

The Role of Innovative Project Management Practices on Construction Project Performance

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ABSTRACT

This study examines the impact of innovative project management practices on construction project performance. The study adopts positivist epistemology, conducting a cross-sectional survey of 296 professionals in Oman's construction sector. Quantitative data analysis was performed covering the dimensions of innovative project management practices such as cost efficiency, stakeholder engagement, and project management methodologies while evaluating the impact on project performance. The findings confirm a significant and positive impact of innovation project management practices on project performance with an innovative culture as a moderating variable. The study also discussed challenges in the form of financial constraints, persistent fragmented approaches, scepticism, and indifference. It reveals the need for system transformation with a call to strategically invest in and increase capacity in technology, as well as advance collaborative governance to facilitate innovation practices. The study suggests four (4) main objectives for Oman's construction sector, covering innovation project management, increased efficiency, managing risks, and contributing to the diversification goals of the country. This research adds to the knowledge on innovation value chains in emerging economies. Innovative value chain and innovative culture have also been significantly and strongly associated with project performance. In general, it provides policy and practical implications for managers and policymakers to harness the benefits of innovation through adaptive project management.

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INTRODUCTION

Today's dynamic global environment, involving rapid technological advancement and economic transition, has made effective project management a critical success determinant across sectors. Modern project management has expanded far beyond scheduling and budgeting (Wu, 2022). At present, it covers strategic planning, optimal utilisation of resources, continuous monitoring and adaptive solutions to problems. Jitpaiboon et al. (2019) discussed how well one can undertake a project and align it with strategic goals from the initiation till the final delivery of a project. Despite the improvements in project management methodologies and approaches, many projects fail because of insufficient strategic planning, inappropriate policies or inadequate adaptive competencies linked to innovative capabilities (Caniëls et al., 2019; AlBarami et al., 2020).

The project management practices are further complicated by the globalisation aspects, which are a necessary component of the present contemporary projectised environment. Lehtimäki and Komulainen (2021) discussed that most international and cross-organisational projects often merge teams from dissimilar cultural, organisational, and geographical environments. As a result, this enhanced complexity raises the need for experienced project managers capable of meeting contemporary challenges through innovative ideation, risk identification and informed decision-making. Current practices require the ability of innovation, brainstorming and agile practices to alleviate the risks and make projects successful (Parast, 2011). Significant progress has also been made in project management practices and methodologies, considering contemporary challenges. However, flexibility and the ability to innovate and learn fall outside the majority of organisations' vision.

Todt et al. (2019) discussed that the absence of formal learning frameworks within educational and, consequently, workplace settings results in ad-hoc and informal responses to the challenges that work against long-term performance improvement and innovation. At large, capital-intensive projects, delays, cost overruns and resource inefficiencies effect the intended outcomes of projects to a greater extent (de Melo et al., 2021). This global pattern reflects the situation in Oman, as the nation has accomplished several successful infrastructure projects, but it has also faced significant failures in reaching its medium and long-term development goals. For instance, one (1) of the most well-known initiatives is the partial achievement of the "Oman Vision 2020", focused on diversifying the economy and reducing crude oil dependence (Al-Rahbi, 2021). Although efforts are being made to grow non-oil sectors, the economy continues to depend heavily on oil, leaving it exposed to global oil prices and oil depletion reserves. This failure to fully benefit from other growth potential sectors indicates a weak project performance and the absence of innovation.

Oman's ambition progress is inconsistent with resistance to innovation, poor project performance, and lack of integration of high tech amongst stakeholders (clients, consultants, contractors, vendors). These challenges undermine the ability of the country to achieve the Vision 2040 targets, especially in economic diversification and sustainable development (Durrah et al., 2018). Time, cost, quality, and stakeholder satisfaction are all affected by poor adoption of innovative tools and methodologies.

The study is timely and of importance as it seeks to empirically demonstrate the vital role of innovation in improving project performance in the Omani construction sector. The study focused to advance existing literature as well as industrial practice by providing new enlightenment about the respective impacts of key innovation dimensions. The findings help stakeholders, policymakers, contractors, and project managers better understand how to harness innovation to enhance efficiency, minimise risk, and achieve national development goals. Furthermore, this study further backs Oman's strategic change to the knowledge economy, which aligns with the Vision 2040.

