

A hypothesised model of project quality and management skills regarding the performance of construction SMEs in South Africa, Gauteng Province

Tshegofatso Felicity Mohambi, Viwe Mrwebi and Ronny Shibiti
*Department of Economic and Management Sciences, University of South Africa,
Pretoria, South Africa*

Abstract

Purpose – Construction SMEs in Gauteng Province underperform due to poor project management skills and poor project quality. This study develops and validates a model that explores the relationship between project management skills, project quality, and SME performance.

Design/methodology/approach – The study adopted a quantitative correlational survey design using structured questionnaires analysed through regression analysis and exploratory factor analysis (EFA).

Findings – The findings, which aligned with the Resource-Based View (RBV) and Competency-Based View (CBV), indicate that project management skills improve project quality and SME performance with risk and design skills emerging as the strongest predictors.

Research limitations/implications – Although the study provides valuable insights into construction SMEs in Gauteng, the findings should be interpreted cautiously because of the disproportionate representation of lower- and mid-grade firms within the sample. Organisational and demographic factors such as firm size, contractor grading, and managerial experience were not included as control variables and may influence the observed relationships. Furthermore, the proposed mediating role of project quality was not empirically tested using advanced mediation techniques. Future research should therefore apply covariance-based structural equation modelling (SEM) or bootstrapping approaches to examine indirect effects and validate the proposed mediation model. Additional studies may also investigate the moderating influence of digital maturity, organisational culture, leadership style, and contractor grading across different provinces and developing economies.

Practical implications – The findings highlight the need for SME managers to prioritise the development of project management skills through targeted training, digital project tools, and structured quality management practices. Strengthening a quality-oriented organisational culture further enhances client satisfaction, reduces rework, and improves profitability.

Social implications – The findings have implications for government agencies, industry regulators, and SME development institutions involved in construction sector capacity-building. The study highlights the need for practical training in project management, risk management, design coordination, digital construction technologies, and quality management systems. Improved project quality may reduce project delays, cost overruns, and project failure while enhancing SME competitiveness, employment creation, and infrastructure delivery within Gauteng and similar emerging-market contexts.

Originality/value – Using multiple regression analysis, the findings show that project management skills significantly influence project quality ($R^2 = 0.808$), with design and risk management skills emerging as the strongest predictors. Project quality also significantly improved profitability, innovation, customer satisfaction, and employee performance. The study demonstrates how project management capabilities translate into



measurable organisational outcomes and contributes to the RBV and CBV literature by highlighting the role of strategic competencies in improving project quality and SME performance.

Keywords Small and medium-sized enterprises (SMEs), Construction sector, Project management skills, Performance, Project quality

Paper type Research article

1. Introduction

South Africa's construction sector is crucial for employment creation and assists in developing the country's infrastructure. Construction SMEs play an important role in project delivery, innovation, employment creation and value chain development in South Africa (Enaifoghe, 2024; John *et al.*, 2023). However, construction SMEs face persistent challenges that contributes to poor project quality, cost overruns, limited resources, unpredictable market conditions and overall organisational performance (Guertler and Sick, 2021; Sarvari *et al.*, 2021).

Existing literature identifies project management skills as key elements for project success, sustainable construction, competitiveness and SME performance (Ali, 2021; Egwunatum *et al.*, 2021; Fathalizadeh *et al.*, 2022). Effective quality management practices further improves organisational performance (Ingle and Mahesh, 2022; Irfan *et al.*, 2023). However, many construction SMEs continue to face resource constraints and poor project management skills, limiting their ability to maintain required quality standards (Elraaid *et al.*, 2024).

The RBV and CBV views project management skills as strategic organisational capabilities that enhance competitiveness and performance.

Despite the growing recognition of project management skills such as time management, communication, risk management, design, and technical skills (Beneroso and Robinson, 2022; Elkbuli *et al.*, 2025; Unegbu *et al.*, 2022) little empirical research has examined how these skills influence project quality and SME performance within the South African construction SMEs. Existing studies focus on direct relationships between project management skills and organisational performance, with limited attention given to the role of project quality as a linking mechanism. This gap restricts both theoretical development and evidence based managerial decision making.

To address this gap, the research formulates and empirically evaluates a comprehensive model that connects project management skills, project quality, and the performance of SMEs within the Gauteng construction sector. This study enhances the RBV and the CBV by illustrating the impact of internal capabilities on project quality and organisational performance, while also offering practical guidance on the project management skills that are essential for the success of construction SMEs.

2. Literature review

Guided by the RBV and the CBV theories, this section reviews literature on project management skills, project quality, and SME performance within the construction sector.

2.1 Project management skills and SME performance

Project management skills include technical, managerial and interpersonal skills required for successful project delivery (Unegbu *et al.*, 2022). Research consistently links project management skills with project success and SME performance (Ozorhon *et al.*, 2022; Ghorbani, 2023; Zare Khafri *et al.*, 2023).

However, many construction SMEs face resource constraints that limit the effective implementation of project management skills (Sibiya *et al.*, 2023). Limited research has examined how project management skills and project quality jointly influence SME performance within the South African construction context. Therefore, this study seeks to

address this gap by exploring how project management skills and project quality jointly affect SME performance, drawing on the identified five key dimensions.

Existing literature remains fragmented because most studies examine project management skills independently, focus on large organisations in developed economies and give limited attention to project quality as a linking mechanism to project management skills and SME performance. These limitations highlight the need for an integrated framework within the construction SMEs in emerging markets.

