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RESEARCH ARTICLE

Contractor Innovativeness and Its Influence on the Organizational Performance of Local Contractors in Kenya: A Structural Equation Modelling Approach

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Abstract: The construction industry in Kenya faces persistent challenges of inefficiency, poor quality, financial instability, and weak safety performance. These issues undermine competitiveness and limit contractors' ability to deliver sustainable outcomes. Innovativeness has been identified globally as a key driver of organizational performance, yet its role in developing contexts remains underexplored. This study investigates the effect of contractor innovativeness on multidimensional organizational performance among Kenyan contractors. The study is grounded in the Resource-Based View, which conceptualizes innovativeness as a strategic resource, and Contingency Theory, which emphasizes that its effectiveness depends on environmental fit. Structural Equation Modeling was employed to test the relationship between innovativeness and ten performance dimensions: efficiency, technical capability, employee satisfaction, financial stability, managerial capability, customer satisfaction, growth, quality, profitability, and safety performance. Findings revealed that innovativeness exerts a significant positive influence across all dimensions, with the strongest effects on efficiency, technical capability, and employee satisfaction, and weaker effects on profitability and safety performance. The study contributes theoretically by demonstrating that innovativeness functions both as a strategic resource, consistent with the Resource-Based View, and as a contingent capability shaped by environmental fit, as emphasized in Contingency Theory. The findings underscore the need for contractors to embed innovation into their operations by investing in digital tools, participatory management, and structured safety practices. Policymakers should create enabling environments that support adoption while also embedding innovation benchmarks into accreditation and procurement systems, strengthening enforcement, and addressing systemic barriers. Researchers should explore hybrid frameworks and contextual moderators to deepen understanding of innovativeness in developing economies. Ultimately, innovativeness emerges as a multidimensional lever for enhancing organizational performance in construction.

Keywords: Kenya; Contractor innovativeness; Organizational performance; Local contractors; Structural equation modelling; Resource-based view

1 Introduction

The construction industry plays a pivotal role in the national development of both developing and developed countries, yet its performance is often constrained by inefficiencies, weak institutionalization, and limited innovation, especially in developing countries (Lopes & Banaitiene, 2024; Mengistu et al., 2023; Tanko et al., 2017). In Kenya, contractors face systemic challenges such as delayed government payments, corruption, and weak regulatory enforcement, which undermine profitability and safety outcomes despite formal reporting structures (Gacheru et al., 2024).

Globally, empirical studies highlight that innovativeness, defined as the ability to adopt new technologies, processes, and organizational practices, significantly enhances efficiency, technical capability, and employee satisfaction (Abdilahi et al., 2017; Andaregie & Astatkie, 2022; Ayinaddis, 2023; Dessie et al., 2022). Innovativeness is increasingly viewed as a strategic resource under the Resource Based View (RBV), enabling firms to achieve competitive advantage through unique capabilities (Barney, 1991). However, Contingency Theory emphasizes that the effectiveness of innovativeness depends on contextual fit, particularly in environments characterized by informality and institutional weaknesses (Donaldson, 2001).

Despite growing recognition of innovativeness as a driver of organizational performance, empirical evidence in Kenya remains limited and largely descriptive. Most studies, which also happen to be outside the construction sector, emphasize financial outcomes while neglecting multidimensional aspects such as safety, efficiency, managerial capability, and employee satisfaction (Mboga et al., 2023; Nafula, 2017). Structural Equation Modeling (SEM) offers a methodological advancement by allowing simultaneous testing of multiple dimensions of performance, thereby providing a more detailed understanding of how innovativeness influences organizational outcomes (Muñoz-Peña et al., 2023).

This study, therefore, investigates the effect of contractor innovativeness on ten dimensions of organizational performance among local contractors in Kenya through the application of SEM. It provides robust evidence on the multidimensional influence of innovativeness, bridging theoretical perspectives with practical realities in the Kenyan construction sector.

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2 Literature Review

2.1 Underpinning Theories

This study is grounded in two complementary theoretical perspectives: the Resource Based View (RBV) and Contingency Theory. The Resource Based View (RBV) (Barney, 1991) posits that firms achieve sustained competitive advantage through resources and capabilities that are valuable, rare, inimitable, and non substitutable. Innovativeness, conceptualized as an organizational orientation toward adopting new processes, technologies, markets, and R&D practices, can be understood as such a strategic capability. Within the construction sector, innovativeness enables contractors to enhance efficiency, technical capability, and employee satisfaction, thereby strengthening organizational performance. RBV provides the primary theoretical lens for this study, framing innovativeness as a strategic resource that contributes directly to multidimensional performance outcomes.

Contingency Theory (Donaldson, 2001), by contrast, emphasizes that organizational effectiveness depends on the fit between internal practices and external environmental conditions. In contexts characterized by systemic barriers, such as delayed payments, corruption, and weak regulatory enforcement (Okeyo, 2023), innovative practices may not translate into consistent gains in profitability or safety performance. Contingency Theory, therefore, offers an interpretive framework for understanding why the effects of innovativeness may vary across different institutional environments.

Collectively, these perspectives suggest that innovativeness functions both as a strategic resource (RBV) and as a contingent capability shaped by environmental fit (Contingency Theory). While this study does not empirically test Contingency Theory through moderator variables, it draws on the theory to contextualize findings and highlight the importance of institutional conditions in shaping innovation outcomes.

2.2 Contractor Innovativeness

Contractor innovativeness refers to the ability of construction firms to adopt, adapt, and implement new technologies, processes, and organizational practices to improve performance and competitiveness. Innovativeness is increasingly recognized as a strategic capability that enables firms to respond to dynamic market conditions, enhance efficiency, and achieve sustainable growth (Canh et al., 2019; Ibarra-Cisneros et al., 2024).

In developed economies, innovativeness in construction has been closely linked to digital transformation and Industry 4.0 technologies. Studies in Europe (Alshorafa & Ergen, 2019) and North America (Emmanuel et al., 2024) show that contractors who adopt Building Information Modeling (BIM), automation, and data-driven project management achieve significant improvements in efficiency, quality, and client satisfaction. For instance, research in New Zealand highlighted that innovative contractors were more resilient and adaptable, particularly during periods of economic uncertainty (Andisheh et al., 2023). Similarly, in the UK, integration of sustainability innovations into construction practices has been shown to enhance reputational capital and long term profitability (Keles et al., 2025; Rodrigo et al., 2023).

Studies reveal a contrast in developing countries, whereby innovativeness is often constrained by systemic challenges such as limited financing, weak institutional frameworks, and corruption (Lozano-Ramírez & García-López, 2025; Shabbir et al., 2025). Research in

South Africa and Nigeria shows that while contractors recognize the importance of innovation, adoption remains uneven due to resource limitations and a lack of technical expertise (Ayodele & Kajimo-Shakantu, 2021; Bamgbose et al., 2024). In Kenya, contractors often innovate informally through adaptive practices such as improvisation and resource reallocation, but these innovations are rarely institutionalized or captured in performance reports (Gacheru et al., 2024). This divergence underscores Contingency Theory's assertion that organizational effectiveness depends on contextual fit (Donaldson, 2001).

While global evidence emphasizes the transformative potential of innovativeness, its impact in developing countries is moderated by institutional weaknesses. Contractors in Kenya, for example, may adopt innovative practices at the project level, but systemic barriers such as delayed payments and weak enforcement dilute their organizational impact (Okeyo, 2023).

2.3 Organizational Performance

Organizational performance is a multidimensional construct encompassing financial, operational, managerial, and social outcomes. Traditional measures such as profitability and growth remain central, but contemporary scholarship emphasizes broader dimensions, including efficiency, safety, quality, and stakeholder satisfaction (Richard et al., 2009).

In construction, performance is often assessed through project delivery metrics (time, cost, quality), but firm-level outcomes such as managerial capability, financial stability, and business efficiency are equally critical for long-term sustainability (Muñoz-Peña et al., 2023). Studies highlight that firms with strong managerial capacity and financial resilience are better positioned to withstand market volatility and regulatory pressures (Ahmed et al., 2023).

Kenyan studies reveal persistent weaknesses in contractor performance, particularly in profitability and safety outcomes (Waweru & Omwenga, 2015). Delayed payments, corruption, and weak enforcement of safety standards dilute the impact of managerial interventions. While efficiency and managerial capability have shown improvement among firms adopting structured practices, profitability remains inconsistent, suggesting that external systemic factors play a significant role (Chebwai & Kinyuru, 2024; Velani, 2017).

In light of the above, it is clear that organizational performance cannot be reduced to financial outcomes alone. A multidimensional approach is necessary to capture the complex realities of contractors in Kenya, where efficiency, managerial capability, and financial stability may be more reliable indicators of resilience than profitability or growth.

2.4 Research Gap

Existing studies on contractor innovativeness in Kenya are limited in two key respects. First, most rely on descriptive statistics or case studies, which provide useful insights but do not capture the magnitude and direction of causal relationships across multiple performance dimensions. Few studies employ advanced modeling techniques such as Structural Equation Modeling (SEM), leaving a gap in robust empirical evidence. Second, while the literature acknowledges the role of innovativeness in enhancing organizational performance, theoretical explanations remain fragmented. The Resource-Based View (RBV) emphasizes innovativeness as a strategic resource, while Contingency Theory highlights the importance of environmental fit. However, these perspectives are rarely integrated, particularly in developing country contexts where systemic barriers dilute innovation outcomes. This lack of synthesis limits explanatory power and leaves open questions about how innovativeness functions both as a strategic capability and as a contingent practice shaped by institutional environments. Collectively, these gaps underscore the need for localized empirical studies that adopt multidimensional measures of performance and situate innovativeness within hybrid theoretical frameworks. This study responds to that need by applying SEM to examine the influence of contractor innovativeness across ten performance dimensions, while drawing on RBV and Contingency Theory as interpretive lenses to contextualize findings.

While prior studies have acknowledged innovativeness as a strategic resource under the Resource Based View (RBV) and as a contingent capability under Contingency Theory, neither framework alone adequately explains why innovativeness produces uneven performance outcomes across different dimensions in institutionally constrained construction contexts. RBV emphasizes the VRIN attributes of innovativeness but does not account for systemic barriers that dilute its impact on profitability or safety. Contingency Theory highlights environmental fit but lacks explanatory precision on how firm level innovativeness interacts with multidimensional performance outcomes. Moreover, existing scholarship has not integrated these perspectives to explain the paradox whereby innovativeness strongly enhances efficiency and employee satisfaction yet yields weaker effects on profitability and safety in developing country construction industries such as Kenya.

3 Research Methodology

3.1 Research Design

This study employed a quantitative, cross-sectional survey design complemented by a dual-source data collection approach. The quantitative approach was chosen to test hypothesized causal relationships between contractor innovativeness and organizational performance across multiple dimensions. A cross-sectional design allowed for efficient data collection at a single point in time, capturing prevailing practices and outcomes.

A dual-source data collection approach was achieved by collecting data from two distinct respondent groups: contractors and consultants. Contractors provided insights into internal organizational practices and performance outcomes, while consultants offered external, professional perspectives on the same firms. This dual-source design enhanced the validity and reliability of findings by reducing single-source bias and providing a more holistic view of organizational practices in Kenya's construction industry.

3.2 Target Population

The target population comprised two groups. First were local contractors registered with the National Construction Authority (NCA). NCA1–NCA3 contractors were selected because they represent the largest firms in the registry, with the highest project values, organizational complexity, and exposure to innovation practices. These firms are more likely to have the resources and systems necessary to implement and sustain innovativeness, making them an appropriate starting point for testing the hypothesized relationships. These firms represent the formal segment of Kenya's construction industry and are directly responsible for project execution. Second were construction consultants (architects, engineers, construction managers, and quantity surveyors). These professionals routinely interact with contractors and provide independent assessments of organizational practices and performance. Including both contractors and consultants ensured that the study captured both internal organizational perspectives and external professional evaluations, thereby strengthening the robustness of the data.

3.3 Sampling Procedures

A stratified random sampling technique was employed. Contractors were stratified according to the NCA categories (NCA1–NCA3). Within each stratum, random sampling was used to select participants. Consultants were sampled purposively for having engaged in construction works being handled by the selected contractors, ensuring that respondents had direct experience working with contractors. Consultant–contractor pairs were identified through contractor referrals and verified using project documentation and professional association membership records, ensuring that consultants included in the sample were actively engaged in the construction works handled by the selected contractors.

The following formula (Equation 1) by Cochran (1963) was used to generate the sample size for this study. The same formula has also been adopted by Mugenda and Mugenda (1999). This formula is applicable when the population ranges from 10,000 to infinity. The formula yielded a statistically adequate sample capable of supporting SEM analysis, which requires relatively large samples for stable parameter estimation (Byrne, 2013).

$$n_0 = \frac{z^2 pq}{e^2} \tag{1}$$

Where:

- n_0 = sample size
- Z^2 = abscissa of a normal curve cutting off an area α at the tails ($1 - \alpha$ is the desired confidence level, e.g., 95%)
- p = estimated proportion of an attribute that is present in the population (50% commonly adopted)
- q = 1-p
- e = desired level of precision (usually set at 0.05)

Therefore;

$$n_0 = \frac{1.96^2 \times 0.5(1 - 0.5)}{0.05^2}$$

$$n_0 = 384$$

The following formula (Equation 2) has been proposed by Israel (1992) to adjust the estimated sample size from an infinite population to a finite one;

$$n = \frac{n_0}{1 + \frac{n_0 - 1}{N}} \tag{2}$$

Where;
n = New sample size
n_0 = sample size = 384

N = population size = 1,427 (local contractors)
NB: 1,427 is the number of local contractors obtained by subtracting multiple registrations in various categories (1,735), foreign contractors (138), and those whose core business is not construction (217) from the total number of NCA1 registrations (3,517)

Therefore;

$$\text{New n} = \frac{384}{1 + \frac{384-1}{1,427}} = \frac{384}{1.268} = 306 \text{ contractors}$$

An equal number of consultants was adopted since for every contractor, either an architect, a quantity surveyor, a construction manager, or a structural engineer was selected to give an external perspective and to reduce common method bias.