LITERATURE REVIEWS

Strategic Innovation in Project Management

With the current technological advancements and globalisation, it is crucial to develop effective approaches to project management that will enable the achievement of project outcomes with minimal costs. Andersen (2016) indicated that project managers are now paying more attention to developing plans to achieve project intended outcomes at minimal costs. This shift has changed the concept of project management to encompass a strategic initiative where portfolios of projects are in sync with the organisation's goals to sustain competitive advantage in competitive environments. Galvez et al. (2018) discussed that competitive advantage is achieved by understanding the environment, deciding on an organisation's place, and integrating innovation. Project managers who adopt strategic innovation can manage the project more effectively by making use of new tools and methods to manage risks. Salerno et al. (2015) stated that innovation is costly, and therefore, the environment for innovation needs to be thoroughly searched to identify the areas that bring real value to the process or organisation.

Innovation's Impact on Project Performance

Existing literature discussed innovation as a positively related factor to project performance in various aspects. Wang and Li (2022) suggested that the integration of modern technologies in portfolio management helps project managers to overcome operational challenges and improve their productivity and costs. Al-Balawneh and Tarabieh (2024) also added that strategic innovation enhances resource management as project managers manage existing resources with changes to attain favourable outcomes. However, the relationship between innovation and performance is not unidirectional. Machado and Martens (2015) argued that in a low technological maturity environment like Oman, the lack of innovation hinders resource utilisation and calls for innovation strategies within the country's capacity. Globalisation and emergent technologies present new threats that affect project profitability when managed adequately or strategically (Nikolova et al., 2017). Therefore, innovation is accompanied by effective risk management mechanisms in order to reduce the probability of risk involved. Further, by focusing on innovation in problematic or challenging scenarios, project managers enable themselves to effectively manage uncertainties or risk associated with it. Thus, it is possible for managers to provide feasible approach to emergent situations, whether it is a supply chain issue or misaligned stakeholders (Machado & Martens, 2015).

Innovation and Economic Growth in Oman

The economy of Oman is largely dependent on hydrocarbons; however, there is an ongoing pressure to diversify and advance the process of digitisation. The Omani government has set aggressive digitisation strategies aiming to cover 59 government sectors for digitisation by 2021, with the intention to insulate the economy from oil market volatility (Alam & Hussein, 2019). Although these steps demonstrate political will in the process of innovation, the lack of advancement in technology beyond the petrochemical industry prevents broader economic change. Jitpaiboon et al. (2019) discussed that the development of national infrastructure, high technology industries and the efficiency of the public sector are the key to the formation of a knowledge-oriented society. Lehtimäki and Komulainen (2021) also noted four (4) drivers of structural technological development: customer engagement, digitisation of products and business frameworks, decision-making processes, and operational competencies. Oman's Digital Transformation Program governed by Ministry of Transport, Communications, and Information Technology (MTCIT) aims to automate the public services operations and projects to fast-track project delivery, and facilitates resource-sharing across institutions (Almaqtari et al., 2025). These initiatives have enhanced the standards of project management practices within country strives to generate alternate sources of non-oil revenues.

Project Management Transformation for Construction Businesses

The construction industry is the leading indicator of Oman's broader economic development objectives. With a global worth of USD 11.7 trillion in the year 2020, and estimated to rise to USD 14.4 trillion by 2026, the industry is fuelled mainly by government infrastructural spending and technological innovations that include BIM and 3D printing (Lin & Fu, 2024). The construction sector contributes approximately 9% to the country's GDP and is still the leading sector in terms of employment, with 2,410 ongoing projects worth USD 190 billion in 2020 (Alawi et al., 2022). However, it experienced a declined by 10.3 % in the succeeding year, mainly because of the volatility of oil prices and the Covid-19 pandemic.