Time management, communication, risk management, design and technical skills were selected because construction management literature consistently identifies them as critical competencies influencing project delivery and organisational performance (Beneroso and Robinson, 2022; Unegbu *et al.*, 2022; Elkbuli *et al.*, 2025). These dimensions align with RBV and CBV perspectives that emphasise strategic internal capabilities.

2.1.1 Time management skills. Efficient time management skills are recognised as crucial for reducing project delays and cost overruns through improved scheduling, planning and monitoring practices (Aulia, 2023; Lehdonvirta, 2018). However, time management remains a challenge in many developing countries, contributing to project failure (Alshihri *et al.*, 2022).

2.1.2 Communication skills. Communication skills enhance coordination, teamwork, stakeholder engagement and conflict resolution, thereby contributing to project success (Khan *et al.*, 2017; Eyieyien *et al.*, 2024; Schwaeye *et al.*, 2025). However, some studies suggest that communication alone may not significantly improve project performance unless supported by technical competence and effective decision making structures (Adham, 2023; Azhari, 2024; Kubana, 2025; Wawak, 2024).

2.1.3 Risk management skills. Risk management skills support stability by identification, assessment and control of uncertainties within construction projects (Alzoubi *et al.*, 2022). Effective risk management improves project delivery, financial control and quality performance (Glette-Iversen *et al.*, 2023; Isibor *et al.*, 2022; Ogunmokun *et al.*, 2022; Wiśniewska *et al.*, 2025).

2.1.4 Design skills. Design skills improve innovation, operational efficiency, customer satisfaction and project quality by reducing rework and supporting customised construction solutions (De Silva *et al.*, 2025; Kunrath *et al.*, 2020; Muhsin, 2024). Furthermore, it is essential to align these skills with employee's individual skills to allow them to perform better (Chen *et al.*, 2023).

2.1.5 Technical skills. Technical skills enable compliance with industry standards, safety requirements and quality specifications, thereby improving competitiveness and project delivery performance (Beneroso *et al.*, 2022; Kaiser *et al.*, 2023). Furthermore, construction companies are extending their technical skills by adopting technologies such as Building Information Modelling (BIM) and virtual reality, which contribute to more efficient and effective project delivery (Jiang *et al.*, 2022). These findings strengthen the idea that project management skills can serve as strategic assets that enhance the competitive position of SMEs. From an RBV perspective, such skills represent valuable, distinctive, and hard-to-imitate resources that set high-performing SMEs apart from their competitors.

2.1.6 Digital and technological capabilities in construction SMEs. Digital technologies such as BIM, project management software, cloud-based collaboration systems and data driven monitoring tools increasingly support project quality, scheduling accuracy, communication and operational efficiency within construction SMEs (Jiang *et al.*, 2022; Parisi and Donyavi, 2025). However, many SMEs are faced with barriers to digital adoption, including financial constraints and limited technical expertise (Omowole *et al.*, 2024). According to existing research, organisations with higher levels of digital maturity are better positioned to gain a competitive advantage, improve quality, and increase operational efficiency. For example, using BIM has been linked to better decision-making during project execution, decreased rework, and increased project coordination. Similarly, project management software enhances resource allocation, task integration, and real-time project monitoring, all of which lead to improved project outcomes (Olaseni, 2022; Omol *et al.*, 2023;

Tran and Nguyen, 2024). Technological and technical competencies are integrated into the larger project management skills framework, recognising the growing significance of digital capabilities in attaining project quality and SME performance, even though this study does not directly measure digital maturity as an independent construct.

2.2 Linking project management skills, project quality and SME performance

Existing research indicates that project management skills improve project quality, customer satisfaction, operational efficiency and organisational performance (Bannikov *et al.*, 2022; Kala Kamdjoug, 2024; Tominc *et al.*, 2024; Vrečko *et al.*, 2023). High project quality enhances customer satisfaction, boosts reputation and leads to repeat business which in turn influences the overall performance (Moh'd Abu Raje *et al.*, 2024). Literature also emphasise that extensive project management skills improve management practices and resource utilisation, leading to high performance (Rana and Arya, 2024; Vrontis *et al.*, 2024). Despite this, there's still limited research examining the relationship between project management skills, project quality and SME performance within the construction sector.

2.3 Theoretical foundation

2.3.1 Resource-Based View (RBV). RBV argues that organisations achieve competitive advantage through valuable, rare and difficult to imitate resource and capabilities (Ananda and Astuti, 2023; Barney *et al.*, 2021).

This highlights the role of internal resources, particularly technological assets, human capital, and organisational skills, in enhancing the performance of SMEs, especially in the construction sector. It argues that project management skills such as scheduling, communication, risk management, and problem solving are vital for delivering high-quality projects, thereby improving SME performance. These skills meet key RBV criteria because they enhance project delivery, are relatively rare among smaller construction firms, are hard to imitate due to experiential learning, and are essential for achieving competitive advantage, thus qualifying as strategic capabilities.

2.3.2 Competency-Based View (CBV). CBV extends on RBV by emphasising the importance of human competencies in shaping the organisational capability and performance (Škrinjarić, 2022). Alongside the RBV and the Dynamic Capability View (DCV), the CBV is seen as a useful framework to understand how companies achieve competitive advantage, especially through the strategic deployment of resources, capabilities, and individual skills. Based on this, organisational performance relies on how effective the individuals or project teams are incorporated into the operational success. The combined skills of employees and project managers are crucial to ensure high quality projects and customer satisfaction (Ribeiro *et al.*, 2021). Therefore, effective application of project management skills contributes to improved project quality and customer satisfaction.