3.4 Study Variables

3.4.1 Contractor Innovativeness

The study operationalizes contractor innovativeness as an organizational orientation or disposition, that is, the firm's propensity to innovate, measured as a composite index of five items: adoption of new processes, advancement of equipment, entry into new markets, advancement in software technology, and research and development endeavour. These items are intended to capture the orientation toward innovativeness, not the direct measurement of innovation outputs, and have been grounded in established taxonomies. Specifically, the items align with the Oslo Manual framework (OECD, 2005), which distinguishes between process innovation, product innovation, marketing innovation, and organizational innovation. Adoption of new processes reflects process innovation, advancement of equipment and software technology reflects technological/product innovation, entry into new markets reflects market innovation, and research and development endeavour captures the broader organizational commitment to innovation. Additionally, the study draws on Crossan and Apaydin's (2010) multidimensional model of organizational innovation, which conceptualizes innovation as encompassing processes, outcomes, and strategic orientations. By situating the indicators within these frameworks, contractor innovativeness is operationalized as a multidimensional construct, capturing the holistic innovation practices of contractors rather than conflating distinct typologies. Indeed, the use of indicators spanning across several dimensions of innovation has been justified by previous studies, such as Samuelsson (2023).

This approach is also consistent with the Resource-Based View, which treats innovativeness as a strategic capability that integrates diverse innovation practices into a source of competitive advantage. However, the study acknowledges the limitations of discriminant validity and theoretical precision associated with the adopted approach and suggests future research should disaggregate innovativeness into its sub-dimensions to test for differential effects on organizational performance.

3.4.2 Organizational Performance

Organizational performance was also operationalized as a multidimensional construct, reflecting both financial and non-financial outcomes relevant to contractor sustainability.

Consistent with contemporary scholarship (Richard et al., 2009; Muñoz Peña et al., 2023), ten dimensions were selected to capture the breadth of performance in the construction sector: business efficiency, managerial capability, financial stability, profitability, safety performance, growth, client satisfaction, technical capability, employee satisfaction, and quality performance. Each dimension was measured using multiple questionnaire items adapted from validated scales in prior studies and refined through expert consultation to ensure contextual relevance to Kenya's construction industry.

3.4.3 Measurement Scale

Both contractor innovativeness and organizational performance were measured using a 10-point Likert-type scale (1 = very low, 10 = very high). The choice of a 10-point scale was guided by several methodological and practical considerations. First is the enhanced sensitivity and discrimination. A 10 point scale provides greater granularity than traditional 5 point or 7 point scales, allowing respondents to express subtle differences in perception (Dawes, 2008). This level of precision is particularly important when measuring multidimensional constructs such as innovativeness and organizational performance, where small variations can have significant implications for statistical modeling. Second is the improved reliability and validity. Research in psychometrics suggests that scales with more response categories tend to yield higher reliability coefficients, as they reduce random measurement error (Lozano et al., 2008). The 10 point format enhances discriminant validity by minimizing the risk of clustering responses around the midpoint, thereby producing more normally distributed data suitable for advanced techniques such as SEM. Third, SEM requires robust measurement models with sufficient variance across indicators (Hair Jr et al., 2014). A 10-point scale increases variance and improves the stability of parameter estimates, thereby strengthening model fit indices and hypothesis testing.

3.5 Data Collection

Data were collected using structured questionnaires administered to senior managers, directors, and project managers within both contracting and consulting firms. The use of two respondent groups reduced bias associated with self-reported data and enhanced construct validity. The questionnaire was divided into three sections: (A) background information, (B) independent variable: contractor innovativeness, measured through items on adoption of new processes, advancement of construction equipment, entry into new markets, advancement in software technology, and research and development endeavour, and (C) dependent variables: ten dimensions of organizational performance, including business efficiency, managerial capability, financial stability, profitability, safety performance, growth, client satisfaction, technical capability, employee satisfaction, and quality performance. To mitigate subjectivity bias in the design phase, the survey instrument was developed under supervisory guidance, refined through peer debriefing sessions with academic colleagues, and underwent expert panel review. A pilot test was also conducted with a group of 20 contractors and consultants to assess clarity, reliability, and contextual relevance. Feedback from the pilot informed minor revisions before full deployment. The dual-respondent design was specifically adopted to eliminate bias, with the structure of the inquiry validated by a supervisory committee to prevent leading questions or researcher bias.

3.6 Data Analysis

Data were analyzed using Structural Equation Modeling (SEM) with AMOS software. SEM has increasingly been used in construction-related studies (AL-Fadhali, 2022; Al-Mhdawi et al., 2023; Alaloul et al., 2020). According to Muñoz-Peña et al. (2023), SEM enables simultaneous testing of multiple relationships, accounts for measurement error, and provides robust model fit indices. This method was chosen as the analytical technique because it allows for: (i) testing of complex relationships between latent constructs, (ii) simultaneous estimation of multiple dependent variables, and (iii) assessment of overall model fit using indices such as CMIN/df, RMSEA, CFI, TLI, and SRMR (Hu Bentler, 1999). The analysis proceeded in three stages: (i) preliminary analysis: data cleaning, missing value treatment, and reliability testing using Cronbach's alpha, (ii) measurement model assessment: Confirmatory Factor Analysis (CFA) to validate constructs and ensure convergent and discriminant validity, and (iii) structural model testing: estimation of path coefficients, critical ratios, and significance levels to test hypotheses. This analytical approach provided robust evidence of the influence of contractor innovativeness on various organizational performance dimensions, while accounting for measurement error and model complexity. Data from contractors and consultants were compared to identify convergence and divergence in perceptions. This strengthened the robustness of findings by ensuring that observed relationships were not artifacts of single-source bias.

3.7 Ethical Considerations

Ethical integrity was upheld throughout the study. Key measures included: (i) informed consent: participants were briefed on the purpose of the study, their rights, and the voluntary nature of participation, (ii) confidentiality: responses were anonymized, and data were stored securely to prevent unauthorized access,(iii) non-maleficence: care was taken to ensure that participation posed no harm to respondents or their organizations, (iv) academic integrity: the study adhered to ethical guidelines for research involving human participants, including those outlined by the National Commission for Science, Technology and Innovation (NACOSTI) in Kenya, and (v) transparency: findings were reported honestly, with limitations acknowledged to avoid misrepresentation. These measures not only ensured compliance with ethical standards but also enhanced the credibility of the research.

4 Results

4.1 Data Quality and Bias Analysis

4.1.1 Response Rate

As seen in Table 1, a total of 378 questionnaires were returned. Based on the study sample size of 612, the overall response rate was therefore 62%. Given that no questionnaire had missing values exceeding 10%, all questionnaires were deemed usable. A response rate of 50% and above is usually considered adequate (Mugenda & Mugenda, 2003).

Table 1: Overall response rate.

Group	Questionnaires				Percentages	
	Sample	Returned	Unusable	Usable	Returned	Usable
Contractors	306	235	0	235	77%	77%
Consultants	306	143	0	143	47%	47%
Total	612	378	0	378	62%	62%

Source: [Fieldwork, Nairobi, 2025]

A sample size of 378 was also deemed adequate for SEM analysis, Bentler and Chou (1987) recommend a minimum of 5 respondents per estimated parameter. With 55 observed variables, the sample of 378 exceeds this threshold. Boomsma (1982, 1985) suggests that samples of 200–400 are generally adequate for SEM models of moderate complexity. The sample falls within this recommended range. Kline (2016) emphasizes that SEM models with more than 10 latent constructs typically require at least 200 cases, and preferably 300+. The sample of 378 meets this criterion. Hair et al. (2014) note that SEM sample adequacy depends on communalities and factor loadings, but generally recommend 5–10 cases per indicator. With 55 indicators, this suggests 275–550 cases; the sample of 378 is within this range.

4.1.2 Non-Response Bias

To evaluate potential non-response bias, four sets of wave analyses were conducted to compare early (first 25%) and late respondents (final 25%) within the contractor and consultant groups. The variables tested represent the composite means for the dimensions and determinant constructs. The independent samples t-test results have been presented in Appendix 8.

In the first wave analyses involving the contractors' data (n=235) for the dimensions of organizational performance (Appendix 8A), all p-values exceeded 0.05 (ranging from 0.273 to 0.766); therefore, the null hypothesis was not rejected. There was no statistically significant difference between the contractors who responded early and those who responded late for the ten dimensions of organizational performance. In the second wave analyses involving the contractors' data for the determinants of organizational performance (Appendix 8B), all p-values exceeded 0.05 (ranging from 0.435 to 0.756); therefore, there was no statistical difference between the early and late waves of contractor responses.

In addition to the contractor analysis, a wave analysis was performed on the consultant respondent group (n=143). For the dimensions of organizational performance (Appendix 8C), all p-values exceeded 0.05 (ranging from 0.419 to 0.724); therefore, there was no statistical difference between the early and late waves of consultant responses. In the last wave analyses involving the consultants' data for the determinants of organizational performance (Appendix 8D), all p-values exceeded 0.05 (ranging from 0.403 to 0.715); therefore, there was no statistical difference between the early and late waves of consultant responses.

These results suggest that the late respondents (who serve as a proxy for non-respondents) do not differ fundamentally from the early adopters. Therefore, non-response bias is not a significant threat to the validity of the findings. These findings support the assumption that the sample is representative and that the results are not significantly skewed by the timing of responses.

4.1.3 Common Method Bias

Presence of common method bias was tested using the correlation matrix procedure and Harman's single-factor test in IBM® SPSS® Statistics v21. According to the results for the former, the collected data did not suffer from common method bias since the highest recorded correlation value between any two variables was 0.821. According to Rodríguez-Ardura and Meseguer-Artola (2020), common method bias exists when there is a very high correlation between any two variables (exceeding 0.9). The results for Harman's single-factor test have been presented in Appendices 6 and 7. Based on this criterion, the total variance explained by a single factor in the contractors' data was found to be 56.97%. The figure was found to be 53.19% in the consultants' data. When the two sets of data were combined, the value was found to be 55.04%, which exceeds the commonly accepted threshold ($\leq 50\%$) (Chen & Ding, 2026) and indicates that common method bias may be present. These values indicate that, though common method bias was found to be present in both sets of data, the level of bias in contractors' self-assessment was reduced when the two sets of data were combined. Even though Fuller, Simmering, Atinc, Atinc and Babin (2016) demonstrate that a relatively high level of common method bias is not necessarily detrimental and must be present in order to 'bias true relationships among substantive variables at typically reported reliability levels', the study acknowledges that common method bias may have contributed to the uniformly high path coefficients. However, the dual-source design, the magnitude of effects, and the overall pattern of findings suggest the relationships are substantive.

4.2 Demographic Profiles

4.2.1 Contractors

A total of eleven (11) questions were presented to the contractors to establish their background profile. The results have been presented in Appendix 5. The majority of firms surveyed were classified as NCA1 (45.5Financial indicators show that annual turnover was concentrated below KShs 400 million (57.5Project experience data reveal that most NCA1 contractors undertook relatively few mega projects exceeding KShs 1 billion, with 65.6Regarding financing, reliance on loans to fund working capital was most common in the 0–40Overall, the demographic profile illustrates that while NCA1–NCA3 contractors represent the larger end of the industry, they remain diverse in terms of staffing, financial capacity, project portfolios, and growth trajectories. These characteristics provide important context for interpreting the SEM analysis of innovativeness and performance outcomes.

4.2.2 Consultants

Appendix 5 summarizes the demographic characteristics of the consultant respondents. The majority of consultants came from a quantity surveying background (60.1%), followed by construction management (16.1%), civil and structural engineering (14.7%), and architecture (6.3%). A small proportion (2.8%) reported other professional specializations. This distribution reflects the central role of quantity surveyors in project cost management and contract administration within the Kenyan construction industry.

In terms of professional experience, most consultants reported between 6–10 years of practice (39.2%), while 28.7% had less than 5 years of experience. Mid career professionals with 11–20 years of experience accounted for 24.5% of the sample, whereas only a small minority (less than 8%) reported more than 25 years of experience. This indicates that the consultant sample is skewed toward early and mid career practitioners, with relatively few highly experienced professionals represented.

Overall, the consultant demographic profile highlights a workforce dominated by quantity surveyors and characterized by moderate levels of professional experience. These characteristics provide important context for interpreting the SEM analysis, particularly in relation to how professional background and years of experience may shape perceptions of innovativeness and performance outcomes in the construction sector.

4.3 Descriptive Statistics on Contractor Innovativeness and Organizational Performance

4.3.1 Contractor Innovativeness

The highest degree (5.82) of contractor's innovativeness was seen in 'adoption of new processes' and closely followed by 'advancement of construction equipment' with a mean of 5.81, as shown in Table 2. The lowest level of innovativeness was found in 'research and development endeavor' with a mean of 5.33. The overall level of local contractors' innovativeness was considered moderate with a mean of 5.642.

Table 2: Descriptive statistics on level of contractor's innovativeness

Code	Attribute	N	Min.	Max.	Mean	Std. Dev
CI1	adoption of new processes	378	1	10	5.82	2.379
CI2	advancement of construction equipment	378	1	10	5.81	2.467
CI3	entry into new markets	378	1	10	5.71	2.433
CI4	advancement in software technology	378	1	10	5.54	2.558
CI5	research and development endeavor	378	1	10	5.33	2.650

Source: [Fieldwork, Nairobi, 2025]

4.3.2 Level of Organizational Performance of Local Contractors

This study employed a multidimensional approach where ten dimensions were used to measure the level of organizational performance. Each of the dimensions was measured using five indicators. All the indicators were measured on a numerical rating scale of 1-10, ranging from very low to very high.

a) Profitability

All five indicators of profitability had almost equal means and standard deviations except for 'return on assets' and 'asset turnover', which had slightly higher standard deviations. The highest mean was 5.72 (gross profit margin) while the lowest mean was 5.26 (return on assets) as shown in Table 3. The overall mean for five indicators was 5.406, indicating that the level of profitability among local contractors is moderate.