Further, the use of digital tools leads to real-time tracking of the project, identification of risks that are likely to occur, and management of the stakeholders involved, which helps avoid delays and control costs. However, for the sector to reach its optimum capacity, project managers must incorporate cross-industry knowledge and insight, involving the use of virtual reality, Internet of things sensors, and predictive analysis to make construction sites competent and responsive. Also, construction project management maturity is positively related to the economic diversification measures. According to Masan (2016), Oman's long-term development depends on the ability to develop human capital to create value-added products outside oil and gas. Through the incorporation of innovation drivers into construction project management, it is possible for stakeholders to put in place systems and structures that will encourage innovation, support experimentation, and foster continuous development (Alawamleh et al., 2020).

Innovation Drivers and Methodologies

Innovation management in project management goes beyond brainstorming, as it has to be systematic and methodical. Innovation can be classified into product, process, marketing, and organisational types, which can be used to analyse and redesign project management processes. Project Management Institute (PMI)'s five (5) Process Groups, namely: initiating, planning, executing, monitoring & controlling, and closing, offer a framework of how innovation steps can be implemented from concept development to closure. However, these processes fail to thrive without the right experimentation and organisational learning climate encouraging innovation. Allahar (2019) suggested that strategic governance policies and stakeholders' engagement are the essential foundational elements that help to address complexity by creating a culture of innovation and discipline.

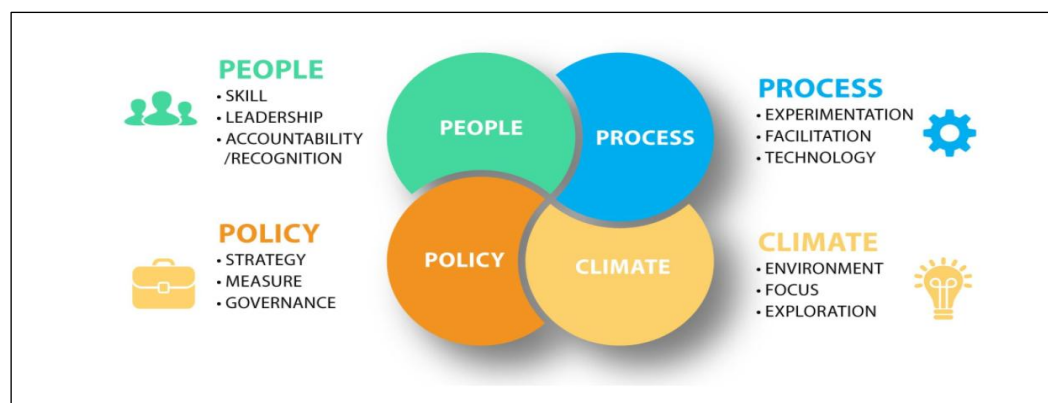


Fig. 1. Innovation Ecosystem

Source: Alawamleh et al. (2020)

At the methodological level, there are different approaches to combine innovation with project management rigidity, such as using Scrum and Kanban, Lean, Waterfall, and both hybrid approaches (Leech & Hanslo, 2025). The agile method is best applied when there is a need to go through the development cycle several times, and where feedback from the stakeholders is critical to integrate. Further, the lean method is preferred in processes with greater potential waste and less value addition. While it is easy to understand the process in well-defined projects due to the waterfall model, the linear process lacks flexibility. Managers have to make sure that the choice of methodology depends on both the complexity and risk of the project and the level of innovation required (Weiss et al., 2017).