2.3.3 Integrating RBV and CBV in the study context. Together, RBV and CBV provide a complementary framework for understanding how project management skills influence project quality and SME performance. RBV highlights the strategic value of internal capabilities, while CBV explains how managerial and technical capabilities are applied to achieve superior project outcomes. Within the framework proposed, the RBV demonstrates that project management skills are valuable and difficult-to-duplicate organisational resources that enhance project quality through improved operational efficiency, coordination, and technical execution. The CBV further complements this statement by claiming that the effective application of managerial and technical competencies enables employees and project teams to transform these resources into superior project outcomes. Therefore, project quality is conceptually positioned as the operational mechanism that facilitates the translation of internal capabilities into performance outcomes for SMEs, thereby supporting the proposed indirect pathway between project management skills and SME performance.

2.4 Conceptual model

Project quality refers to the extent to which project outcomes meet stakeholder expectations and predefined requirements (Adekunle et al., 2022). Within the construction sector, quality management includes prevention of defects, continuous process improvement and adherence to project specifications (Permana et al., 2021). Therefore, high performing SMEs are driven by strong quality control, effective project execution and innovative ideas to achieve customer satisfaction (John et al., 2023). Furthermore, performance improved by good managerial skills that align with the quality management systems Performance is further reinforced when managerial skills are integrated with structured quality management systems (Duarte et al., 2024). Based on this, the conceptual framework of this study proposes that extensive project management skills improve project quality, which in turn leads to SME performance.

Based on the analysis of existing literature and the theoretical bases of the RBV and the CBV, this investigation suggests that project management skills positively influence project quality, which, in turn, improves the performance of construction SMEs. Moreover, it is proposed that project quality acts as a mediator in the relationship between project management skills and SME performance. Figure 1 showcases the hypothesised relationships among the constructs and the corresponding hypotheses (H1–H3).

The conceptual model proposes that project management skills positively influence project quality (H1), project quality positively influences SME performance (H2), and project quality is proposed to mediate the relationship between project management skills and SME performance (H3).

The proposed model indicates that project management skills have extensive influence on project quality which leads to overall SME performance. These skills can also have a direct effect on SME performance either independently or together with project quality. Grounded in RBV and CBV, this framework links project management skills to organisational resources and individual capabilities highlighting their connection to overall organisation outcomes. Empirical evidence states that four key project management skills as time management, technical skills, risk management, and design skills positively contribute to project quality. Although the relative significance of each project management skill dimension may vary across different studies, all five dimensions are included to ensure a complete representation of project management skills within the construction SME framework.

2.5 Hypotheses development

This study aimed to develop and empirically assess a model linking project management skills, project quality, and SME performance within the construction sector in Gauteng. The research draws on the RBV, which states that unique resources such as skilled staff can produce organisational performance, and the CBV, which highlights the role of individual capabilities in achieving strategic objectives. Within this framework, project management skills are

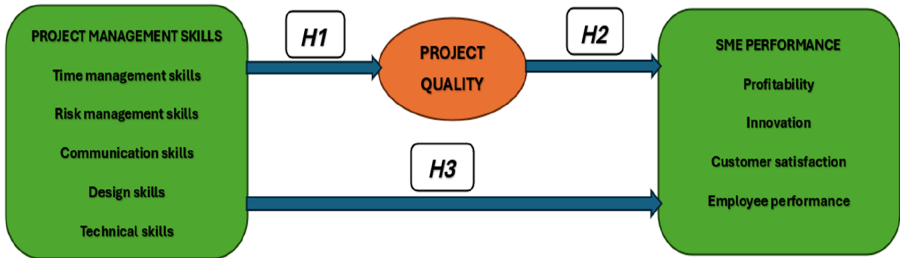


Figure 1. Conceptual model illustrating the hypothesised relationships between project management skills, project quality, and SME performance. Source: Authors' own work

regarded as essential organisational resources that directly influence both project quality and overall SME performance (Alnawafleh *et al.*, 2022).

2.5.1 Project management skills and project quality. Project management skills such as time management, communication skills, risk management, design and technical skills, are vital for achieving successful project delivery and ensuring quality outcomes in construction projects (Kearney *et al.*, 2024; Omer *et al.*, 2022; Elkbuli *et al.*, 2025; Pieterse *et al.*, 2024; Wawak, 2024). Therefore:

H1. Project management skills have a positive influence on project quality.

2.5.2 Project quality and SME performance. High-quality projects contribute to improved customer satisfaction, greater operational efficiency, enhanced competitiveness, and better organisational performance within SMEs (Parast and Safari, 2022; Moh'd Abu Raje *et al.*, 2024). From an RBV perspective, project quality represents an operational capability that enables organisations to transform internal capabilities to sustainable competitive advantage. Additionally, CBV suggests that the effective deployment of managerial and technical competencies enhance project quality, which subsequently improves organisational performance. More recent mediation-oriented research shows that project quality serves as a vital link between managerial competences and broader organisational outcomes, particularly in project-based industries (Tominc *et al.*, 2024; Vrontis *et al.*, 2024). Based on this discussion, a second hypothesis is proposed.

H2. Project quality has a positive influence on SME performance.

2.5.3 Proposed mediating role of project quality. Existing literature suggests that project management skills may influence organisational indirectly through improved project quality. Skills such as technical, communication, time management, risk management, and design skills support project execution, operational efficiency and adherence to project (Rana and Arya, 2024; Tominc *et al.*, 2024; Vrontis *et al.*, 2024). Consequently, SMEs with stronger project management skills are more likely to deliver high quality projects which may improve customer satisfaction, profitability, innovation and overall organisational performance.