Table 3: Descriptive statistics on profitability

Code	Indicator	N	Min.	Max.	Mean	Std. Deviation
PR1	gross profit margin	378	1	10	5.72	1.951
PR2	operating profit margin	378	1	10	5.44	1.879
PR3	net profit margin	378	1	10	5.34	1.949
PR4	return on assets	378	1	10	5.26	2.076
PR5	asset turnover	378	1	10	5.28	2.140

Source: [Fieldwork, Nairobi, 2025]

b) Client Satisfaction

Results presented in Table 4 indicate that the item with the highest mean (7.13) under client satisfaction was 'service quality', while that with the lowest mean (6.67) was 'adherence to schedule'. The second-lowest mean (6.77) was reported in 'adherence to budget'. This is a reflection of prevailing conditions as Okweto (2012) reported that more than 70% of the projects handled by local contractors experienced time overruns exceeding 50%, while 50% of similar projects experienced cost overruns exceeding 20%. The overall level of client satisfaction was 6.923, which was considered to be moderately high.

Table 4: Descriptive statistics on client satisfaction

Code	Indicator	N	Min.	Max.	Mean	Std. Deviation
CS1	service quality	378	2	10	7.13	2.002
CS2	adherence to schedule	378	1	10	6.67	2.161
CS3	adherence to budget	378	1	10	6.77	2.094
CS4	communication skills	378	1	10	6.94	2.109
CS5	personnel skills	378	1	10	7.11	2.028

Source: [Fieldwork, Nairobi, 2025]

c) Growth

The indicator with the highest mean (6.20) under growth was found to be 'client retention' as shown in Table 5. This could be a result of the relatively high level of client satisfaction reported previously. The trend in the means of the growth in 'volume of work' (5.71), 'number of employees' (5.67), and 'equipment/assets' (5.59) was almost similar to that measured earlier (demographic profiles) at 34.9%, 29.0%, and 31.0%, respectively. The overall mean of the five indicators was established to be 5.808 and was considered to be moderate.

Table 5: Descriptive statistics on growth

Code	Indicator	N	Min.	Max.	Mean	Std. Dev.
GR1	profitability	378	1	10	5.87	2.237
GR2	annual turnover/volume of work	378	1	10	5.71	2.208
GR3	client retention	378	1	10	6.20	2.486
GR4	number of employees	378	1	10	5.67	2.384
GR5	equipment/assets	378	1	10	5.59	2.536

Source: [Fieldwork, Nairobi, 2025]

d) Technical Capability

As presented in Table 6, the item with the highest mean (6.97) under client satisfaction was 'experience (previous works)', while that with the lowest mean (5.96) was 'advancement of electronic software used'. The second-lowest mean (6.03) was reported in 'advancement of electronic hardware used'. This means local contractors do not invest heavily in electronic hardware and software technology as compared to plant and equipment. The overall mean of the five indicators was moderately high at 6.431.

Table 6: Descriptive statistics on technical capability

Code	Indicator	N	Min.	Max.	Mean	Std. Dev.
TC1	experience (previous works)	378	2	10	6.97	1.989
TC2	adequacy of plant & equipment	378	1	10	6.34	2.166
TC3	qualification of personnel	378	2	10	6.85	1.928
TC4	advancement of electronic hardware used	378	1	10	6.03	2.149
TC5	advancement of electronic software used	378	1	10	5.96	2.249

Source: [Fieldwork, Nairobi, 2025]

e) Business Efficiency

'Labour productivity' recorded the highest mean (6.72) followed by 'energy efficiency' at 6.25, as seen in Table 7. Wachira (1999) observed that labor productivity is so important that it not only determines the contract period and costs of construction projects but also influences the performance of the entire construction industry here in Kenya. This perhaps explains the focus it's given by most local contractors. The lowest mean (6.10) was recorded in 'revenue per employee'. Earlier, the annual revenue and number of permanent staff were established to be Kshs. 435.84 million and 25.89 respectively. Though this means that the revenue per employee is Kshs. 16.83 million, which is misleading in the sense that since the construction industry is 'project-based', most of the employees engaged by contractors are casuals. The overall mean of the five indicators was moderately high at 6.293.

Table 7: Descriptive statistics on business efficiency

Code	Indicator	N	Min.	Max.	Mean	Std. Dev.
BE1	labour productivity	378	2	10	6.72	1.955
BE2	return on investment in equipment	378	1	10	6.19	1.944
BE3	energy efficiency	378	1	10	6.25	1.964
BE4	revenue per employee	378	1	10	6.10	1.928
BE5	marketing efficiency	378	1	10	6.21	2.057

Source: [Fieldwork, Nairobi, 2025]

f) Employee Satisfaction

The highest (5.92) employee satisfaction was reported in 'favourability of working conditions', while the lowest (5.38) was reported in 'reward for excellence in job performance', as seen on Table 8. Generally, the level of employee satisfaction was moderate at 5.683. This could be a reason why the employee turnover was relatively high at 27.8%. High employee satisfaction is associated with low employee turnover and higher employee performance.

Table 8: Descriptive statistics on employee satisfaction

Code	Indicator	N	Min.	Max.	Mean	Std. Dev.
ES1	remuneration/salary	378	1	10	5.66	2.230
ES2	reward for excellence in job performance	378	1	10	5.38	2.424
ES3	favourability of working conditions	378	1	10	5.92	2.460
ES4	professional growth	378	1	10	5.82	2.471
ES5	training and development	378	1	10	5.63	2.621

Source: [Fieldwork, Nairobi, 2025]

g) Financial Stability

As presented in Table 9, the two highest means were 6.42 and 6.30 for 'credit ratings' and 'access to overdraft facilities' respectively. This means that due to relatively good credit ratings, local contractors can access overdraft facilities from local financial institutions. The least financial stability was reported in 'adequacy of working capital'. This explains why 27.73% of the working capital by local contractors is financed through loans. The second last item was found to be 'net cash flow from projects' with a mean of 6.16. The reduced cash flow could be a result of loan repayments, which reduce the net cash flow from projects.

Table 9: Descriptive statistics on financial stability

Code	Indicator	N	Min.	Max.	Mean	Std. Deviation
FS1	credit ratings	378	1	10	6.42	2.101
FS2	net value of current assets	378	1	10	6.23	1.996
FS3	adequacy of working capital	378	2	10	6.12	2.031
FS4	net cash flow from projects	378	1	10	6.16	1.994
FS5	access to overdraft facilities	378	1	10	6.30	2.091

Source: [Fieldwork, Nairobi, 2025]

The means reported in all the indicators were high, with the lowest at 7.16, as seen in Table 10. The overall mean for 'quality of products' was 7.303. This is a clear indication that local contractors are capable of achieving good quality in the projects they execute.

Table 10: Descriptive statistics on quality of products

Code	Indicator	N	Min.	Max.	Mean	Std. Dev.
QP1	aesthetics	378	2	10	7.19	1.903
QP2	freeness from defects on completion	378	1	10	7.20	1.983
QP3	fitness for the purpose	378	2	10	7.47	1.786
QP4	support by worthwhile guarantees	378	2	10	7.16	1.830
QP5	durability	378	2	10	7.52	1.802

Source: [Fieldwork, Nairobi, 2025]

i) Managerial Capability

As seen on Table 11, the two highest means were 6.97 and 6.96 for 'effectiveness of strategic management' and 'consistency in decision making', respectively. The least (6.81) level of managerial capability was reported in 'efficiency in human resource management'. The overall mean for managerial capability was found to be 6.907 and considered to be moderately high.

Table 11: Descriptive statistics on managerial capability

Code	Indicator	N	Min.	Max.	Mean	Std. Dev
MC1	effectiveness of strategic management	378	1	10	6.97	1.947
MC2	consistency in decision making	378	1	10	6.96	1.994
MC3	promptness in decision-making	378	1	10	6.87	2.033
MC4	prudence in financial management	378	1	10	6.92	2.042
MC5	efficiency in human resource management	378	1	10	6.81	2.024

Source: [Fieldwork, Nairobi, 2025]

j) Safety Performance

As seen in Table 12, the indicator with the highest (7.09) mean was found to be 'use of personal protective equipment'. Based on regulations provided by the NCA, it is usually mandatory for all personnel on construction sites to use personal protective equipment

(NCA, 2012). This could be the reason why this indicator had the best performance compared to the rest. The least performed (6.37) indicator was 'availability of health and safety officer'.

Table 12: Descriptive statistics on safety performance

Code	Indicator	N	Min.	Max.	Mean	Std. Dev.
SP1	soundness of health and safety policies	378	1	10	6.87	2.032
SP2	availability of health and safety officer	378	1	10	6.37	2.437
SP3	use of personal protective equipment	378	1	10	7.09	1.992
SP4	use of warning signage, barriers etc.	378	1	10	6.77	2.211
SP5	induction of workers on OHS	378	1	10	6.58	2.324

Source: [Fieldwork, Nairobi, 2025]

4.4 Confirmatory Factor Analysis

Confirmatory Factor Analysis (CFA) was performed utilizing IBM® SPSS® Amos version 21. The number of observed variables for each latent construct is crucial in performing CFA. Nayak (2018) posits that a concept is under-identified when it has fewer than two variables, whereas it is over-identified when it possesses more than three variables. All our latent constructs possess five (5) measured variables, indicating that they are over-identified, which is essential for Confirmatory Factor Analysis (CFA).

The validity of a measuring model is contingent upon the levels of goodness-of-fit (GOF) and its construct validity. Hair Jr et al. (2014) assert that GOF signifies the degree of similarity between the observed and calculated covariance matrices. If the majority of indices suggest a good fit, it is likely that a good match exists, with TLI, CFI, and RMSEA being the most prevalent indices (Schreiber et al., 2006). The assessment criteria for the measurement models were adapted from Kline (1998), Kriston, Gunzler, Harms and Berner (2008), Mohamad (2013), Hair Jr et al. (2014), and Stevens and Pituch (2016).

Validation of the models was achieved through sample splitting. The full sample (378) was split into calibration (189) and validation (189) samples. The calibration (C) sample comprised of randomly selected 118 contractors and 71 consultants. The validation (V) sample comprised of randomly selected 117 contractors and 72 consultants. Two measurement models were generated, one for the dimensions and the other for determinants.

4.4.1 Measurement Model for the Dimensions of Organizational Performance

The hypothesized model for the three samples (calibration, validation, and full) was run in IBM® SPSS® Amos v21. Figure 1 presents the hypothesized model based on the full sample. To attain a superior fit, adjustments to the model were implemented based on standardized residuals and modification indices. In instances of extreme values, correlations were established among errors exhibiting elevated values. This, however, was only applicable to faults within like structures. The findings are displayed in Table 13. Figure 2 illustrates the revised model derived from the complete sample. Significant enhancements were observed in the model fit. The critical ratios for the correlations between constructs and indicators were significant for all items. The Hoelter Index value of 157, utilized to assess sample size adequacy, exceeded the minimum criterion of 75 established by Shadfar and Malekmohammadi (2013).

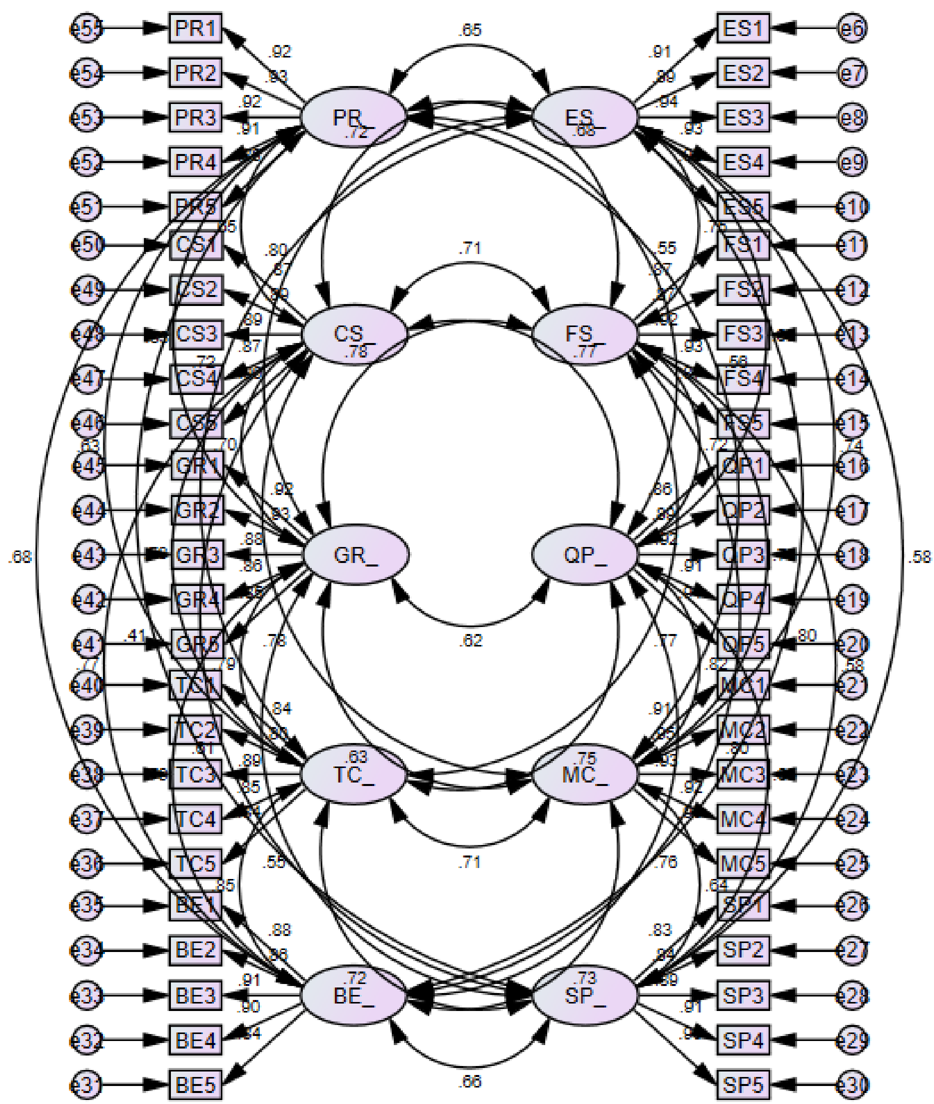

Figure 1: Hypothesized Measurement Model for the Dimensions of Organizational Performance (Full sample)

