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ASSESSMENT OF COST CONTROL STRATEGIES IN MASS HOUSING PROJECTS IN THE FEDERAL CAPITAL TERRITORY, ABUJA

Bamishaye Temitayo^{1*}, Prof. Salihu H. Muhammed-Gani¹, Lawal Mohammed¹

¹Ibrahim Usman Jibrin Institute for the Built Environment (IUJ-IBE), Nasarawa State University, Keffi, Nigeria.

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*Corresponding Author: Bamishaye Temitayo

Ibrahim Usman Jibrin Institute for the Built Environment (IUJ-IBE), Nasarawa State University, Keffi, Nigeria.

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ABSTRACT

Cost overruns remain a persistent challenge in mass housing projects in Nigeria, particularly in the Federal Capital Territory (FCT), Abuja, where inflation, material-price volatility, delayed fund disbursement, regulatory constraints and procurement challenges can undermine project cost performance. This study assessed cost-control strategies in mass housing projects in the FCT, Abuja, with specific emphasis on the major causes of cost overruns, conventional and digital cost-control practices, contextual challenges, and procurement methods. A quantitative descriptive survey design was adopted. Data were collected from construction professionals and other stakeholders involved in mass housing delivery using a structured questionnaire. A total of 413 questionnaires were administered, of which 404 valid responses were available for analysis. Data were analysed using descriptive statistics, Relative Importance Index (RII), paired-samples *t*-test, multiple linear regression and one-way ANOVA with Tukey HSD post-hoc analysis. The findings identified fluctuation in building-material prices (RII = 0.904), delayed disbursement of project funds (RII = 0.882) and high inflation (RII = 0.870) as the leading causes of cost overruns. Conventional cost-control strategies were significantly more utilised than digital technologies (Mean = 4.10 versus 3.23; $t(403) = 19.17, p < .001$), with high technology costs and inadequate staff competency identified as major barriers to digital adoption. Regulatory challenges ($\beta = -0.421, p < .001$) and socio-political challenges ($\beta = -0.248, p < .001$) significantly reduced cost-control effectiveness, whereas environmental challenges were not statistically significant ($p = .065$). Procurement method also significantly influenced cost performance, with Traditional Design-

Bid-Build and Design and Build outperforming Direct Labour. The study concludes that effective cost control in FCT mass housing requires an integrated approach combining macroeconomic risk management, institutional efficiency, phased digital adoption and appropriate procurement strategies.

KEYWORDS: Cost Control; Cost Overruns; Mass Housing; Procurement Methods; Abuja.

1. INTRODUCTION

Cost overruns remain one of the major challenges affecting construction project delivery, particularly in mass housing, where projects involve large investments, multiple stakeholders, complex procurement arrangements and relatively long implementation periods. Poor cost control can result in financial losses, delays, reduced project quality, abandonment and failure to achieve intended housing-delivery targets. These challenges are particularly important in developing countries where economic instability and institutional constraints can further increase exposure to cost escalation (Durdyev et al., 2020).

In Nigeria, the need for mass housing has increased considerably because of population growth, urbanisation and continuing housing demand. Government and private-sector interventions have therefore sought to increase housing supply, including through mass housing programmes in the Federal Capital Territory (FCT), Abuja. However, housing projects continue to experience cost escalation, delays and implementation difficulties. Inflation, fluctuations in material prices, exchange-rate instability, delayed release of project funds and weaknesses in project planning and monitoring have contributed to these challenges (Ajanlekoko & Ojo, 2022). Consequently, controlling project costs has become increasingly important for achieving affordable and sustainable housing delivery.

The FCT presents a particularly important context for examining construction cost control. As Nigeria's administrative capital, Abuja has experienced rapid physical expansion and increasing demand for residential development. Mass housing projects in the territory operate within a regulatory and institutional environment involving land administration, development approvals, procurement procedures and other statutory requirements. These conditions can increase project uncertainty and affect project costs. Previous evidence also indicates that projects in Abuja may be affected by geotechnical conditions, stringent approval requirements and political or administrative changes, which are not always adequately incorporated into initial project planning (Bala et al., 2024).