The proposed mediating role of project quality is further supported by RBV and CBV frameworks. RBV suggests that valuable organisation capabilities contribute to competitive advantage, while CBV emphasises the effective application of managerial and technical competencies to achieve operational excellence. Within this context, project quality is conceptually positioned as a mechanism through which project management skills influence organisational performance. Even though the current research conceptually posits a mediating role for project quality, the mediation effect has not been empirically assessed using advanced techniques like bootstrapping or indirect-effects analysis. Therefore, the suggested mediation should be interpreted as a theoretical construct that calls for further empirical validation. Therefore, the following hypothesis is proposed.

H3. (Conceptual proposition): Project quality is proposed to mediate the relationship between project management skills and SME performance.

3. Methodology

This study adopted a quantitative correlational survey design within a positivist research paradigm to examine the relationships between project management skills, project quality, and SME performance. Data was collected using the structured questionnaire administered to construction SMEs in Gauteng.

3.1 Research participants and biographical information

A total of 500 questionnaires were distributed, of which 363 valid responses were returned, yielding a response rate of 72.6%. Most respondents were mid-level managers (53.7%), followed

by CEOs (15.4%) and managing directors (11.8%). Most participants had between 6 and 10 years of industry experience (42.7%). Small enterprises represented 57% of the sample, while medium-sized firms accounted for 43%. Most participating firms were CIDB grades 4 and 5 contractors. [Table 1](#) below presents the demographic profile of the SMEs that took part in the study.

3.2 Sampling and data collection

The study employed a cross-sectional survey design using simple random sampling to select SME owners, project managers, supervisors, and construction professionals involved in project execution and quality management processes within Gauteng Province. Measurement items for project management skills, project quality, and SME performance were adapted from previously validated studies ([Unegbu et al., 2022](#); [Beneroso and Robinson, 2022](#); [Elkbuli et al., 2025](#)). Responses were measured using a seven-point Likert scale ranging from 1 (Strongly disagree) to 7 (Strongly agree). A pilot study involving 39 construction SMEs was conducted to assess questionnaire clarity, reliability, and suitability. Feedback from the pilot study assisted in refining the questionnaire prior to the main data collection process. The pilot respondents were excluded from the final analysis. The complete questionnaire is presented in [Appendix](#).

3.3 Research procedure

Ethical approval for the study was obtained from the Department of Business Management Committee at the University of South Africa prior to data collection and the questionnaires were distributed using Google Forms.

Table 1. Demographic characteristics of respondents (*N* = 363)

Demographic information	Frequency	Percentage
<i>Position in the company</i>		
CEO/Owner	56	15.4%
MD/Director	43	11.8%
Manager/Supervisor	195	53.7%
Engineer	31	8.5%
Employee	24	6.6%
Other	14	3.9%
<i>Length of service/employment</i>		
Less than a year	27	7.4%
1–2 years	43	11.8%
3–5 years	71	19.6%
6–10 years	155	42.7%
11–15 years	40	11%
15+ years	27	7.4%
<i>Employment size</i>		
Small (10–49 Employees)	207	57%
Medium (50–249 Employees)	156	43%
<i>CIDB grading</i>		
1	18	5%
2	49	13.5%
3	35	9.6%
4	137	37.7%
5	82	22.6%
6	42	11.6%
Source(s): Authors' own work		

3.4 Testing the proposed research model and data analysis

The analysis of data was carried out using SPSS, which included Exploratory Factor Analysis (EFA), reliability analysis, correlation analysis, and multiple regression analysis. EFA was utilised to determine the dimensionality and construct validity of the measurement items, while Cronbach's alpha coefficients were employed to evaluate internal consistency reliability. Correlation and regression analyses were executed to explore the relationships between project management skills, project quality, and SME performance. Reliability coefficients were above the recommended threshold of 0.70, and factor loadings greater than 0.60 confirmed acceptable construct validity. The adequacy of sampling and its appropriateness for factor analysis were verified through the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity.

To minimise the risk of Common Method Variance (CMV), procedural remedies such as questionnaire anonymity, voluntary participation and clear question wording were implemented during data collection. Additionally, Harman's single-factor test was conducted to statistically assess the presence of common method bias. The findings revealed that no single factor accounted for the majority of total variance, implying that CMV was not a big concern in this investigation. This method is compatible with the suggestions of Podsakoff *et al.* (2003). Non-response bias was evaluated by comparing early and late responses, following standard survey research practices. The findings from the analysis demonstrated no significant disparities between the response groups, suggesting that non-response bias was not likely to materially affect the results of the study. Although mid-level managers represented the largest group of respondents, they were considered suitable participants because of their direct involvement in project coordination, quality monitoring, and operational decision-making within construction SMEs.

Reliability and validity were evaluated utilising Cronbach's alpha coefficients, item-total correlations, the Kaiser-Meyer-Olkin (KMO) measure, Bartlett's Test of Sphericity, and Exploratory Factor Analysis (EFA). Values of Cronbach's alpha greater than 0.70 demonstrated acceptable levels of internal consistency, while EFA confirmed that the measurement items were correctly aligned with their corresponding constructs.

4. Findings and discussion

4.1 Findings

The findings of the study are discussed below.

4.1.1 Measurement model assessment. The analysis began with an assessment of the reliability and validity of the measurement model using correlation analysis, KMO, Bartlett's test, EFA, and reliability statistics.