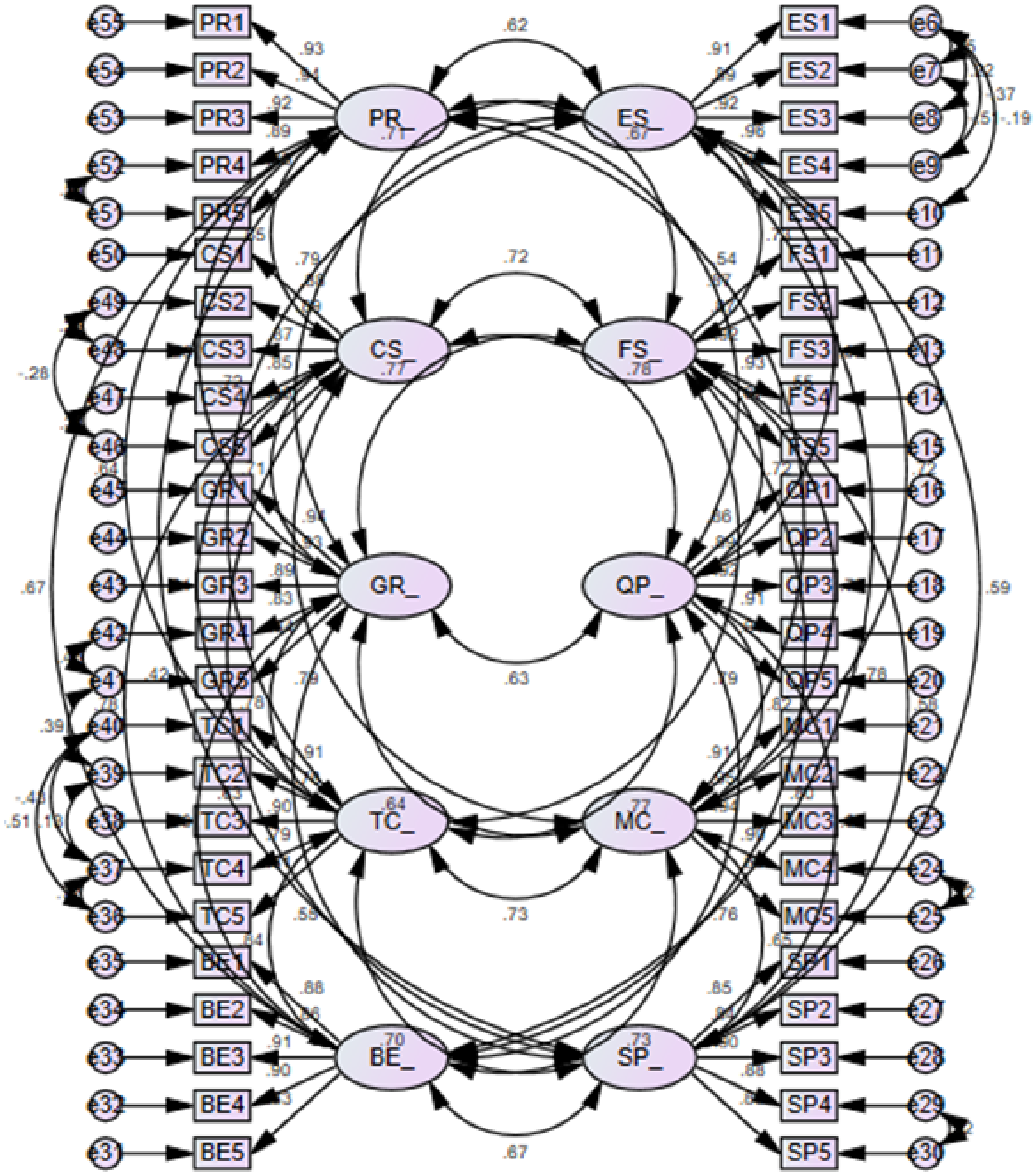

Figure 2: Modified Measurement Model for the Dimensions of Organizational Performance (Full sample)

Two techniques were employed to evaluate the validity of the measurement model: the initial technique involved analyzing the goodness-of-fit indices, while the subsequent approach focused on assessing construct validity and reliability of the designated measurement model. The outcomes of the former are displayed in Table 13, whilst those of the latter are shown in Table 14. Three types of fit indices were used in this study: absolute (χ^2, CMIN/Df, GFI, RMSEA & SRMR), incremental (NFI, TLI, CFI, IFI & RFI), and parsimony (AGFI, PNFI & PCFI). Out of the 13 fit indices checked, 10 were acceptable, two (GFI and AGFI) were tolerable, and one (significance of χ^2) was outside the acceptable range. However, Hair Jr et al. (2010) point out that it is difficult to obtain a non-significant χ^2 when the sample size is relatively large. The overall model fit was considered satisfactory since at least 2 fit indices from each of the 3 categories of indices were acceptable.

Table 13: Model fit indices; dimensions of organizational performance

No.	Fit Index	C		V		F		Limit	Remarks
		H	M	H	M	H	M		
1	χ^2	2872	2505	2837	2416	3710	2863		
2	Df	1130	1123	1130	1121	1130	1113	N/A	N/A
3	p-value	0.00	0.00	0.00	0.00	0.00	0.00	$> .05$	Significant
4	CMIN/Df	2.46	2.23	2.51	2.16	3.28	2.57	≤ 5	Acceptable
5	GFI	0.62	0.64	0.61	0.66	0.69	0.75	$> .80$	Tolerable
6	RMSEA	0.09	0.08	0.09	0.08	0.08	0.07	$< .10$	Acceptable
7	SRMR	0.05	0.05	0.06	0.06	0.06	0.04	$< .10$	Acceptable
8	NFI	0.80	0.82	0.80	0.83	0.86	0.89	$> .80$	Acceptable
9	TLI	0.86	0.88	0.86	0.89	0.89	0.92	$> .80$	Acceptable
10	CFI	0.87	0.89	0.87	0.90	0.90	0.93	$> .85$	Acceptable
11	IFI	0.87	0.89	0.87	0.90	0.85	0.93	$> .90$	Acceptable
12	RFI	0.78	0.80	0.78	0.81	0.85	0.88	$> .85$	Acceptable
13	AGFI	0.57	0.60	0.56	0.61	0.65	0.71	$> .80$	Tolerable
14	PNFI	0.74	0.75	0.74	0.76	0.79	0.81	$> .50$	Acceptable
15	PCFI	0.80	0.82	0.80	0.82	0.84	0.85	$> .50$	Acceptable

C=calibration sample (n=189); V=validation sample (n=189); F=full sample (n=378);
H=hypothesized model; M=modified sample.
NB: The remarks made are in reference to the modified model for the full sample.

Source: [Fieldwork, Nairobi, 2025]

The model's reliability was evaluated using three metrics: Cronbach's Alpha (α), Item Reliability (Squared Multiple Correlation or R^2), and Composite Reliability (CR). The findings are displayed in Table 14. The Cronbach's Alpha values varied from 0.925 to 0.965. These numbers demonstrated a remarkably high degree of internal consistency. The squared multiple correlation coefficients for the observed variables varied from 0.616 to 0.890. Considering the criterion of 0.25, all these numbers indicated a high level of item reliability. Furthermore, the calculated CR values were exceedingly elevated.

In addition to the previously examined fit indices, concept validity was evaluated through three methods: convergent validity, discriminant validity, and nomological validity. Convergent validity was evaluated by factor loadings and average variance extracted (AVE). Factor loadings varied from 0.793 to 0.961 (Appendix 1); the consistently elevated loadings on each latent construct demonstrated that the measured variables converged on shared dimensions, the latent constructs. Hair Jr et al. (2010) assert that standardized factor loadings must be a minimum of 0.5, with an optimum threshold of 0.7 or greater. AVE values varied between 0.707 and 0.851, and CR values fluctuated from 0.923 to 0.966, as illustrated in Table 14. All these values significantly above the minimum threshold of 0.5, indicating sufficient convergence.

Table 14: Reliability and validity; dimensions of organizational performance

No.	Construct	Cronbach's Alpha	CR>0.5	AVE>0.5
1	Profitability	0.960	0.959	0.823
2	Client satisfaction	0.946	0.943	0.767
3	Growth	0.948	0.947	0.783
4	Technical capability	0.925	0.923	0.707
5	Business efficiency	0.944	0.945	0.773
6	Employee satisfaction	0.963	0.966	0.851
7	Financial stability	0.952	0.953	0.801
8	Quality of products	0.954	0.954	0.808
9	Managerial capability	0.965	0.964	0.844
10	Safety performance	0.940	0.940	0.757

Source: [Fieldwork, Nairobi, 2025]

Discriminant validity was assessed using the Fornell-Larcker criterion, which involves comparing Average Variance Extracted (AVE) values with squared correlations. The results of the former are displayed in Table 15, demonstrating that all squared correlation values between constructs are inferior to the AVE values. Fornell and Larcker (1981) originally established the criterion, and Hair et al. (2019) note that it continues to be acceptable when HTMT is not available.

Convergent validity was assessed by comparing Composite Reliability (CR) with AVE. The results indicated that for all constructs, CR exceeded AVE, therefore demonstrating convergence. The model attained nomological validity due to the theoretically correct correlations observed between the constructs previously. Furthermore, all p-values in the covariance table were significant, and all inter-construct correlations were positive.

Table 15: Discriminant validity of constructs; dimensions of organizational performance

	PR	CS	GR	TC	BE	ES	FS	QP	MC	SP
PR	**0.823**									
CS	0.428	**0.767**								
GR	0.697	0.498	**0.783**							
TC	0.407	0.651	0.610	**0.707**						
BE	0.444	0.608	0.629	0.712	**0.773**					
ES	0.383	0.507	0.626	0.513	0.615	**0.851**				
FS	0.454	0.511	0.598	0.618	0.645	0.533	**0.801**			
QP	0.297	0.608	0.394	0.596	0.582	0.461	0.520	**0.808**		
MC	0.303	0.618	0.404	0.539	0.531	0.524	0.529	0.676	**0.844**	
SP	0.176	0.396	0.300	0.486	0.444	0.350	0.341	0.432	0.420	**0.757**

*Bold items are AVE values, while the rest are squared correlations

Source: [Fieldwork, Nairobi, 2025]

Though the chi-square was significant above the 0.05 level, the majority of the absolute, incremental, and parsimony indices were quite good. Overall, the model fit stats suggest that the estimated model is capable of reproducing the sample covariance matrix reasonably well. Further evidence suggested good construct validity and overall reliability.

4.4.2 Measurement Model for the Determinants of Organizational Performance

The hypothesized and modified measurement models for the determinants of organizational performance have been presented in Figures 3 and 4.

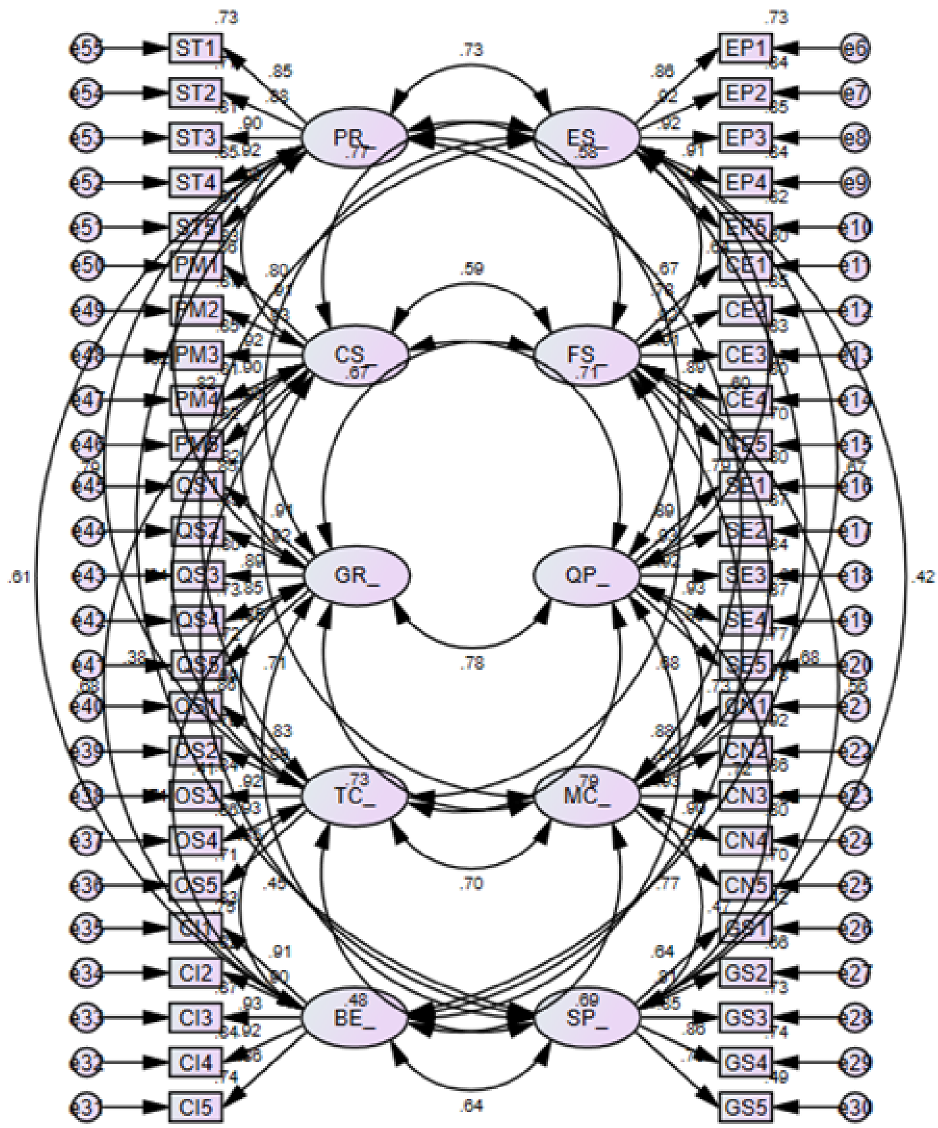

Figure 3: Hypothesized Measurement Model for the Determinants of Organizational Performance (Full sample)