Cost overruns, however, cannot be attributed solely to inaccurate estimates or increases in material prices. The procurement process itself can influence the timing, allocation and control of project costs. Prolonged procurement procedures may extend the pre-construction period and expose projects to inflation, price fluctuations and changes in market conditions. Similarly, differences in procurement methods can affect risk allocation, accountability, contractor selection and ultimately project cost performance. These issues are particularly relevant to mass housing projects, where procurement decisions can have substantial implications for overall project expenditure (Ajanlekoko & Ojo, 2022).

At the same time, construction organisations increasingly have access to digital technologies that can improve cost planning, monitoring and control. Tools such as Building Information Modelling (BIM), Earned Value Management (EVM) and construction cost-management software provide opportunities for more timely and integrated cost information. However, the adoption of such technologies in developing-country construction environments remains constrained by factors such as implementation costs, limited technical competencies and organisational capacity. Evidence relating specifically to their application in Nigerian mass housing projects, particularly in Abuja, remains limited.

Although previous studies have examined construction cost overruns, cost-management practices and procurement performance, limited empirical evidence integrates these dimensions within the context of mass housing projects in Abuja. In particular, there is insufficient evidence on the relative importance of cost-overflow factors, the conventional and digital cost-control strategies used by practitioners, the barriers to digital adoption, the influence of regulatory, environmental and socio-political conditions, and the relationship between procurement methods and project cost objectives. This study addresses these gaps by providing an integrated assessment of cost-control strategies in mass housing projects in the FCT.

The study therefore aims to assess cost control strategies in mass housing projects in the FCT, Abuja. Specifically, it seeks to identify the major factors responsible for cost overruns; assess the cost-control strategies and technologies employed by construction practitioners; evaluate the influence of regulatory, environmental and socio-political challenges on cost-control effectiveness; and examine the relationship between procurement methods and project cost objectives.

The study contributes FCT-specific empirical evidence by examining cost overruns, cost-control practices, digital technology adoption, contextual constraints and procurement performance within a single assessment. Its findings are expected to provide useful evidence

for contractors, developers, consultants and project managers seeking to improve cost-control practices, while also supporting policymakers in strengthening procurement, regulatory and institutional processes affecting mass housing delivery.

2. LITERATURE REVIEW

2.1 Cost Control in Construction and Mass Housing Projects

Cost control in construction involves the systematic planning, monitoring and management of project expenditure to ensure that actual costs remain consistent with approved budgets and project objectives. It extends beyond the preparation of an initial estimate to include continuous cost monitoring, variance identification, change management, resource control and corrective action throughout project implementation. Effective cost control is therefore closely linked to the ability of project teams to establish reliable cost baselines and respond promptly to deviations. Evidence suggests that organisations with established cost-monitoring and value-management practices are better positioned to maintain financial performance (Alu et al., 2024).

Mass housing projects present particular challenges for cost control because of their scale, repetitive construction activities, large resource requirements and the need to deliver substantial numbers of housing units within relatively constrained budgets and schedules. Cost-control problems can therefore have consequences beyond individual projects, affecting housing affordability, project completion and the ability of government programmes to address housing shortages. In Nigeria, these challenges are compounded by inflation, fluctuations in material prices, financing constraints and institutional weaknesses (Ibem & Amole, 2021; Alu et al., 2024).

The causes of construction cost overruns are multidimensional. They include inaccurate estimation, design and scope changes, poor planning, inefficient resource allocation, rework, inadequate contract management and procurement inefficiencies. External factors such as inflation, exchange-rate movements and political or institutional influences can further intensify these problems (Durdyev, 2021; Asiedu & Adaku, 2020). In the Nigerian context, Alu et al. (2024) identified financial constraints, scope changes, inflationary pressures and procurement inefficiencies among important cost-overrun drivers. This suggests that cost control cannot be treated solely as an internal project-management function; it must also account for the wider economic and institutional environment in which projects are delivered. For mass housing projects in Abuja, the contextual dimension is particularly important. Regulatory requirements and approval processes can prolong project implementation, while

geotechnical conditions may generate unanticipated excavation and foundation costs. Political and administrative changes may also affect funding continuity and project priorities (Mamman & Tumba, 2021; Idris & Ganiyu, 2023). These factors reinforce the need for cost-control strategies that are adapted to the specific conditions of the FCT rather than relying exclusively on generic construction-management practices.