4.1.2 Correlation matrix. To examine the relationships among project management skills, project quality, and SME performance, a correlation matrix was used. High correlation coefficients need careful assessment, as values approaching 1 may indicate that variables are overlapping or have similar information (Zhou *et al.*, 2022; Chicco and Jurman, 2023). In addition, Pearson's correlation coefficient (r) was used to analyse the strength and direction of these relationships and to detect potential multicollinearity among the variables. The results are summarised in Table 2 below.

The correlation analysis showed strong relationships between the variables, providing strong evidence that effective management skills namely time management (TM), technical skills (TS), communication skills (CMS), risk management (RM), and design skills (DS) together with strong project quality practices (PQ), have a positive impact on organisational performance outcomes, including profitability (P), customer satisfaction (CS), innovation (IN), and employee performance (EP). These findings offer empirical support for the relationships suggested in the conceptual framework and imply that project quality acts as a significant linking mechanism between project management skills and the performance of SMEs.

Table 2. Pearson's correlation results

Variables	TM	TS	CMS	RM	DS	P	CS	IN	EP	PQ
TM	1									
TS	0.800**	1								
CMS	0.830**	0.781**	1							
RM	0.807**	0.831**	0.761**	1						
DS	0.781**	0.863**	0.745**	0.854**	1					
P	0.830**	0.817**	0.808**	0.846**	0.841**	1				
CS	0.833**	0.792**	0.796**	0.790**	0.775**	0.866**	1			
IN	0.760**	0.828**	0.733**	0.841**	0.818**	0.871**	0.857**	1		
EP	0.786**	0.772**	0.741**	0.787**	0.790**	0.847**	0.867**	0.883**	1	
PQ	0.767**	0.815**	0.705**	0.824**	0.837**	0.848**	0.827**	0.869**	0.841**	1

Note(s): TM = time management; TS = technical skills; CMS = communication skills; RM = risk management; DE = design skills; P = profitability; CS = customer satisfaction; IN = innovation; EP = employee performance; PQ = project quality

All correlations are significant at the 0.01 level (2-tailed)

Source(s): Authors' own work

4.1.2.1 Kaiser-Meyer-Olkin (KMO) and Bartlett tests. To identify the key factors related to project management skills, project quality, and SME performance, the survey data was assessed using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test to ensure sampling adequacy and suitability for factor analysis (Shrestha, 2021). The KMO statistic, which ranges from 0 to 1, evaluates whether the sample is sufficient for factor analysis (Kaiser, 1974). A study by Nikhil *et al.* (2024), states that KMO values between 0.8 and 1.0 demonstrates strong adequacy, 0.70–0.79 suggest average adequacy, and 0.60–0.69 reflect marginal adequacy. Bartlett's test of sphericity further confirmed that the correlation matrices were statistically meaningful, validating the relevance of the data for factor analysis. In the current study, KMO values ranged from 0.907 to 0.943 across all scales, revealing excellent suitability, while Bartlett's test was significant for all constructs ($p < 0.001$).

These results confirm that the dataset was appropriate for factor analysis across all variables. Table 3 below depicts the KMO measure and Bartlett's Test results.

4.1.2.2 Assessing the reliability and validity of the data. The SPSS analysis included a Cronbach's alpha test, which confirmed an excellent internal consistency across all variables, with values ranging from 0.984 to 0.993. According to Haji-Othman and Yusuff (2022), reliability coefficients above 0.70 or 0.80 are deemed acceptable, meaning the results in this study exceed these standards. Item-total correlations were all above 0.30, indicating that each item meaningfully contributes to the overall consistency and supports the validity of the measurement tool. These findings confirm that the instrument used to assess project management skills, project quality, and SME performance is highly reliable and suitable for further multivariate analyses, such as correlation and regression.

The assessment of the measurement model's reliability and validity occurred before hypothesis testing. Cronbach's alpha and composite reliability values were utilised to evaluate internal consistency reliability, while convergent validity was assessed through factor loadings. Discriminant validity was evaluated by investigating the relationships among the constructs to guarantee their distinctiveness.

Detailed results for each dimension's internal consistency are presented in Table 4.

All item-total correlations exceeded the recommended threshold of 0.3, confirming strong internal consistency across the survey items. Each construct achieved a Cronbach's alpha of 0.984 or higher which we above the commonly accepted benchmark of 0.70, indicating that the measurement instrument was highly reliable.

Table 3. The KMO measure and the Bartlett's test results

Constructs	KMO measure	Bartlett's test Approximate chi-square	Degrees of freedom	Significance level
TM	0.943	6024.703	105	<0.001
TS	0.933	6933.757	120	<0.001
CMS	0.920	6599.290	120	<0.001
RM	0.926	6595.880	120	<0.001
DS	0.907	4767.876	105	<0.001
P	0.925	6156.731	120	<0.001
CS	0.926	5892.721	105	<0.001
IN	0.936	7229.313	120	<0.001
EP	0.938	5669.282	91	<0.001
PQ	0.942	6636.801	105	<0.001

Note(s): TM = time management; TS = technical skills; CMS = communication skills; RM = risk management; DE = design skills; P = profitability; CS = customer satisfaction; IN = innovation; EP = employee performance; PQ = project quality