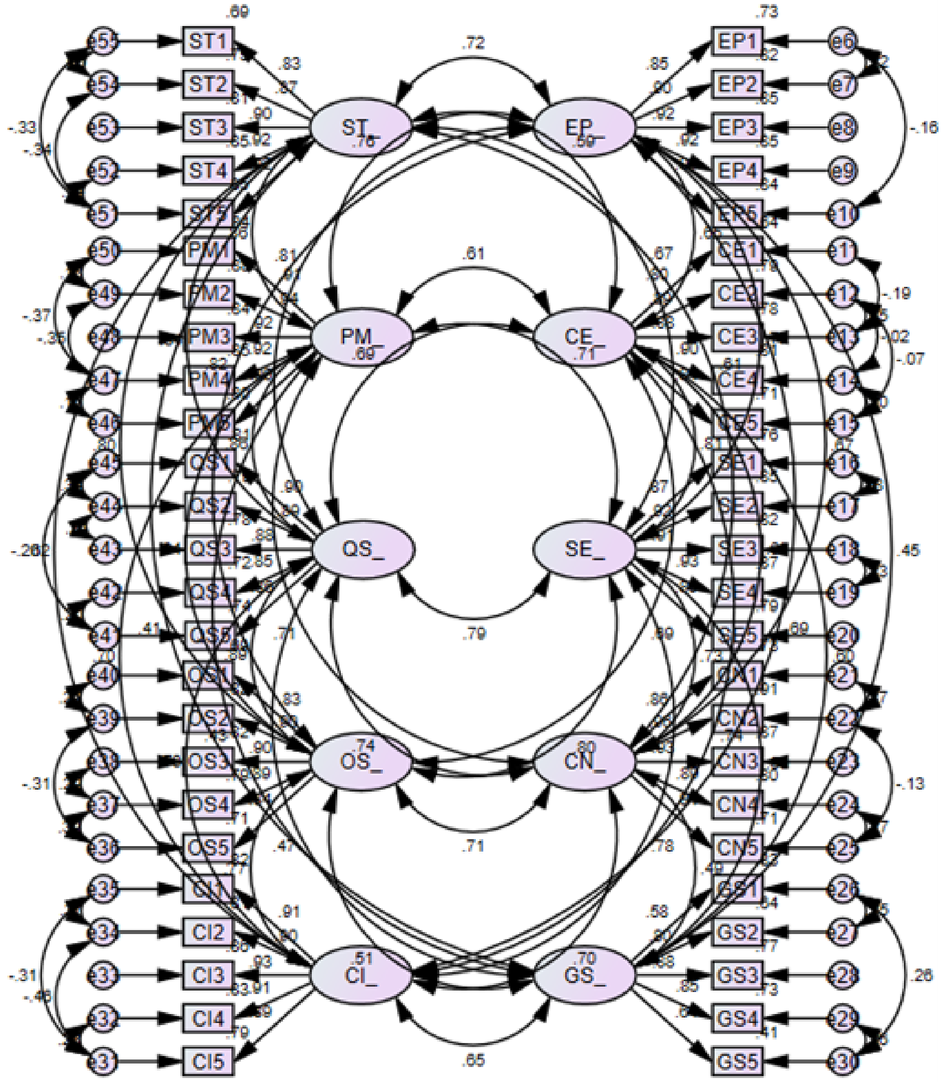

Figure 4: Hypothesized Measurement Model for the Determinants of Organizational Performance (Full sample)

The results for assessing model fit have been presented in Table 16. The goodness-of-fit indices for the full sample showed CMIN/df=2.14, GFI=0.80, RMSEA=0.06, SRMR=0.04, NFI=0.91, TLI=0.94, CFI=0.95, IFI= 0.95, RFI=0.90, AGFI=0.77, PNFI=0.81 and PCFI=0.85.

Table 16: Model fit indices; determinants of organizational performance

No.	Fit Index	C		V		F		Limit	Remarks
		H	M	H	M	H	M		
1	χ^2	2728	2352	2548	2162	3335	2343		
2	Df	1130	1115	1130	1112	1130	1095	N/A	N/A
3	p-value	0.00	0.00	0.00	0.00	0.00	0.00	$> .05$	Significant
4	CMIN/Df	2.41	2.11	2.26	1.94	2.95	2.14	≤ 5	Acceptable
5	GFI	0.64	0.68	0.65	0.69	0.73	0.80	$> .80$	Acceptable
6	RMSEA	0.09	0.08	0.08	0.07	0.07	0.06	$< .10$	Acceptable
7	SRMR	0.05	0.05	0.06	0.06	0.05	0.04	$< .10$	Acceptable
8	NFI	0.78	0.81	0.82	0.84	0.87	0.91	$> .80$	Acceptable
9	TLI	0.85	0.88	0.88	0.91	0.90	0.94	$> .80$	Acceptable
10	CFI	0.86	0.89	0.89	0.92	0.91	0.95	$> .85$	Acceptable
11	IFI	0.86	0.89	0.89	0.92	0.91	0.95	$> .90$	Acceptable
12	RFI	0.76	0.79	0.80	0.83	0.86	0.90	$> .85$	Acceptable
13	AGFI	0.59	0.63	0.60	0.65	0.69	0.77	$> .80$	Tolerable
14	PNFI	0.72	0.74	0.75	0.77	0.80	0.81	$> .50$	Acceptable
15	PCFI	0.79	0.81	0.82	0.83	0.84	0.85	$> .50$	Acceptable

C=calibration sample (n=189); V=validation sample (n=189); F=full sample (n=378); H=hypothesized model; M=modified sample.
NB: The remarks made are in reference to the modified model for the full sample.
Source: [Fieldwork, Nairobi, 2025]

Cronbach's Alpha values, as presented in Table 17, varied from 0.881 to 0.962. The CR values varied between 0.869 and 0.964, with merely two squared multiple correlation values for observed variables falling below 0.70. Consequently, the model exhibited sufficient reliability. Subsequent findings indicated that merely two factor loadings fell below 0.70 (Appendix 2). Hair Jr et al. (2010) established a threshold of 0.5 for factor loadings. AVE values varied between 0.576 and 0.843, and CR values fluctuated from 0.869 to 0.964, as illustrated in Table 17. All these results demonstrated sufficient convergence. All p-values in the covariance table were significant, and all inter-construct correlations were positive. This indicated that nomological validity was attained.

Table 17: Reliability and validity; determinants of organizational performance

No.	Construct	Cronbach's Alpha	CR>0.5	AVE>0.5
1	Strategic planning practices	0.951	0.949	0.789
2	Performance measurement practices	0.962	0.964	0.843
3	Quality of service	0.947	0.943	0.768
4	Organizational structure of the firm	0.944	0.942	0.764
5	Contractor's innovativeness	0.957	0.958	0.822
6	Employee performance	0.956	0.956	0.815
7	Clients' effectiveness	0.938	0.936	0.746
8	Suppliers' effectiveness	0.960	0.957	0.817
9	Competition	0.955	0.954	0.805
10	Government support	0.881	0.869	0.576

Source: [Fieldwork, Nairobi, 2025]

Comparisons between AVE and R^2 indicated that, across all inter-construct correlations, the AVE values for the constructs exceeded the squared correlations. The results are displayed in Table 18. Furthermore, all CR values exceeded the AVE values. Consequently, the model attained sufficient discriminant validity.

Table 18: Discriminant validity of constructs; determinants of organizational performance

	ST	PM	QS	OS	CI	EP	CE	SE	CN	GS
ST	**0.789**									
PM	0.743	**0.843**								
QS	0.225	0.741	**0.768**							
OS	0.258	0.712	0.783	**0.764**						
CI	0.425	0.484	0.526	0.598	**0.822**					
EP	0.523	0.585	0.664	0.681	0.476	**0.815**				
CE	0.347	0.373	0.471	0.482	0.543	0.425	**0.746**			
SE	0.450	0.507	0.632	0.635	0.616	0.605	0.663	**0.817**		
CN	0.367	0.507	0.549	0.511	0.494	0.456	0.436	0.534	**0.805**	
GS	0.166	0.187	0.225	0.258	0.425	0.205	0.359	0.345	0.237	**0.576**

*Bold items are AVE values, while the rest are squared correlations

Source: [Fieldwork, Nairobi, 2025]

In summary, the measurement model for the determinants of organizational performance demonstrated adequate reliability, convergent validity, and discriminant validity.

4.5 Structural Equation Modelling Results

The hypothesized and modified structural models for establishing the influence of contractor innovativeness on each of the dimensions of organizational performance have been presented in Figures 5 and 6. Following the initial assessment of the hypothesized model, modification indices were consulted to identify areas where model fit could be improved. In line with best practice recommendations, modifications were not made purely on statistical grounds but were guided by theoretical reasoning and prior literature, since purely data driven modifications can threaten validity (Kline, 2015). Specifically, only those indices suggesting correlations between conceptually related constructs were acted upon. For example, managerial capability and business efficiency are closely linked in construction management theory, and client satisfaction is often tied to perceptions of quality performance. By restricting modifications to theoretically defensible adjustments, the integrity of the hypothesized model was preserved while improving overall fit. A summary of the modification indices, changes made, and their theoretical justifications is presented in Appendix 3.

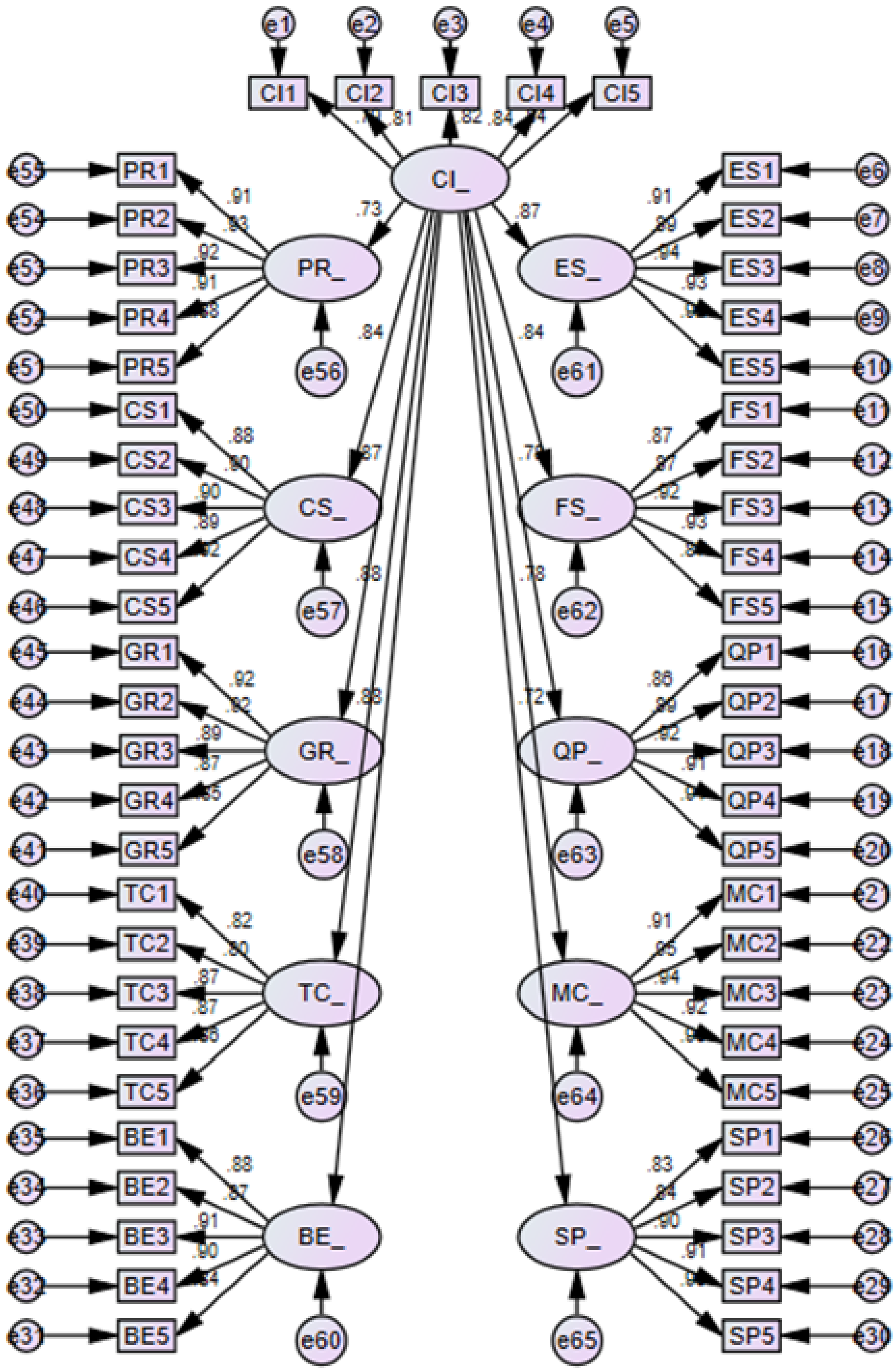

Figure 5: Hypothesized structural model showing the influence of contractor innovativeness on organizational performance dimensions

