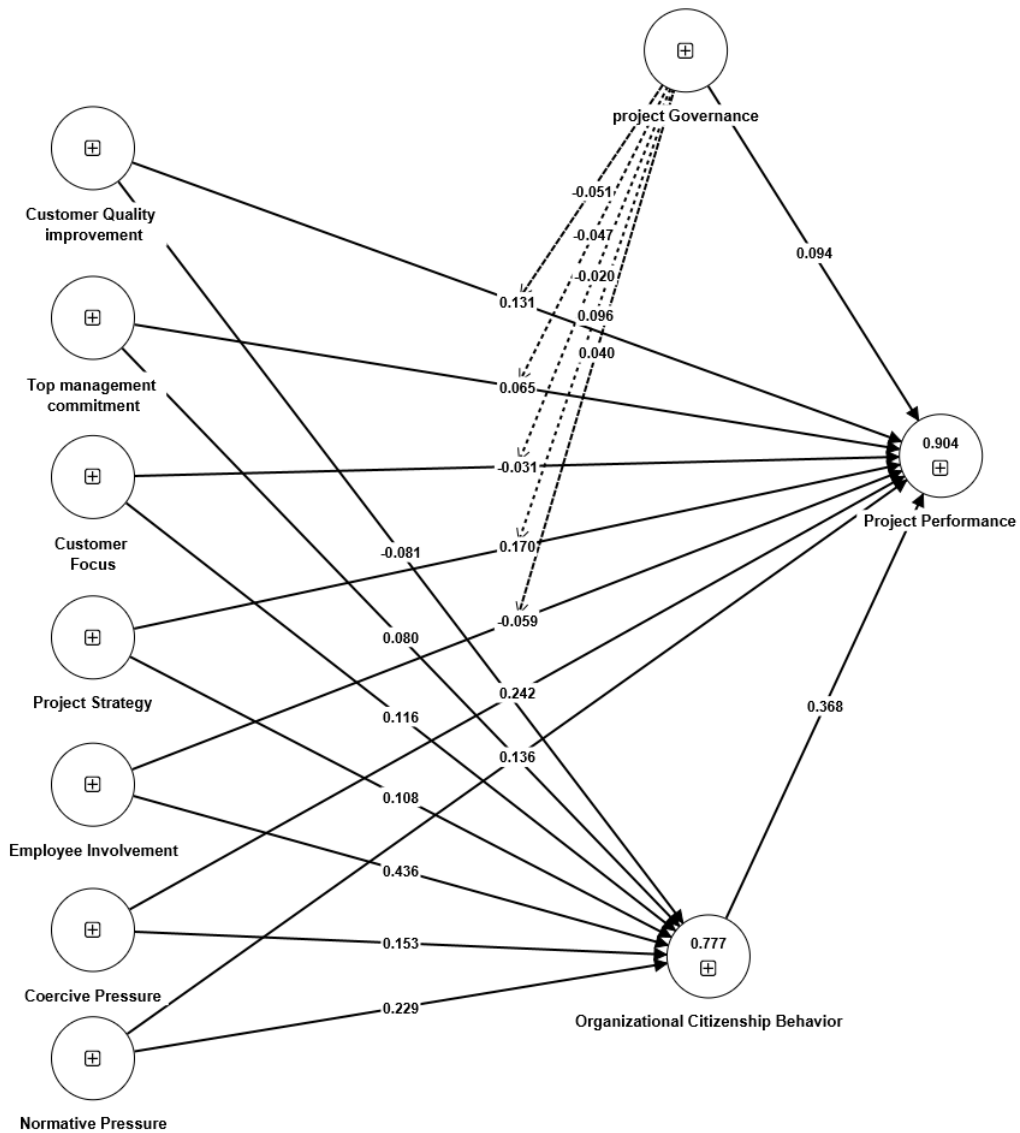


Figure 1. Re-specified model

Table 6. The overall effect of exogenous constructs on endogenous constructs

Endogenous and exogenous constructs	Path coefficient	T statistics	P values
Coercive Pressure → Organizational Citizenship Behavior	0.153	1.669	0.096
Coercive Pressure → Project Performance	0.299	3.504	0.001
Customer Quality Improvement → Organizational Citizenship Behavior	-0.081	1.064	0.288
Customer Quality Improvement → Project Performance	0.101	2.082	0.038
Customer Focus → Organizational Citizenship Behavior	0.116	2.057	0.041
Customer Focus → Project Performance	0.012	0.286	0.775
Employee Involvement → Organizational Citizenship Behavior	0.436	4.689	0
Employee Involvement → Project Performance	0.101	1.882	0.061
Normative Pressure → Organizational Citizenship Behavior	0.229	2.835	0.005
Normative Pressure → Project Performance	0.22	3.387	0.001
Organizational Citizenship Behavior → Project Performance	0.368	4.414	0
Project Strategy → Organizational Citizenship Behavior	0.108	1.773	0.077
Project Strategy → Project Performance	0.21	3.843	0
Top Management Commitment → Organizational Citizenship Behavior	0.08	1.649	0.1
Top Management Commitment → Project Performance	0.095	2.252	0.025
Project Governance → Project Performance	0.094	2.037	0.043