Source(s): Authors' own work

Table 4. Test for reliability

Research construct	Items	Item–total correlation	Cronbach’s α value	Reliability result
Time Management (TM)	TM1–TM5	All >0.3	0.986	Reliable
Technical Skills (TS)	TS1–TS5	All >0.3	0.988	Reliable
Communication Skills (CMS)	CMS1–CMS5	All >0.3	0.987	Reliable
Risk Management (RM)	RM1–RM6	All >0.3	0.993	Reliable
Design Skills (DS)	DS1–DS5	All >0.3	0.992	Reliable
Project Quality (PQ)	PQ1–PQ8	All >0.3	0.984	Reliable
Profitability (P)	P1–P6	All >0.3	0.987	Reliable
Customer Satisfaction (CS)	CS1–CS5	All >0.3	0.988	Reliable
Innovation (IN)	IN1–IN5	All >0.3	0.989	Reliable
Employee Performance (EP)	EP1–EP5	All >0.3	0.992	Reliable

Source(s): Authors’ own work

Face validity was assessed by faculty members who reviewed the structure and wording of the questionnaire. Content validity was evaluated through a pilot study that involved 39 construction SMEs from the Gauteng construction sector, which helped improve the instrument and ensured that established measures of project management from the literature were appropriately incorporated. Construct validity was confirmed using EFA in SPSS, which generated a high KMO value of 0.970 and significant results from Bartlett’s Test of Sphericity, indicating that the factor structure was appropriate. The analysis revealed nine distinct constructs with no problematic cross-loadings. Predictive validity was assessed through multiple regression analysis, which showed that project management skills extensively influence project quality and overall SME performance.

Although this study showed relatively high reliability coefficients, this may be due to the conceptual similarities present among some measurement items within the constructs. To mitigate concerns about redundancy and multicollinearity, a thorough analysis of factor loadings and inter-item relationships was performed during the EFA. Moreover, the Variance Inflation Factor (VIF) values were found to range from 3.67 to 5.03, which is below the recommended threshold of 10, indicating that severe multicollinearity among the predictor variables is absent.

4.2 Discussion

The research findings indicated that time management, technical skills, risk management, and design skills had a favourable effect on project quality, thereby corroborating hypothesis H1. These findings are consistent with previous studies that stress the importance of technical skills, planning, and risk management in the delivery of projects (Al-Kwafi *et al.*, 2023; Elkbuli *et al.*, 2025). From the RBV and CBV perspectives, these skills are viewed as strategic organisational capabilities that enhance operational performance and project execution.

On the other hand, communication skills did not have a statistically significant influence on project quality. This may be indicative of the informal communication practices that are often utilised within resource-constrained construction SMEs in Gauteng, where the emphasis is placed on operational and technical execution rather than on formal communication structures. This finding contrasts with studies conducted in more formal project environments and suggests contextual disparities between emerging and developed construction markets.

4.2.1 *Project management skills and project quality.* The findings validated that the quality of projects has a positive effect on the performance of SMEs, thereby supporting hypothesis H2. High-quality project execution was linked to enhanced customer

satisfaction, increased operational efficiency, innovation, and overall organisational performance. These results are consistent with earlier research that connects project quality to improved business performance and competitiveness among SMEs (Parast and Safari, 2022; Popoola *et al.*, 2024). From the perspectives of RBV and CBV, project quality serves as an operational outcome through which organisational capabilities lead to performance enhancement.

4.2.2 Project quality and SME performance. The results showed that project quality has a significant positive influence on SME performance, providing support for hypothesis H2. Projects that are completed on time, within budget, and according to technical specifications were linked to stronger overall business performance. These findings are consistent with prior research, which shows that high-quality project delivery enhances client satisfaction, promotes repeat business and improves operational productivity (Alzoubi *et al.*, 2022; Popoola *et al.*, 2024). From a theoretical perspective, the RBV positions project quality as a mechanism through which firm resources and competencies generate tangible value, while the CBV highlights the contribution of skilled human capital in translating these quality outputs into superior organisational performance.

These findings additionally broaden the scope of earlier studies by Parast and Safari (2022) by revealing that project quality affects not only customer satisfaction but also drives innovation and enhances employee performance in construction SMEs that are operating within an emerging economy framework.

4.2.3 Proposed mediating role of project quality. Although the mediating role of project quality was not empirically tested using advanced mediation techniques, the findings provide preliminary support for a possible indirect relationship between project management skills and SME performance through project quality. RBV and CBV indicate that both managerial and technical competencies play a role in enhancing organisational performance via operational processes and the delivery of high-quality projects (Mokbel Al Koliby *et al.*, 2024; El Namar *et al.*, 2025).

5. Managerial implications

The findings highlight the importance of strengthening design, risk management, technical, and time management skills within construction SMEs. Improving these capabilities may enhance project quality, reduce rework, improve customer satisfaction, and strengthen organisational competitiveness. The study further supports the adoption of structured project management practices, including digital scheduling tools, BIM, quality-monitoring systems, and formal coordination processes to improve project governance and operational efficiency.

6. Theoretical implications

This study extends the RBV and CBV within the context of construction SMEs in an emerging economy by demonstrating that project management skills function as strategic organisational capabilities that enhance project quality and SME performance. The findings further suggest that project quality may serve as a conceptual mechanism linking internal competencies to organisational outcomes. The study also contributes to limited empirical literature on African construction SMEs.

7. Policy and societal implications

The findings have implications for government agencies, industry regulators, and SME development institutions involved in construction sector capacity-building. The study highlights the need for practical training in project management, risk management, design coordination, digital construction technologies, and quality management systems. Improved

project quality may reduce project delays, cost overruns, and project failure while enhancing SME competitiveness, employment creation, and infrastructure delivery within Gauteng and similar emerging-market contexts.