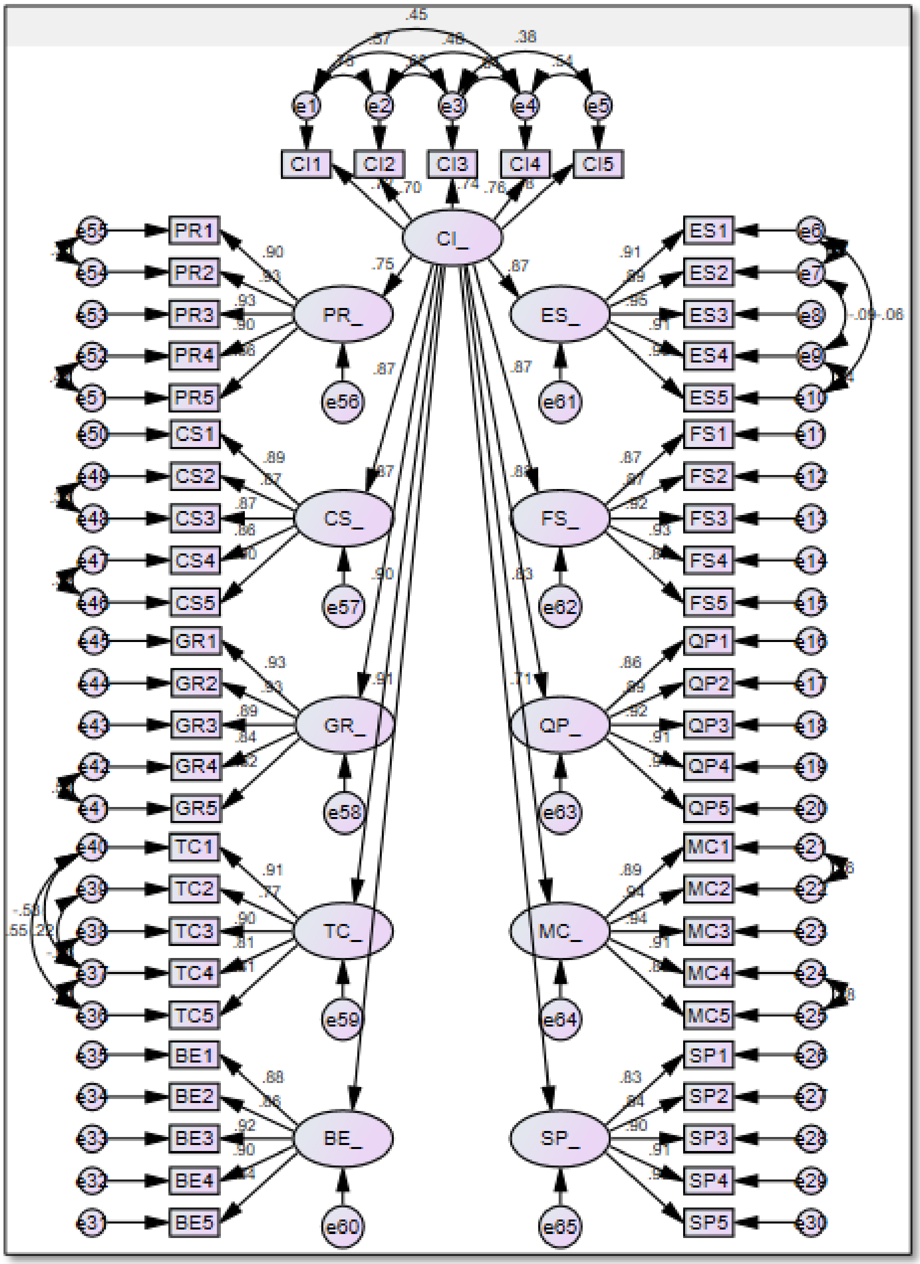

Figure 6: Modified structural model showing the influence of contractor innovativeness on organizational performance dimensions

The results for assessing model fit have been presented in Table 19. The goodness-of-fit indices showed CMIN/df=2.85, GFI=0.70, RMSEA=0.07, SRMR=0.06, NFI=0.87, TLI=0.90, CFI=0.91, IFI= 0.91, RFI=0.86, AGFI=0.67, PNFI=0.81 and PCFI=0.85. Only 3 out of the

12 indices were found not to be acceptable. These results, therefore, showed a reasonably good overall model fit. This is because in SEM practice, scholars often emphasize a holistic evaluation of fit rather than reliance on a single index (Byrne, 2013; Hu & Bentler, 1999).

Table 19: Model fit indices

No.	Fit Index	Hypothesized model	Modified model	Threshold	Remarks
1	χ^2	5669.16	3980.54	None	
2	Df	1421	1397	None	
3	p-value	0.00	0.00	$> .05$	Significant
4	CMIN/Df	3.99	2.85	≤ 5	Acceptable
5	GFI	0.58	0.70	$> .80$	Tolerable
6	RMSEA	0.09	0.07	$< .10$	Acceptable
7	SRMR	0.07	0.06	$< .10$	Acceptable
8	NFI	0.81	0.87	$> .80$	Acceptable
9	TLI	0.84	0.90	$> .90$	Acceptable
10	CFI	0.85	0.91	$> .90$	Acceptable
11	IFI	0.85	0.91	$> .90$	Acceptable
12	RFI	0.80	0.86	$> .85$	Acceptable
13	AGFI	0.58	0.67	$> .80$	Unacceptable
14	PNFI	0.77	0.81	$> .50$	Acceptable
15	PCFI	0.81	0.85	$> .50$	Acceptable

Source: [Fieldwork, Nairobi, 2025]

This structural model tested the hypothesis that 'Contractor's innovativeness' is significantly related to each of the dimensions of organizational performance. It had been hypothesized that the variable 'Contractor's innovativeness' had a significant positive influence on all the dimensions of organizational performance. Table 20 presents the results of the analysis of these relationships. All the relationships were found to be significant and positive, indicating that all the hypotheses were supported. The three dimensions of organizational performance that are most influenced by 'Contractor's innovativeness' are Business efficiency (0.912), Technical capability (0.896), and Employee satisfaction (0.874). The three dimensions which are least influenced by 'Contractor's innovativeness' are Safety performance (0.711), Quality of products (0.829), and Managerial capability (0.831).

Table 20: Influence of contractor's innovativeness on organizational performance

	Structural path			Estimate		R^2	S.E	C.R	P	Remark
H_1	CI	→	PR	.842	.749	.561	.055	15.323	.000	Supported
H_2	CI	→	CS	1.000	.873	.762				Supported
H_3	CI	→	GR	1.099	.867	.752	.063	17.338	.000	Supported
H_4	CI	→	TC	.992	.896	.803	.057	17.471	.000	Supported
H_5	CI	→	BE	.956	.912	.832	.051	18.889	.000	Supported
H_6	CI	→	ES	1.081	.874	.764	.054	20.052	.000	Supported
H_7	CI	→	FS	.966	.868	.753	.052	18.726	.000	Supported
H_8	CI	→	QP	.823	.829	.687	.048	17.327	.000	Supported
H_9	CI	→	MC	.881	.831	.691	.048	18.250	.000	Supported
H_{10}	CI	→	SP	.729	.711	.506	.052	13.928	.000	Supported

Source: [Fieldwork, Nairobi, 2025]

5 Discussion of Findings

The results of this study demonstrate that contractor innovativeness exerts a significant and positive influence across all dimensions of organizational performance among Kenyan contractors. Innovativeness emerged as a multidimensional driver, enhancing efficiency, technical capability, employee satisfaction, financial stability, managerial capability, customer satisfaction, growth, quality, profitability, and safety performance. Although the strength of these effects varied, with business efficiency, technical capability, and employee satisfaction showing the strongest impacts, and profitability and safety performance the weakest, the overall pattern confirms that innovativeness is a central determinant of organizational success in the construction sector.

The finding that safety performance was the weakest influenced dimension suggests that innovation alone may not be sufficient to drive improvements in safety outcomes. Safety practices in construction are often shaped by regulatory frameworks, compliance requirements, and industry standards, which limit the discretionary role of innovation. While innovative technologies and processes can indirectly enhance safety, firms may prioritize innovation in areas more directly tied to profitability and client satisfaction. This highlights the need for managers to complement innovation with deliberate safety culture initiatives and compliance enforcement.

In contrast, employee satisfaction emerged as one of the strongest influenced dimensions. Innovative practices often introduce new technologies, improved workflows, and opportunities for skill development, which employees interpret as signals of organizational commitment to progress and well being. Such perceptions can enhance morale, engagement, and retention. This finding underscores the practical implication that innovation can be strategically leveraged to strengthen human resource outcomes, making employees more motivated and aligned with organizational goals.

The following sections seek to critically analyze these outcomes, compare them with evidence from both developed and developing contexts, and highlight areas of convergence and divergence.

5.1 Perspectives from Developed Countries

Contractor innovativeness has emerged as a key determinant of organizational performance in the construction industry. In developed economies, innovativeness has been strongly linked to improvements in efficiency, quality, and client satisfaction. For example, Lo and Kam (2021) found that contractors in the United States who adopted multidimensional innovation frameworks, such as Building Information Modeling (BIM), lean construction, digital monitoring, and participatory management, achieved higher managerial capability and resilience. Similarly, Maqbool et al. (2025) found that organizational design innovations in international projects enhanced managerial decision making, leading to improved profitability and client satisfaction. In New Zealand, Li et al. (2024) reported that innovative contractors were more adaptable and better able to sustain employee satisfaction during periods of economic uncertainty. Similarly, studies in Europe highlight that integration of sustainability innovations into construction practices enhances reputational capital and long term profitability (Alshorafa & Ergen, 2019; Keles et al., 2025). These contexts illustrate how supportive institutional environments, advanced technologies, and strong regulatory frameworks amplify the benefits of innovativeness, enabling contractors to achieve balanced improvements across technical, financial, and social dimensions.

5.2 Perspectives from Developing Countries

In developing contexts, innovativeness is often constrained by systemic barriers such as limited financing, weak institutional frameworks, and corruption. Research in Nigeria shows that while contractors recognize the importance of innovation, adoption remains uneven due to resource limitations and a lack of technical expertise (Adebowale & Agumba, 2022; Umeokafor et al., 2022). In Kenya, larger contractors (NCA1–NCA3) who institutionalize innovative practices report improvements in efficiency, technical capability, and employee satisfaction (Odanga, 2019). However, smaller contractors (NCA6–NCA8) often rely on informal adaptive practices, which are rarely institutionalized or captured in performance reports (Gacheru et al., 2024). Profitability and safety outcomes remain weaker, with Okeyo (2023) noting that family-owned contractors struggle to translate innovativeness into financial resilience due to delayed government payments and weak enforcement

5.3 Critical Perspective

Innovativeness in Kenyan construction firms can be interpreted through the VRIN (Valuable, Rare, Inimitable, and Non substitutable) framework (Barney, 1991). Process innovations and organizational learning are valuable in enhancing efficiency and performance, but they are not always rare, as many firms adopt similar incremental improvements. Technological adoption, particularly of advanced construction methods and ICT tools, is both valuable and relatively rare in the Kenyan context, given limited diffusion across the industry. Certain innovations, such as firm specific knowledge systems and tacit expertise, may be inimitable due to their embeddedness in organizational routines. Finally, innovations that combine technical and managerial practices can be considered non substitutable, as they cannot be easily replaced by alternative resources. Thus, while not all forms of innovativeness fully meet VRIN criteria, the evidence suggests that innovativeness functions as a strategic resource with varying degrees of alignment to RBV attributes.

The uniformly high path coefficients observed in this study strongly support the Resource Based View (RBV), which emphasizes the centrality of firm specific resources such as innovativeness in driving performance outcomes. At the same time, Contingency Theory suggests that institutional constraints can weaken or shape these relationships. The apparent tension between these perspectives can be reconciled by recognizing that innovativeness may be one of the few resources capable of overcoming institutional barriers in Kenya's construction industry. In this context, innovation functions as a strategic lever that remains influential despite regulatory and institutional challenges. Thus, RBV is strongly supported, while Contingency Theory is partially supported in the sense that institutional context determines which resources retain their influence.

The findings confirm that innovativeness is a critical driver of organizational performance, but its impact is uneven across contexts. In developed countries, supportive institutional environments amplify the benefits of innovativeness, translating into measurable gains in profitability, safety, and quality. In Kenya, systemic barriers dilute these benefits, particularly among smaller firms. This divergence underscores the need for hybrid theoretical approaches: while the Resource-Based View (RBV) conceptualizes innovativeness as a strategic resource that enhances multidimensional performance, Contingency Theory highlights that its effectiveness depends on environmental fit. Thus, innovativeness should be understood both as a firm-level capability and as a context-dependent practice whose outcomes are shaped by institutional and regulatory environments. Without supportive institutional environments, innovativeness alone cannot guarantee improved organizational performance.

While the findings strongly support the hypothesized relationships, several critical issues warrant reflection. First, the uniformly high path coefficients may partly reflect common method variance or industry specific institutional dynamics, rather than purely substantive effects. Second, although SEM provides a powerful tool for modeling complex relationships, its application to cross sectional survey data limits causal inference. The observed associations cannot be interpreted as definitive evidence of causality; longitudinal or multi source designs would be required to strengthen causal claims. Third, alternative theoretical perspectives may also explain the results. For example, institutional theory suggests that firms may adopt innovative practices to signal legitimacy in a constrained environment, while stakeholder theory highlights the role of employee perceptions in shaping organizational outcomes. Finally, the practical implications of these findings should be interpreted with caution: managers can leverage innovativeness to enhance performance, but must recognize that safety outcomes may require regulatory enforcement and cultural interventions beyond innovation.

6 Conclusion and Recommendations

6.1 Conclusion

This study examined the effect of contractor innovativeness on multiple dimensions of organizational performance among local contractors in Kenya. Using SEM, the findings revealed that innovativeness exerts a significant and positive influence across all ten dimensions, with the strongest effects observed in business efficiency, technical capability, and employee satisfaction, and the weakest in profitability and safety performance. These results confirm that innovativeness is a critical driver of organizational outcomes, but its impact is moderated by contextual realities.