**Table 7.** Moderating effect of project governance

Moderating effect of project governance	Effect	T value	P value
Project Governance x Top Management Commitment → Project Performance	-0.047	0.979	0.328
Project Governance x Project Strategy → Project Performance	0.096	2.594	0.01
Project Governance x Customer Quality Improvement → Project Performance	-0.051	1.111	0.268
Project Governance x Employee Involvement → Project Performance	0.04	0.637	0.524
Project Governance x Customer Focus → Project Performance	-0.02	0.484	0.629

and organizational citizenship behavior, according to the path coefficient measurements reported in Table 6. This indicates a directional link between both, i.e., when coercive pressure increases by one unit, project performance increases by 0.299 units.

Similarly, customer quality improvement significantly impacted the performance of ongoing projects. From these results, it is confirmed that the relationship is directional. Additionally, the relationship between the determinants of TQM and

institutional factors on project performance was critically analyzed. The impact of TQM factors was found to be very high compared to the other control variables.

The substantial association between TQM elements, institutional factors, organizational citizenship behavior, project governance, and project success was confirmed through an interaction effect using a re-specified model. The considerable factor loading interaction between factors validated the influence of the project performance.

## CONCLUSION

This study aimed to investigate the impact of TQM and institutional factors on the performance of ongoing projects in Oman. A total of 162 participants engaged in the ongoing projects were considered respondents to the survey questionnaire. The institutional and contingency theories provide support for the existing research framework. The study found that organizational citizenship behavior, institutional variables, and TQM components are considered intangible resources and project performance and are viewed as having a dynamic capability. The empirical findings revealed a positive influence of TQM on project performance. Similarly, institutional factors were found to impact the performance of construction projects positively. However, the study did not discover any significant mediation relationship of OCB between TQM and project performance. Next, the empirical findings revealed no significant influence of OCB on the performance of construction projects. The current study found no evidence of a mediating role for OCB concerning the relationship between TQM and institutional factors and project performance. However, the study found that project governance partially moderated the relationship between TQM and project performance. In conclusion, three of the four proposed hypotheses were confirmed and accepted.

The construction sector in Oman is aware of how crucial TQM is to its methods for continuous quality improvement. The application for ISO 9000 certification is one TQM suggestion for the construction sector. According to the Oman Construction Company, the ISO 9000 certification is only required for people in the construction business in Grade 7 (TOCO). TQM awareness and application still lag in other smaller construction organizations. It is important to support Oman's ongoing efforts to promote and apply quality management principles, particularly in the construction industry.

This study created a theoretical framework for quality management and project performance in the construction industry based on resource capabilities. It considers the organization's practices for using its resources to develop and carry out project strategies. Additionally, the framework connects these practices to expanding a project's capacity to enhance research quality. The theoretical framework closes a gap in the literature and provides a sound theoretical foundation for research on the causes and effects of TQM in projects in the construction sector.

The construct of knowledge, creation, and transfer (KCT) capabilities is also proposed in this study, and it is thought to signify the dynamic capabilities that projects must enhance for quality and performance in quickly changing environments. This study has significant ramifications for researchers, project managers, and policymakers in Oman and beyond. Creating a resource capability-based paradigm for TQM adds to the literature and fills a need in this field of study. By implementing this framework, organizations can utilize all the resources and facilities to build capabilities that enable them to perform and deliver at the desired level. By adopting this approach, policy planners can prepare to create instruments for supporting project development and improving the performance and quality of projects. Concerning how TQM practices might improve project performance, this study has established several valuable strategies for organizations, particularly Oman's construction companies. A TQM framework must be created, evaluated, and researched in the appropriate context to benefit the industry.

## AUTHOR CONTRIBUTIONS

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Data curation: Wafa Rashid Alalyani, Chia Kuang Lee.

Formal analysis: Wafa Rashid Alalyani.

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Supervision: Chia Kuang Lee.

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