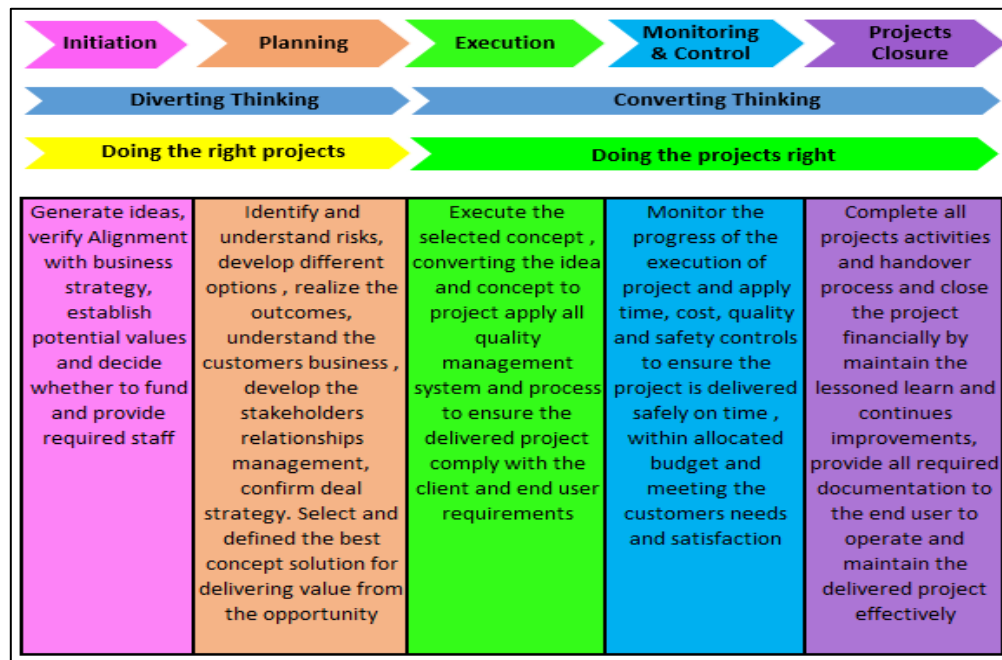


Fig. 1. Project Process Group and Innovation Steps from Diverting to Converting Thinking

Source: Authors (2024)

Hypotheses and Conceptual Framework

The study covers various aspects of project management and leadership, particularly the extent to which project management practices have contributed to strategic success in managing projects. Data from the primary insights survey was utilised to facilitate the empirical analysis of the usefulness of integrating innovative strategies in project management practices. The study addresses issues such as the role of innovative project management practices and innovative culture in Oman's construction industry projects' performance. The research model is constructed on the following objectives:

- (i) To identify the roles of the main elements of the innovation value chain (innovation drivers, innovation barriers, innovation enablers, and the benefits of innovation) in project management practices.
- (ii) To identify the impact of Innovative Project Management Practices on Oman's construction project performance.

- (iii) To identify the role of innovative culture in moderating the relationship between innovative project management practices and project performance in Oman's construction industry.
- (iv) To develop the concept, the research framework reflects the relationships between all study variables.

Based on existing literature, it is clear that project management performance depends on effective alignment, monitoring, and controlling of innovation. Therefore, it is necessary to maximise the project management performance to integrate the applications and processes of project management with innovative elements, drivers, enablers, and impacts. Based on this, the following hypotheses were developed to test and explore the relationships between the constructs:

- (i) H1: There is a positive role for the main elements of the innovation value chain (innovation drivers, innovation barriers, innovation enablers, and the benefits of innovation) in project management practices.
- (ii) H2: There is a positive relationship between the innovative project management practices and the performance of projects in Oman's construction industry.
- (iii) H3: There is a positive relationship between the innovative culture and project performance in Oman's construction industry.

Therefore, the proposed model in Figure 3 suggests that projects depend on the assistance of innovative project management techniques to become completely accomplished and result in improved construction conditions in Oman.