2.2 Cost-Control Strategies, Digital Technologies and Contextual Challenges

Traditional cost-control strategies remain important in construction practice. Detailed budgeting, regular cost monitoring, valuation of completed work, financial reporting, cost forecasting and variation control provide mechanisms through which project teams can identify deviations and take corrective action. However, the increasing complexity and volatility of construction projects have encouraged the adoption of more integrated technological approaches.

Earned Value Management (EVM) provides an important framework for integrating cost, schedule and physical progress. Rather than considering expenditure in isolation, EVM compares planned value, earned value and actual cost to identify cost and schedule variances. Research has demonstrated the potential of EVM and its variants to improve project performance monitoring, although its effectiveness depends on reliable baselines, objective progress measurement, effective variance analysis and organisational commitment (Aramali et al., 2021; Mayo-Alvarez et al., 2025). Other studies have also explored the integration of EVM with Building Information Modelling (BIM) and other digital systems to improve real-time project monitoring (Proaño-Narváez et al., 2022).

Building Information Modelling, particularly 5D BIM, provides another important opportunity for cost management by linking three-dimensional project information with quantities and cost data. It can support quantity take-off, cost estimation, design coordination and dynamic monitoring of changes. Pishdad and Onungwa (2024) identified the potential of 5D BIM to improve cost visibility and integrate cost information with project development. Nevertheless, technological adoption is not automatic. High implementation costs, limited technical skills, organisational resistance and inadequate digital infrastructure can constrain the use of BIM and other advanced cost-management systems.

This technological dimension is particularly relevant to developing construction markets. Much of the evidence on advanced digital cost-control systems originates from developed construction environments, while empirical evidence concerning their practical application in Nigerian mass housing remains limited. The issue is therefore not simply whether BIM or EVM can improve cost control technically, but whether construction organisations in Abuja

possess the financial, organisational and human capacity required to implement them effectively. This distinction is important because technology adoption without appropriate skills, management support and institutional conditions may not translate into improved project performance (Aramali et al., 2024).

Cost control is also influenced by contextual factors outside the immediate control of project professionals. Regulatory delays, environmental conditions and socio-political circumstances can affect project schedules, resource requirements and expenditure. In Abuja, prolonged approval procedures can increase project duration and exposure to price escalation, while difficult terrain and soil conditions can generate additional construction costs (Mamman & Tumba, 2021; Idris & Ganiyu, 2023). Political and administrative changes may similarly influence funding decisions and project continuity. Thus, the effectiveness of a cost-control strategy depends not only on the technique employed but also on the environment within which it is implemented.

2.3 Procurement Methods, Empirical Evidence and Research Gap

Procurement is an important component of project cost control because it determines how design, construction responsibilities, risks and contractual relationships are structured. Different procurement routes can consequently produce different cost, time and risk outcomes. Traditional procurement, Design and Build, Direct Labour and Public-Private Partnership (PPP) arrangements each involve different approaches to risk allocation, contractor involvement and project management.

Evidence concerning PPP arrangements demonstrates that their potential cost and efficiency advantages depend strongly on appropriate risk allocation, institutional capacity and contractual arrangements. Financial-close uncertainty, land-acquisition delays and demand risks can undermine PPP performance where responsibilities are not appropriately allocated (Arijeloye et al., 2024). Similarly, international evidence indicates that PPP arrangements do not automatically provide superior cost performance; outcomes can depend on project complexity, contractual completeness and public-sector experience (Verweij & van Meerkerk, 2021). This is particularly relevant to mass housing because PPP arrangements involve multiple stakeholders whose objectives may differ with respect to affordability, investment returns and public expenditure.

Studies of Nigerian construction have identified procurement inefficiencies as contributors to cost escalation, but much of the available evidence considers procurement, cost overruns, technological adoption or contextual risks separately. There is comparatively limited evidence integrating these dimensions within mass housing projects in Abuja. In particular,

existing studies provide insufficient empirical evidence on which cost-control strategies practitioners actually employ, how conventional approaches compare with digital technologies, and how local regulatory, environmental and socio-political conditions influence their effectiveness.