Comparisons with global evidence show that in developed economies, innovativeness consistently translates into measurable gains in efficiency, profitability, and safety outcomes due to supportive institutional environments and advanced technological adoption. In Kenya and other developing contexts, however, systemic barriers such as delayed government payments, corruption, and weak regulatory enforcement dilute these benefits, particularly among smaller contractors. This divergence underscores the importance of integrating the Resource-Based View (RBV), which conceptualizes innovativeness as a strategic resource, with Contingency Theory, which emphasizes environmental fit, to fully explain the innovativeness–performance relationship in emerging markets.

The study contributes to theory by highlighting the need for hybrid frameworks that reconcile strategic resource perspectives with contextual realities. It also provides practical insights for contractors, policymakers, and industry stakeholders on how to institutionalize innovativeness to enhance multidimensional performance outcomes. Ultimately, the findings suggest that while innovativeness is a powerful lever for organizational success, its transformative potential can only be fully realized when embedded within supportive institutional and regulatory environments.

6.2 Recommendations

6.2.1 Policy Recommendations:

The paper makes the following policy recommendations:

a) Strengthen Institutional Frameworks: Government agencies such as the National Construction Authority (NCA) should embed innovation benchmarks into contractor accreditation and classification systems, ensuring that innovativeness is rewarded and incentivized.
b) Improve Regulatory Enforcement: Stronger enforcement of safety and quality standards is necessary to ensure that innovative practices translate into measurable improvements in compliance and performance.
c) Financial Reforms: Address systemic barriers such as delayed government payments and corruption, which undermine liquidity and profitability, limiting contractors' ability to reinvest in innovation.
d) Capacity Building Programs: National training initiatives and subsidies for digital tools should be introduced to help smaller contractors institutionalize innovation practices.
e) Innovation in Public Procurement: Public tendering processes should integrate innovation-driven criteria to encourage contractors to adopt modern practices and technologies.

6.2.2 Practical Recommendations:

The paper makes the following practical recommendations for contractors:

a) Invest in digital monitoring tools, BIM, and lean construction practices to enhance efficiency, technical capability, and quality outcomes.
b) Institutionalize participatory management and employee engagement initiatives to improve satisfaction and reduce turnover.
c) Diversify procurement strategies and revenue streams to strengthen financial stability and growth.
d) Prioritize structured safety training and reporting systems to improve safety performance.

Finally, the paper makes the following practical recommendations for industry stakeholders, including clients, consultants, and associations:

a) Encourage collaborative innovation practices, such as integrated project delivery, to improve client satisfaction and trust.
b) Support smaller contractors through mentorship and partnerships that transfer innovative practices across firms.
c) Promote continuous improvement cultures by embedding innovation into everyday project management and reporting.

7 Limitations and Further Research

The first limitation concerns the conceptualization of contractor innovativeness. In this study, innovativeness was operationalized as an organizational orientation or disposition, that is, the propensity of contractors to adopt new processes, technologies, markets, and R&D practices. While this approach aligns with the Resource Based View, which treats innovativeness as a strategic capability, it does not directly measure innovation outputs (e.g., number of new products, patents, or process improvements). The innovation management literature (Hurley & Hult, 1998; Wang & Ahmed, 2004) treats orientation and output as conceptually distinct, and conflating them may limit theoretical precision. Future research should therefore complement orientation based measures with output based indicators to test the relationship between innovativeness as a disposition and realized innovation outcomes, thereby enhancing discriminant validity and deepening theoretical clarity.

The second limitation relates to the measurement of contractor innovativeness. In this study, innovativeness was operationalized as a composite construct using five items (adoption of new processes, advancement of equipment, entry into new markets, advancement in software technology, and R&D endeavour). While these items capture multiple innovation typologies, they may conflate distinct dimensions such as process, product, market, and technological innovation. This conflation could weaken discriminant validity and limit theoretical precision. Future research should therefore disaggregate innovativeness into its sub-dimensions, guided by established frameworks such as the Oslo Manual and Crossan & Apaydin's (2010) multidimensional model of organizational innovation, to test for differential effects on organizational performance and enhance theoretical clarity.

This study invoked Contingency Theory to interpret the findings, particularly the observation that systemic barriers in Kenya (e.g., delayed payments, corruption, weak regulatory enforcement) may dilute the benefits of contractor innovativeness. However, the study design did not formally model environmental contingencies through moderator variables. As such, Contingency Theory was employed as a post hoc explanatory lens rather than empirically tested. This limits the strength of the theoretical contribution, as the fit between innovativeness and external conditions was not directly measured. Future research should incorporate moderator variables representing environmental contingencies, such as regulatory enforcement, institutional quality, or market volatility, to formally test the moderating role of environmental fit. Doing so would allow for a more rigorous validation of Contingency Theory and strengthen the integration of contextual factors into innovation–performance relationships.

Although the majority of fit indices (CFI, TLI, RMSEA, SRMR) fell within acceptable thresholds, the Goodness of Fit Index (GFI = 0.70) and Adjusted Goodness of Fit Index (AGFI = 0.67) were below the conventional benchmark of 0.80. These indices are known to be highly sensitive to sample size and model complexity, and lower values are not uncommon in multidimensional models with numerous latent constructs. Nevertheless, their weakness limits the strength of the model fit conclusion. Future research should consider re specifying the measurement model, such as simplifying indicator structures or testing alternative configurations, to improve GFI and AGFI values and thereby strengthen confidence in the robustness of the findings.

The uniformly high path coefficients observed in the structural model (0.711–0.912) raise the possibility of common method variance (CMV). Harman's single factor test indicated that the largest factor accounted for 55% of the variance, exceeding the conventional

50% threshold and suggesting that CMV may have influenced the results. While this does not invalidate the observed relationships, it does caution against interpreting the strength of the coefficients as purely substantive. Future research should employ more robust CMV controls, such as marker variable techniques or longitudinal designs, to mitigate CMV risk and validate the relationships between innovativeness and performance outcomes.

Lastly, while discriminant validity was assessed using the Fornell-Larcker criterion, the absence of HTMT ratio computation represents a methodological limitation. As Henseler et al. (2015) caution, Fornell Larcker alone may not fully detect discriminant validity problems; therefore, future studies should incorporate HTMT testing to strengthen construct validity in complex SEM models.

Declaration of Interest Statement:

The authors report there are no competing interests to declare.

Data Availability Statement:

Data will be available upon request.

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Appendices

Appendix 1: Influence of contractor's innovativeness on organizational performance

Construct	Code	Indicator	Factor loading	$R^2 > .25$
Profitability	PR1	gross profit margin	.927	.858
	PR2	operating profit margin	.943	.890
	PR3	net profit margin	.921	.848
	PR4	return on assets	.891	.794
	PR5	asset turnover	.851	.724
Client satisfaction	CS1	service quality	.875	.766
	CS2	adherence to schedule	.887	.788
	CS3	adherence to budget	.868	.754
	CS4	communication skills	.850	.723
	CS5	personnel skills	.898	.807
Growth	GR1	profitability	.935	.874
	GR2	annual turnover/volume of work	.927	.859
	GR3	client retention	.886	.785
	GR4	number of employees	.834	.696
	GR5	equipment/assets	.837	.701
Technical capability	TC1	experience (previous works)	.911	.830
	TC2	adequacy of plant & equipment	.785	.616
	TC3	qualification of personnel	.899	.808
	TC4	advancement of electronic hardware used	.793	.629
	TC5	advancement of electronic software used	.806	.650
Business efficiency	BE1	labour productivity	.882	.778
	BE2	return on investment in equipment	.863	.745
	BE3	energy efficiency	.915	.837
	BE4	revenue per employee	.900	.810
	BE5	marketing efficiency	.835	.697
Employee satisfaction	ES1	remuneration/salary	.906	.821
	ES2	reward for excellence in job performance	.893	.797
	ES3	favourability of working conditions	.919	.845
	ES4	professional growth	.961	.923
	ES5	training and development	.933	.870

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Appendix 1 Continued

Construct	Code	Indicator	Factor loading	$R^2 > .25$
Financial stability	FS1	credit ratings	.870	.756
	FS2	net value of current assets	.873	.762
	FS3	adequacy of working capital	.924	.853
	FS4	net cash flow from projects	.934	.872
	FS5	access to overdraft facilities	.873	.762
Quality of products	QP1	aesthetics	.860	.739
	QP2	freeness from defects on completion	.892	.795
	QP3	fitness for the purpose	.920	.847
	QP4	support by worthwhile guarantees	.912	.832
	QP5	durability	.908	.825
Managerial capability	MC1	effectiveness of strategic management	.910	.828
	MC2	consistency in decision making	.954	.910
	MC3	promptness in decision making	.935	.875
	MC4	prudence in financial management	.904	.817
	MC5	efficiency in human resource management	.888	.789
Safety performance	SP1	soundness of health and safety policies	.846	.716
	SP2	availability of health and safety officer	.843	.711
	SP3	use of personal protective equipment	.903	.816
	SP4	use of warning signage, barriers etc.	.882	.778
	SP5	induction of workers on OHS	.876	.767

Source: [Fieldwork, Nairobi, 2025]

Appendix 2: Factor loadings in Determinants of Organizational Performance

Construct	Code	Indicator	Factor loading	$R^2 > .25$
Strategic planning practices	ST1	definition of the firm's purpose and goals	.831	.690
	ST2	development of a mission and vision	.865	.748
	ST3	assessment of business environment	.898	.807
	ST4	identification and analysis of firm's strategic issues	.921	.848
	ST5	implementation, evaluation and control systems	.922	.851
Performance measurement practices	PM1	clarity and meaningfulness to all	.914	.836
	PM2	harmony with organizational goals	.938	.879
	PM3	reliability of data used	.919	.845
	PM4	commitment by top management	.923	.851
	PM5	employee involvement	.896	.802
Quality of service	QS1	reliability	.902	.814
	QS2	responsiveness to clients	.887	.786
	QS3	knowledge and courtesy of employees	.883	.780
	QS4	empathy towards clients	.847	.717
	QS5	appearance of physical facilities and personnel	.861	.741
Organizational structure of the firm	OS1	clarity of line of authority	.828	.685
	OS2	flexibility	.905	.819
	OS3	adequacy of delegation of authority	.904	.817
	OS4	provision of stability and continuity	.889	.791
	OS5	documentation of the structure	.840	.705
Contractor's innovativeness	CI1	adoption of new processes	.905	.819
	CI2	advancement of construction equipment	.900	.811
	CI3	entry into new markets	.929	.863

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Appendix 2 Continued

Construct	Code	Indicator	Factor loading	$R^2 > .25$
	CI4	advancement in software technology	.910	.829
	CI5	research and development endeavour	.888	.788
Employee performance	EP1	work quality	.852	.726
	EP2	effectiveness of communication	.905	.819
	EP3	creativity and taking initiative	.920	.847
	EP4	cooperation (level of team play)	.920	.847
	EP5	acceptance and learning from feedback	.914	.836
Clients' effectiveness	CE1	promptness in payment	.801	.642
	CE2	selection of competent project consultants	.892	.795
	CE3	timeliness in appointment of project consultants	.881	.776
	CE4	responsiveness to information requests and decisions	.898	.806
	CE5	acquisition of local authority permissions	.843	.711
Suppliers' effectiveness	SE1	timeliness of delivery	.875	.765
	SE2	adherence to quality specifications	.920	.846
	SE3	timeliness of communication	.906	.821
	SE4	consistency of improvement of services	.931	.866
	SE5	technical support for their installations	.887	.786
Competition	CN1	increased efficiency	.856	.732
	CN2	improved quality	.956	.913
	CN3	enhanced client satisfaction	.934	.873
	CN4	increased innovativeness	.895	.801
	CN5	improved industry linkages	.841	.708
Government support	GS1	provision of construction jobs	.575	.331

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Appendix 2 Continued

Construct	Code	Indicator	Factor loading	$R^2 > .25$
	GS2	regulation of the industry	.799	.639
	GS3	skills development through formal training e.g. NITA, NCA	.878	.771
	GS4	efficiency of procurement practices	.852	.726
	GS5	direct support e.g. financial	.642	.413

Source: [Fieldwork, Nairobi, 2025]

Appendix 3: Modification indices, changes made, and their theoretical justifications

Modification Index (MI)	Change Made	Theoretical Justification
MI = 24.6	Added covariance between error terms of *Managerial Capability* and *Business Efficiency*	Literature in construction management recognizes that managerial practices directly influence efficiency, making correlated measurement errors theoretically plausible.
MI = 19.3	Added covariance between error terms of *Client Satisfaction* and *Quality Performance*	Client perceptions of satisfaction are often strongly tied to quality outcomes; allowing correlation reflects this conceptual overlap.
MI = 15.8	Added covariance between error terms of *Technical Capability* and *R&D Endeavour*	Firms investing in R&D often simultaneously enhance technical capability; correlation between these indicators is theoretically defensible.
MI = 13.1	Added covariance between error terms of *Employee Satisfaction* and *Safety Performance*	Safety practices contribute to employee morale and satisfaction; correlated measurement errors are consistent with occupational health literature.