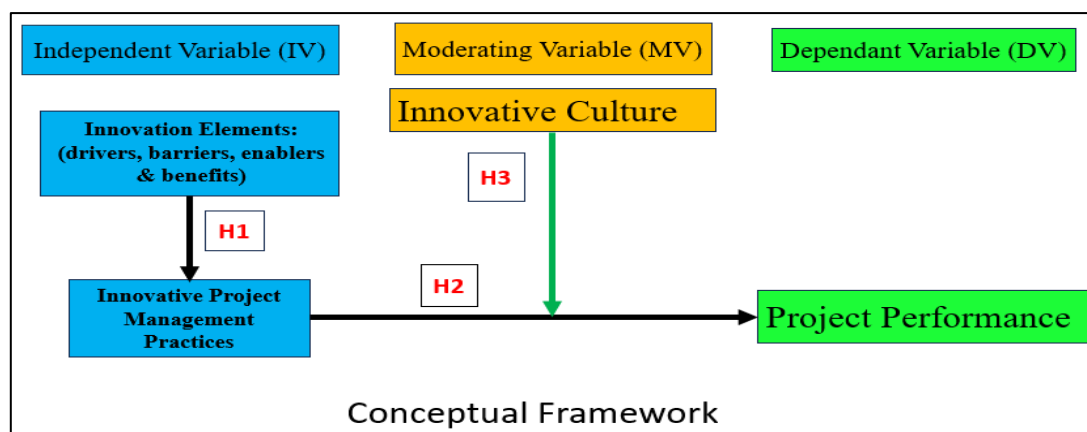


Fig. 2. The Conceptual Framework

Source: Authors (2024)

METHOD AND PROCEDURES

The current study adopted a positivist paradigm with the purpose of investigating the study phenomenon through an objective lens. It employed a deductive approach to examine hypotheses formed in relation to the effects of innovation on project performance. Moreover, a cross-sectional survey instrument was utilised to empirically test hypotheses based on the available literature on the determinants of innovation in project management. The survey was administered to project management professionals and practitioners in Oman, as well as clients, contractors, consultants, and suppliers. The study employed purposive sampling to ensure the inclusion of only informed respondents. According to the standard error estimates for multiple regression analysis, it was estimated that at least 296 valid responses would be required to provide sufficient statistical power (95% confidence level, 5% margin of error).

Data Collection and Instrument

The survey instrument included 50 Likert scale items covering the study constructs of innovation culture, management practices, and project performance. Some items were adopted from existing scales, and the rest were developed from the literature, validated with pilot testing of 20 respondents. The survey was conducted for four (4) weeks, and follow-up emails were sent to the respondents at two (2) and three (3) weeks to ensure a high response rate.

Data Analysis

The survey responses were analysed using the Statistical Package for Social Sciences (SPSS). First, the validity of the responses was established using Cronbach's alpha in order to check the internal consistency. Cronbach's alpha was 0.924, indicating excellent internal consistency and justifying aggregation of items into composite scores for subsequent analyses. Sample adequacy was also performed through factor analysis using Kaiser-Meyer-Olkin (KMO) and Bartlett's Test. Correlation and multiple regression analyses were then conducted to examine the hypothesised relationships between the innovation factors (independent variables) and the project performance measures (dependent variables). The significance level was maintained at two-tailed, i.e. 95% confidence interval.

Ethical Considerations

The study adheres to high ethical standards of voluntarism, informed consent, and anonymity. No personal data was collected or provided to third parties; all the answers were stored on the secure server and used for research purposes only. The participants were allowed to withdraw from the study at any time without any reason being given or required.

RESULTS

Factor Analysis

Factor analysis comprised the correlation matrix presented in Table 1, which shows the relationship strength among the variables, which is 0.973. Table 2 shows KMO and Bartlett's test illustrating sampling adequacy, which is .500 with $p < 0.05$. In addition, the communalities show the extraction that specifies initials as 1.000 and extraction as 0.986, as shown in Table 3. Lastly, Table 4 shows the eigenvalue that reflects the number of extracted factors, whose sum must equal the number of items subjected to factor analysis. The total initial eigenvalue is 1.973 and 0.027 simultaneously for the two (2) components.

Table 1. Correlation Matrix

Correlation	Innovative Project Management Practices	Project Performance
Innovative Project Management Practices	1.000	.973
Project Performance	.973	1.000

Source: Authors (2024)

Table 2. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	1452.353
	Df	1
	Sig.	.000

Source: Authors (2024)

Table 3. Communalities

	Initial	Extraction
Innovative Project Management Practices	1.000	.986
Project Performance	1.000	.986

Extraction Method: Principal Component Analysis.