8. Limitations of the study and future research

Although the study provides valuable insights into construction SMEs in Gauteng, the findings should be interpreted cautiously because of the disproportionate representation of lower- and mid-grade firms within the sample. Organisational and demographic factors such as firm size, contractor grading, and managerial experience were not included as control variables and may influence the observed relationships.

Furthermore, the proposed mediating role of project quality was not empirically tested using advanced mediation techniques. Future research should therefore apply covariance-based Structural Equation Modelling (SEM) or bootstrapping approaches to examine indirect effects and validate the proposed mediation model. Additional studies may also investigate the moderating influence of digital maturity, organisational culture, leadership style, and contractor grading across different provinces and developing economies.

9. Conclusion

This study developed and empirically examined a model linking project management skills, project quality, and SME performance within the Gauteng construction sector. The findings revealed that design, risk management, technical, and time management skills positively influence project quality, while project quality improves profitability, innovation, customer satisfaction, and employee performance within construction SMEs.

The study contributes to RBV and CBV literature by demonstrating how project management capabilities influence operational and organisational outcomes within construction SMEs in an emerging-market context. Although the mediating role of project quality was not empirically tested, the findings provide preliminary support for its proposed conceptual role linking project management skills and SME performance.

Ethical clearance

Ethical clearance for the study was obtained from the Department of Business Management Committee at the University of South Africa. Participation in the study was voluntary, and respondents were informed about the purpose of the research prior to data collection. Confidentiality and anonymity of participants were maintained throughout the study, and respondents were allowed to withdraw from the study at any stage without penalty.

Data availability

The data underpinning the findings of this study are available from the corresponding author upon reasonable request.

(Doctor of Commerce)- Quantitative-Questionnaire*Section A: Project management skills*

Instructions: Please indicate by means of a cross (X) the extent to which you agree or disagree with the following statements. Response Scale: (1) Strongly Agree; (2) Agree; (3) Somewhat Agree; (4) Neutral; (5) Somewhat Disagree; (6) Disagree; (7) Strongly Disagree.

Table A1. Time management skills

Time management skills	Strongly agree	Agree	Somewhat agree	Neutral	Somewhat disagree	Disagree	Strongly disagree
1 Our organisation regularly prioritises tasks based on urgency and importance	1	2	3	4	5	6	7
2 Our organisation creates a detailed plan or schedule before starting a project	1	2	3	4	5	6	7
3 Our organisation consistently meets project deadlines	1	2	3	4	5	6	7
4 Our organisation uses tools or methods to track the time spent on various tasks	1	2	3	4	5	6	7
5 Our organisation manages distractions while working on projects	1	2	3	4	5	6	7

Instructions: Please indicate by means of a cross (X) the extent to which you agree or disagree with the following statements. Response Scale: (1) Strongly Agree; (2) Agree; (3) Somewhat Agree; (4) Neutral; (5) Somewhat Disagree; (6) Disagree; (7) Strongly Disagree.

Table A2. Technical skills

Technical skills	Strongly agree	Agree	Somewhat agree	Neutral	Somewhat disagree	Disagree	Strongly disagree
1 Our personnel apply technical skills in their roles	1	2	3	4	5	6	7
2 Our personnel apply technical skills in project execution	1	2	3	4	5	6	7
3 Our personnel seek opportunities to improve their technical skills	1	2	3	4	5	6	7
4 Our personnel collaborate with technical team members to achieve project goals	1	2	3	4	5	6	7
5 Our personnel is able to troubleshoot technical issues that arise during projects	1	2	3	4	5	6	7

Instructions: Please indicate by means of a cross (X) the extent to which you agree or disagree with the following statements. Response Scale: (1) Strongly Agree; (2) Agree; (3) Somewhat Agree; (4) Neutral; (5) Somewhat Disagree; (6) Disagree; (7) Strongly Disagree.

Table A3. Communication skills

Communication skills	Strongly agree	Agree	Somewhat agree	Neutral	Somewhat disagree	Disagree	Strongly disagree
1 Our managers communicate project goals and expectations clearly to the team	1	2	3	4	5	6	7
2 Our managers listen to feedback and concerns from team members and stakeholders	1	2	3	4	5	6	7
3 Our managers respond promptly to communication from team members and stakeholders	1	2	3	4	5	6	7
4 Our managers resolve conflicts that arise within the team through communication	1	2	3	4	5	6	7
5 Our managers utilise various communication tools (e.g. email, chat, meetings) to facilitate project discussions	1	2	3	4	5	6	7

Instructions: Please indicate by means of a cross (X) the extent to which you agree or disagree with the following statements. Response Scale: (1) Strongly Agree; (2) Agree; (3) Somewhat Agree; (4) Neutral; (5) Somewhat Disagree; (6) Disagree; (7) Strongly Disagree.

Table A4. Risk management skills

Risk management skills	Strongly agree	Agree	Somewhat agree	Neutral	Somewhat disagree	Disagree	Strongly disagree
1 Our personnel is skilled at identifying potential risks in projects early on	1	2	3	4	5	6	7
2 Our personnel assess the impact and likelihood of identified risks	1	2	3	4	5	6	7
3 Our personnel develop and implement strategies to mitigate project risks	1	2	3	4	5	6	7
4 Our personnel regularly monitor and review risks throughout the project lifecycle	1	2	3	4	5	6	7
5 Our personnel communicate identified risks and their potential impacts to stakeholders	1	2	3	4	5	6	7
6 Our personnel have access to training and tools that enhance my risk management skills	1	2	3	4	5	6	7

Instructions: Please indicate by means of a cross (X) the extent to which you agree or disagree with the following statements. Response Scale: (1) Strongly Agree; (2) Agree; (3) Somewhat Agree; (4) Neutral; (5) Somewhat Disagree; (6) Disagree; (7) Strongly Disagree.