Source: [Fieldwork, Nairobi, 2025]

Appendix 4: Contractors' Demographic Profile

Demographic Variable	Category/Range	Frequency (n)	Percentage (%)
Firm Category (NCA) (n=235)	NCA1	107	45.5
	NCA2	62	26.4
	NCA3	66	28.1
Number of permanent staff (n=233)	0–10	64	27.5
	11–20	62	26.6
	21–30	45	19.3
	31–40	26	11.2
	41–50	9	3.9
	51–60	4	1.7
	61–70	2	0.9
	71–80	3	1.3
	81–90	6	2.6
	>90	12	5.2

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Appendix 4 Continued

Demographic Variable	Category/Range	Frequency (n)	Percentage (%)
Annual Turnover/Revenue (KShs) (n=226)	Less than 200 million	73	32.3
	201 – 400 million	57	25.2
	401 – 600 million	33	14.6
	601 – 800 million	17	7.5
	801 million – 1.000 billion	14	6.2
	1.001 – 1.200 billion	16	7.1
	1.201 – 1.400 billion	5	2.2
	1.401 – 1.600 billion	6	2.7
	More than 1.8 billion	5	2.2
Total Annual Expenditure (KShs) (n=225)	Less than 100 million	80	35.6
	101 – 200 million	46	20.4
	201 – 300 million	22	9.8
	301 – 400 million	19	8.4
	401 – 500 million	18	8.0
	501 – 600 million	7	3.1
	601 – 700 million	8	3.6
	701 – 800 million	7	3.1
	801 – 900 million	12	5.3
	More than 900 million	6	2.7
Mega projects undertaken by NCA1 Local Contractors / Proportion of projects exceeding 1 billion (n=157)	11–20%	21	13.4
	21–30%	14	8.9
	31–40%	7	4.5
	41–50%	6	3.8
	51–60%	1	0.6
	61–70%	1	0.6
	71–80%	2	1.3
	81–90%	1	0.6
	91–100%	1	0.6
Employee turnover (n=210)	0–10%	41	19.5
	11–20%	53	25.2
	21–30%	46	21.9
	31–40%	28	13.3
	41–50%	12	5.7
	51–60%	10	4.8
	61–70%	5	2.4
	71–80%	9	4.3
	81–90%	6	2.9
Funding of Working Capital through loans (n=215)	0–10%	49	22.8
	11–20%	37	17.2
	21–30%	40	18.6
	31–40%	47	21.9

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Appendix 4 Continued

Demographic Variable	Category/Range	Frequency (n)	Percentage (%)
	41–50%	19	8.8
	51–60%	9	4.2
	61–70%	5	2.3
	71–80%	4	1.9
	81–90%	4	1.9
	91–100%	1	0.5
Growth in the size of the workforce (n=217)	0–10%	35	16.1
	11–20%	62	28.6
	21–30%	43	19.8
	31–40%	23	10.6
	41–50%	20	9.2
	51–60%	12	5.5
	61–70%	7	3.2
	71–80%	8	3.7
	81–90%	7	3.2
Growth in volume of work (n=216)	0–10%	35	16.2
	11–20%	44	20.4
	21–30%	27	12.5
	31–40%	30	13.9
	41–50%	24	11.1
	51–60%	21	9.7
	61–70%	11	5.1
	71–80%	14	6.5
	81–90%	8	3.7
	91–100%	2	0.9
Growth in the value of owned equipment (n=216)	0–10%	54	25.0
	11–20%	50	23.1
	21–30%	22	10.2
	31–40%	26	12.0
	41–50%	20	9.3
	51–60%	14	6.5
	61–70%	3	1.4
	71–80%	12	5.6
	81–90%	9	4.2
	91–100%	6	2.8

Source: [Fieldwork, Nairobi, 2025]

Appendix 5: Consultants' Demographic Profile

Demographic Variable	Category/Range	Frequency (n)	Percentage (%)
Professional background (n=143)	Construction Management	23	16.1
	Quantity surveying	86	60.1
	Civil & Structural Engineering	21	14.7
	Architecture	9	6.3
	Others	4	2.8
Years of experience (n=216)	Less than 5	41	28.7
	6 – 10	56	39.2
	11 – 15	20	14.0
	16 – 20	15	10.5
	21 – 25	5	3.5
	26 – 30	5	3.5
	36 – 40	1	0.7

Source: [Fieldwork, Nairobi, 2025]

Appendix 6: Common Method Bias in Contractors' Data; Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	56.965	56.965	56.965	56.965	56.965	56.965
2	4.572	4.572	61.536			
3	3.710	3.710	65.247			
4	3.214	3.214	68.460			
5	2.416	2.416	70.876			
6	1.921	1.921	72.797			
7	1.534	1.534	74.331			
8	1.462	1.462	75.794			
9	1.349	1.349	77.143			
10	1.250	1.250	78.393			
11	1.168	1.168	79.562			
12	1.110	1.110	80.671			
13	.980	.980	81.651			
14	.977	.977	82.628			
15	.877	.877	83.504			
16	.785	.785	84.290			
17	.752	.752	85.042			
18	.694	.694	85.736			
19	.651	.651	86.387			
20	.623	.623	87.010			
21	.597	.597	87.607			
22	.546	.546	88.153			
23	.508	.508	88.660			

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Appendix 6 – continued from previous page

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
24	.495	.495	89.155			
25	.469	.469	89.624			
26	.440	.440	90.064			
27	.411	.411	90.476			
28	.397	.397	90.872			
29	.387	.387	91.259			
30	.354	.354	91.613			
31	.352	.352	91.965			
32	.343	.343	92.309			
33	.310	.310	92.618			
34	.304	.304	92.923			
35	.281	.281	93.204			
36	.276	.276	93.480			
37	.267	.267	93.747			
38	.257	.257	94.004			
39	.235	.235	94.239			
40	.230	.230	94.470			
41	.222	.222	94.692			
42	.215	.215	94.907			
43	.210	.210	95.117			
44	.205	.205	95.321			
45	.195	.195	95.516			
46	.190	.190	95.706			
47	.181	.181	95.887			
48	.174	.174	96.062			
49	.167	.167	96.228			
50	.162	.162	96.390			
51	.157	.157	96.548			
52	.152	.152	96.699			
53	.151	.151	96.850			
54	.149	.149	97.000			
55	.143	.143	97.143			
56	.134	.134	97.277			
57	.130	.130	97.407			
58	.120	.120	97.527			
59	.114	.114	97.641			
60	.113	.113	97.754			
61	.106	.106	97.860			
62	.105	.105	97.965			
63	.102	.102	98.067			
64	.097	.097	98.164			

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Appendix 6 – continued from previous page

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
65	.096	.096	98.261			
66	.095	.095	98.355			
67	.092	.092	98.447			
68	.089	.089	98.536			
69	.087	.087	98.623			
70	.083	.083	98.705			
71	.079	.079	98.784			
72	.073	.073	98.856			
73	.070	.070	98.926			
74	.068	.068	98.994			
75	.065	.065	99.059			
76	.063	.063	99.122			
77	.062	.062	99.184			
78	.061	.061	99.245			
79	.056	.056	99.301			
80	.053	.053	99.354			
81	.049	.049	99.403			
82	.048	.048	99.451			
83	.045	.045	99.495			
84	.044	.044	99.539			
85	.041	.041	99.580			
86	.040	.040	99.620			
87	.039	.039	99.659			
88	.037	.037	99.696			
89	.035	.035	99.731			
90	.034	.034	99.765			
91	.033	.033	99.798			
92	.030	.030	99.827			
93	.029	.029	99.856			
94	.027	.027	99.883			
95	.024	.024	99.907			
96	.021	.021	99.927			
97	.020	.020	99.948			
98	.020	.020	99.967			
99	.017	.017	99.984			
100	.016	.016	100.000			

Extraction Method: Principal Component Analysis.

Appendix 7: Common Method Bias in Consultants' Data; Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	53.187	53.187	53.187	53.187	53.187	53.187
2	5.323	5.323	58.510			
3	4.985	4.985	63.495			
4	3.653	3.653	67.148			
5	2.906	2.906	70.054			
6	2.301	2.301	72.355			
7	2.035	2.035	74.390			
8	1.827	1.827	76.218			
9	1.591	1.591	77.809			
10	1.418	1.418	79.227			
11	1.280	1.280	80.507			
12	1.149	1.149	81.656			
13	1.111	1.111	82.767			
14	.989	.989	83.756			
15	.888	.888	84.644			
16	.810	.810	85.454			
17	.771	.771	86.225			
18	.751	.751	86.976			
19	.726	.726	87.702			
20	.694	.694	88.396			
21	.567	.567	88.963			
22	.551	.551	89.514			
23	.482	.482	89.996			
24	.455	.455	90.451			
25	.426	.426	90.877			
26	.416	.416	91.294			
27	.398	.398	91.691			
28	.378	.378	92.070			
29	.366	.366	92.436			
30	.357	.357	92.793			
31	.339	.339	93.132			
32	.337	.337	93.468			
33	.319	.319	93.787			
34	.292	.292	94.079			
35	.269	.269	94.349			
36	.264	.264	94.612			
37	.248	.248	94.860			
38	.244	.244	95.104			
39	.237	.237	95.341			
40	.226	.226	95.567			
41	.222	.222	95.788			

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Appendix 7 – continued from previous page

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
42	.213	.213	96.002			
43	.197	.197	96.198			
44	.183	.183	96.381			
45	.179	.179	96.560			
46	.175	.175	96.735			
47	.173	.173	96.908			
48	.164	.164	97.072			
49	.160	.160	97.231			
50	.155	.155	97.387			
51	.149	.149	97.536			
52	.144	.144	97.679			
53	.133	.133	97.813			
54	.130	.130	97.942			
55	.118	.118	98.061			
56	.109	.109	98.169			
57	.106	.106	98.275			
58	.100	.100	98.375			
59	.097	.097	98.473			
60	.095	.095	98.567			
61	.091	.091	98.658			
62	.084	.084	98.742			
63	.082	.082	98.824			
64	.080	.080	98.904			
65	.074	.074	98.979			
66	.072	.072	99.050			
67	.071	.071	99.122			
68	.063	.063	99.185			
69	.060	.060	99.245			
70	.057	.057	99.302			
71	.054	.054	99.356			
72	.050	.050	99.406			
73	.048	.048	99.453			
74	.046	.046	99.499			
75	.041	.041	99.539			
76	.040	.040	99.580			
77	.037	.037	99.617			
78	.036	.036	99.652			
79	.032	.032	99.684			
80	.029	.029	99.713			
81	.029	.029	99.742			
82	.026	.026	99.768			

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Appendix 7 – continued from previous page

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
83	.023	.023	99.791			
84	.022	.022	99.813			
85	.021	.021	99.834			
86	.021	.021	99.855			
87	.019	.019	99.874			
88	.017	.017	99.892			
89	.015	.015	99.907			
90	.014	.014	99.921			
91	.013	.013	99.934			
92	.011	.011	99.945			
93	.010	.010	99.956			
94	.010	.010	99.966			
95	.009	.009	99.974			
96	.007	.007	99.982			
97	.006	.006	99.988			
98	.005	.005	99.993			
99	.004	.004	99.997			
100	.003	.003	100.000			

Extraction Method: Principal Component Analysis.

Appendix 8: Wave Analysis Results — A. Dimensions of Organizational Performance (Contractors Data)

Variable	Early Mean (1-58)	Late Mean (178-235)	t-value	p-value (Sig. 2-tailed)	Significance
PR	3.82	3.79	0.341	0.734	Not Sig.
CS	4.15	4.08	1.102	0.273	Not Sig.
GR	3.64	3.71	-0.684	0.495	Not Sig.
TC	3.92	3.88	0.452	0.652	Not Sig.
BE	3.77	3.74	0.298	0.766	Not Sig.
ES	4.02	3.98	0.512	0.610	Not Sig.
FS	3.58	3.65	-0.723	0.471	Not Sig.
QP	4.28	4.22	0.841	0.402	Not Sig.
MC	3.91	3.87	0.533	0.595	Not Sig.
SP	3.44	3.51	-0.612	0.542	Not Sig.

Appendix 8: Wave Analysis Results — B. Determinants of Organizational Performance (Contractors Data)

Variable	Early Mean (n=58)	Late Mean (n=58)	t-value	p-value (Sig. 2-tailed)	Significance
ST	3.86	3.82	0.442	0.659	Not Sig.
PM	4.05	3.99	0.678	0.499	Not Sig.
QS	4.18	4.12	0.732	0.466	Not Sig.
OS	3.75	3.79	-0.415	0.679	Not Sig.
CI	3.94	3.88	0.621	0.536	Not Sig.
EP	3.52	3.58	-0.589	0.557	Not Sig.
CE	3.81	3.77	0.395	0.693	Not Sig.
SE	3.66	3.69	-0.312	0.756	Not Sig.
CN	4.02	3.95	0.784	0.435	Not Sig.
GS	3.78	3.83	-0.524	0.601	Not Sig.

Appendix 8: Wave Analysis Results — C. Dimensions of Organizational Performance (Consultants Data)

Variable	Early Mean (1-35)	Late Mean (109-143)	t-value	p-value (Sig.)	Significance
PR	3.89	3.84	0.425	0.672	Not Sig.
CS	4.21	4.14	0.812	0.419	Not Sig.
GR	3.58	3.63	-0.388	0.699	Not Sig.
TC	4.02	3.96	0.541	0.590	Not Sig.
BE	3.85	3.81	0.354	0.724	Not Sig.
ES	4.11	4.05	0.622	0.536	Not Sig.
FS	3.72	3.78	-0.445	0.658	Not Sig.
QP	4.35	4.29	0.723	0.472	Not Sig.
MC	4.05	3.99	0.587	0.559	Not Sig.
SP	3.55	3.61	-0.491	0.625	Not Sig.

Appendix 8: Wave Analysis Results — D. Determinants of Organizational Performance (Consultants Data)

Variable	Early Mean (1-35)	Late Mean (109-143)	t-value	p-value (Sig.)	Significance
ST	3.91	3.87	0.511	0.611	Not Sig.
PM	4.08	4.02	0.724	0.471	Not Sig.
QS	4.22	4.15	0.841	0.403	Not Sig.
OS	3.79	3.84	-0.455	0.650	Not Sig.
CI	3.98	3.92	0.598	0.552	Not Sig.
EP	3.55	3.61	-0.612	0.543	Not Sig.
CE	3.84	3.79	0.488	0.627	Not Sig.
SE	3.69	3.73	-0.367	0.715	Not Sig.
CN	4.05	3.98	0.812	0.420	Not Sig.
GS	3.81	3.86	-0.564	0.575	Not Sig.