Source: Authors (2024)

Table 4. Total Variance Explained

Initial Eigenvalues						
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.973	98.632	98.632	1.973	98.632	98.632
2	.027	1.368	100.000			

Regression Analysis

The following regression summary shows an R² of 0.946, which is high and confirms a high prediction of the independent variable (Innovative Project Management Practices) on the dependent variable (Project Performance). The R value of 0.973 (97.3%) also suggests the developed model is adequately fit and accepted for regression purposes. Also, Table 6 depicts an analysis of variance and elaborates on the significant value of .000. The table confirms $p < 0.005$ depicting that the null hypothesis claiming non-significance of the model should be rejected. Table 7 shows the coefficient summary, showing the beta value and significance value. The positive Beta value of 0.973 reflects that increasing the variable could increase innovative project management practices. Moreover, the sig value is .000, which shows the effect of innovative project management practices on project performance.

Table 5. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.973 ^a	.946	.946	3.18431

a. Predictors: (Constant), Innovative Project Management Practices

Source: Authors (2024)

Table 6. ANOVA Summary

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	88511.599	1	88511.599	8729.123	.000b
	Residual	5049.623	236	10.140		
	Total	93561.222	237			

a. Dependent Variable: Project Performance.

b. Predictors: (Constant), Innovative Project Management Practices

Source: Authors (2024)

Table 7. Coefficients Summary

Coefficients ^a					
Model		Unstandardised Coefficients		Standardised Coefficients	Sig.
		B	Std. Error	Beta	
1	(Constant)	1.251	.894		.162
	Innovative Project Management Practices	1.075	.012	.973	.000

a. Dependent Variable: Project Performance.

Source: Authors (2024)

Correlation Analysis

Table 8 reflects the correlation among the independent and dependent variables comprising innovation value chain elements, innovative project management practices, with the moderating variable, innovative culture, and the dependent variable as project performance. The focus of the correlation was to assess the relationship between each independent variable and the moderating variable with the dependent variable of the study. Pearson Correlation “ $r=0.811$ ” in relation to innovation value chain and project performance suggests a strong relationship exists between the variables. Also, for innovative project management practices, the $r=0.785>0.7$ confirms a strong relationship. Similarly, $r=0.924>0.7$ suggests a strong relationship also exists between innovative culture and project performance.

Table 8. Correlation Matrix

Correlation	Innovation Value Chain	Innovative Project Management Practices	Innovative Culture\	Project Performance
Innovation Value chain (drivers, barriers, enablers& benefits)	1	0.898**	0.915**	0.811**
Innovative Project management Practices	0.898**	1	0.928**	0.785**
Innovative Culture	0.915**	0.928**	1	0.924**
Project Performance	0.811**	0.785**	0.924**	1

** Correlation is significant at the 0.01 level (2-tailed)

Source: Authors (2024)

DISCUSSIONS

Oman's ambition progress is inconsistent with resistance to innovation, poor project performance, and a lack of integration of high tech amongst stakeholders. These challenges undermine the ability of the country to achieve the Vision 2040 targets, especially in economic diversification and sustainable development (Durrah et al., 2018). Time, cost, quality, and stakeholder satisfaction are all affected by poor adoption of innovative tools and methodologies. Considering this, the study aims to provide an understanding of innovation in the Oman construction industry and the relationship between Innovative project management practices and project performance. The study evaluates the innovation value chain, comprised of drivers, enablers, barriers, and benefits, and its relationship has been measured with project performance.

Further, the innovative culture considered as a moderator has also been examined in relation to project performance. The study findings suggest a positive association between innovation drivers, innovative project management practices and innovative culture with construction project performance in Oman. However, this is inconsistent with classification, in which drivers are grouped under environmental tension, technology, transfer of knowledge, and boundary spanning (Zhou et al., 2025).

The study by Zainul Abidin and Powmya (2025) also reveals that Oman's construction sector appreciates external engagement and learning as potential enablers of innovation. This aligns with existing literature on stakeholder management (Al Aamri et al., 2025; Alshukri et al., 2024). However, Harake (2025) suggested that challenges like financial constraints and project fragmentation are also aligned with the systemic factors that are economic volatility and industry fragmentation. The present study identifies barriers such as a lack of efficient project management and clients' lack of trust in innovation, which were rarely discussed in the existing literature. This also explains why the region is still in the early stages of innovation and depends on conventional practices that consequently makes organisations considerate about the recent advances and challenges of contemporary project management.