Table A5. Design skills

Design skills	Strongly agree	Agree	Somewhat agree	Neutral	Somewhat disagree	Disagree	Strongly disagree
1 Our personnel consistently apply creative solutions in their design work	1	2	3	4	5	6	7
2 Our personnel are proficient in using design software and tools relevant to their work	1	2	3	4	5	6	7
3 Our personnel prioritise user needs and experiences in their design process	1	2	3	4	5	6	7
4 Our personnel collaborate with team members to enhance design outcomes	1	2	3	4	5	6	7
5 Our personnel incorporate feedback from stakeholders into their designs	1	2	3	4	5	6	7

Section B: Organisational performance

Instructions: Please indicate by means of a cross (X) your level of agreement with the following statements regarding the organisational performance.

Table A6. Profitability

Profitability	Strongly agree	Agree	Somewhat agree	Neutral	Somewhat disagree	Disagree	Strongly disagree
1 Our organisation consistently meets its financial targets	1	2	3	4	5	6	7
2 Our organisation manages its budgets and financial resources	1	2	3	4	5	6	7
3 Our organisation has measures that reduce costs	1	2	3	4	5	6	7
4 Our organisation generates more revenue than the incurred expenditure	1	2	3	4	5	6	7
5 Our return on investment is always high	1	2	3	4	5	6	7
6 Our organisation regularly evaluates its pricing strategy for competitiveness	1	2	3	4	5	6	7

Instructions: Please indicate by means of a cross (X) your level of agreement with the following statements regarding the d customer satisfaction.

Table A7. Customer satisfaction

Customer satisfaction	Strongly agree	Agree	Somewhat agree	Neutral	Somewhat disagree	Disagree	Strongly disagree
1 Our organisation resolves customer complaints	1	2	3	4	5	6	7
2 Our organisation actively seeks feedback to improve service quality	1	2	3	4	5	6	7
3 Our organisation communicates with its customers	1	2	3	4	5	6	7
4 Our organisation creates a welcoming environment for customers	1	2	3	4	5	6	7
5 Our organisation emphasises the importance of customer satisfaction to all personnel	1	2	3	4	5	6	7

Instructions: Please indicate by means of a cross (X) your level of agreement with the following statements regarding the innovation.

Table A8. Innovation

Innovation	Strongly agree	Agree	Somewhat agree	Neutral	Somewhat disagree	Disagree	Strongly disagree
1 Our organisation encourages a culture of innovation among employees	1	2	3	4	5	6	7
2 Our organisation has a strong emphasis on creativity	1	2	3	4	5	6	7
3 Our organisation rewards and compensates those who are innovative	1	2	3	4	5	6	7
4 Our organisation provides adequate resources for research and development	1	2	3	4	5	6	7
5 Our organisation provides training to foster innovative thinking	1	2	3	4	5	6	7

Instructions: Please indicate by means of a cross (X) your level of agreement with the following statements regarding employee performance.

Table A9. Employee performance

Employee performance	Strongly agree	Agree	Somewhat agree	Neutral	Somewhat disagree	Disagree	Strongly disagree
1 Our employees are motivated to work an extra mile	1	2	3	4	5	6	7
2 Our employees are satisfied with their work	1	2	3	4	5	6	7
3 Our employees are highly motivated	1	2	3	4	5	6	7
4 Our personnel have the resources they need to perform their job	1	2	3	4	5	6	7
5 Our organisation promotes a healthy work-life balance	1	2	3	4	5	6	7

Section C: Project quality

Instructions: Please indicate by means of a cross (X) your level of agreement with the following statements regarding project quality.

Table A10. Project quality

	Strongly agree	Agree	Somewhat agree	Neutral	Somewhat disagree	Disagree	Strongly disagree
1 In our organisation, our construction projects consistently meet or exceed quality standards	1	2	3	4	5	6	7
2 Our organisation ensures that the final output of the project is aligned with the initial requirements	1	2	3	4	5	6	7
3 Our organisation emphasises more on total quality management	1	2	3	4	5	6	7
4 Our organisation has a quality assurance department to ensure that processes are followed during project execution	1	2	3	4	5	6	7
5 Our organisation set aside resources to train personnel on project quality	1	2	3	4	5	6	7
6 Our organisation try to meet the quality expectations of the customers	1	2	3	4	5	6	7
7 Our quality standards conform to ISO 9001:2015	1	2	3	4	5	6	7
8 Our organisation actively seeks customer feedback to improve quality	1	2	3	4	5	6	7

Section D: Demographic information
Please mark your responses to the statements by placing a cross (X) in the corresponding numbered box.

Table A11. Position in the company

CEO/owner	MD/director	Manager/supervisor	Engineer	Employee	Other
1	2	3	4	5	6

Table A12. Length of service/employment

Less than 1 year	1–2 years	3–5 years	6–10 years	11–15 years	15+ years
1	2	3	4	5	6

Table A13. Employment size

Small (10–49 employees)	Medium (50–249 employees)	Large (250 or more employees)
1	2	3

Table A14. CIDB grading

1	2	3	4	5	6	Other (state grade)
1	2	3	4	5	6	7

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Corresponding author

Tshegofatso Felicity Mohambi can be contacted at: tmohambi@gmail.com