Further, the advantages of innovation, such as enhanced stakeholder engagement and competitive advantage, lead to customer satisfaction, hence, ultimately adding value to the project outcomes. In positioning stakeholder engagement, the study implicitly argues against the transactional idea of innovation and for relational improvement of project results. This is in line with Ordoñez de Pablos (2023), suggesting innovation and linkage with organisational creativity is established; nonetheless, the challenges for Oman's construction sector are more specific and concerning.

Further, the second objective focuses on understanding the moderating role of innovation culture. The results confirm a strong and positive relationship between adopting innovation and project performance. The correlational findings suggested a significant association of innovation factors with the project performance. Though prior studies, such as Khalfan *et al.* (2022), established a moderate positive correlation between culture and innovation in service industries, it can be argued that the Oman construction industry may be culturally homogenous or have methodological biases, such as possible self-reporting leading to high correlation.

Moreover, drivers such as innovation culture, innovative value chain and innovative project management practices are aligned with the existing literature, specifically in the context of an emerging economy where diversification pressure increases the innovation pressure. Nevertheless, factors such as institutional environment or international collaborations, which are crucial in the context of the Gulf Cooperation Council (GCC) region, make innovative culture a key and influential factor (Durugbo *et al.*, 2020).

Furthermore, this study has adopted stakeholder engagement as a benefit, which shifts the paradigm from the transactional approach. However, regression and correlation analyses may distort the causal relationships, as some prior studies have criticised the usage of correlation and regression because of their underlying relationship in terms of studying complex relationships.

Overall, the present study adds to the existing literature by establishing the innovation value chain in the context of Oman's construction industry and the extent to which it aligns or deviates from the findings in the existing literature. It supports the findings on enablers and barriers elsewhere, but its focus on stakeholders and some specific barriers contributes to the existing literature. Thus, the study provides a theoretical and empirical reference point for policy to promote innovation in such economies.

CONCLUSION

This study highlights the importance of adopting effective project management practices in construction projects in Oman. The study emphasises that the drivers of innovation, such as cost efficiency and stakeholder engagement, positively relate to project success, while innovation culture also plays a significant role as a moderator. The study discusses the implications and positive contributions of innovative project management practices for the construction sector of an emerging economy in Oman. Likewise, in other emerging economies, the construction sector is considered critical for the sustenance and growth of the entire economy because of its interrelationship with associated industries. The current study provides guidelines on how such economies, by facilitating innovation in their critical sector, can attain wider socio-economic benefits. The study findings have significant implications for policymakers and industry actors to focus on investments in technology, capacity, and cooperation to establish innovation as a lasting development objective for the Oman construction sector and build its ability to respond to shocks.

DIRECTION FOF FUTURE RESEARCH

Though the study is of significant importance in terms of adequately addressing the existing gap in the literature, particularly related to Oman's construction sector, there still persist some methodological and theoretical limitations that future researchers can address. One (1) of the methodological limitations was observed in the KMO value of 0.5 lesser than the widely accepted threshold of 0.6. Though the value of 0.5 is still accepted but considered miserable. Therefore, future researchers have an opportunity to work on the sampling adequacy for the current investigation.

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CONFLICT OF INTEREST STATEMENT

The authors agree that this study was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with the funders.

AUTHORS' CONTRIBUTIONS

Hamed Naseer Mubarak AL Khudhuri conceptualised the study, developed the theoretical framework, and drafted the original manuscript. Sivadass A/I Thiruchelvam designed the methodology, supervised the quantitative data analysis and validated the findings related to innovative culture as a moderating variable. Mohammad Khudari administered the cross-sectional survey, performed the statistical analysis of the 296 professional responses, and contributed to the interpretation of challenges such as financial constraints and fragmented approaches. Sam Wamuziri reviewed and edited the manuscript, provided critical insights on the innovation value chain in emerging economies, and linked the findings to policy and practical implications for Oman's construction sector diversification goals. All authors approved the final version of the manuscript.

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