The literature also reveals a methodological and contextual gap. While studies have examined cost control in large infrastructure and commercial projects, the characteristics of mass housing, including repetitive construction, large quantities of materials, affordability constraints and the need to deliver multiple units, create conditions that may require different combinations of cost-control strategies (Pishdad & Onungwa, 2024; Aramali et al., 2021). Evidence on the application of BIM and integrated EVM approaches in Nigerian mass housing is particularly limited. There is also inadequate empirical evidence comparing different categories of cost-control strategies within the same mass-housing context rather than examining individual technologies or practices independently.

Furthermore, although previous research identifies numerous causes of construction cost overruns, less attention has been given to linking specific cost-overrun drivers with the strategies most appropriate for controlling them. The literature therefore provides substantial knowledge about *what causes* cost escalation and *what technologies or management approaches* may improve control, but less evidence on how these dimensions interact within Abuja's mass housing environment.

Accordingly, this study addresses four interconnected gaps: the limited empirical evidence on cost-control strategies in Abuja mass housing; inadequate evidence on the comparative use of conventional and digital cost-control approaches; insufficient understanding of how regulatory, environmental and socio-political conditions affect cost-control effectiveness; and limited empirical evidence concerning the relationship between procurement methods and project cost objectives. Addressing these gaps provides a basis for evaluating cost control as an integrated interaction among cost drivers, management strategies, technology, contextual conditions and procurement arrangements, rather than as an isolated project-management activity.

3. METHODOLOGY

3.1 Research Design and Study Population

The study adopted a **descriptive survey design** with a quantitative approach to assess cost-control strategies in mass housing projects in the Federal Capital Territory (FCT), Abuja. The study population comprised construction professionals and other stakeholders involved in

mass housing delivery, including quantity surveyors, builders, architects, engineers, project managers, contractors, developers and relevant government officials. These groups were considered appropriate because cost control in construction involves interconnected technical, financial, managerial, procurement and regulatory responsibilities.

3.2 Sample Size and Sampling Procedure

Because a complete sampling frame of stakeholders involved in mass housing projects in the FCT was unavailable, the study determined the sample size using the Cochran formula for an unknown population, with an adjustment for anticipated non-response. A target sample of 413 respondents was established. Quota and purposive sampling techniques were subsequently used to obtain representation across the relevant stakeholder categories and to select respondents with direct experience of mass housing planning, construction, procurement and cost management. A total of 404 valid responses were available for the principal statistical analyses.

3.3 Data Collection and Measurement

Primary data were collected through a structured questionnaire developed around the study objectives and variables identified in the literature. The instrument covered the major causes of cost overruns, conventional cost-control strategies, digital cost-control technologies, barriers to technology adoption, contextual challenges and procurement methods.

The study considered conventional practices such as budgeting and regular cost monitoring alongside digital approaches, particularly Earned Value Management (EVM) and Building Information Modelling (BIM). EVM provides an integrated approach to monitoring cost and schedule performance, while BIM can support quantity measurement, cost estimation and the integration of project information (Aramali et al., 2021; Pishdad & Onungwa, 2024). Contextual challenges were assessed under regulatory, environmental and socio-political dimensions, reflecting conditions that may influence project costs and implementation in Abuja (Mamman & Tumba, 2021; Idris & Ganiyu, 2023).

3.4 Data Analysis

Data were analysed using IBM SPSS Version 26. Descriptive statistics, including frequency, percentage, mean and standard deviation, were used to summarise respondents' characteristics and responses. The analytical procedures were structured around the four study objectives.

For the first objective, the Relative Importance Index (RII) was used to rank the factors responsible for cost overruns. Mean scores and standard deviations were also calculated, with

a mean of 3.00 or above indicating a relatively important factor. The RII provided a basis for establishing the relative ranking of the identified cost-overrun factors.

For the second objective, mean, standard deviation and RII were used to assess the extent to which conventional and digital cost-control strategies were employed. A paired-samples t-test was subsequently applied to the composite scores of the two categories to determine whether their levels of utilisation differed significantly. Statistical significance was assessed at $p < .05$. The analysis followed the study's conceptual distinction between established cost-control practices and emerging digital approaches such as BIM and EVM (Aramali et al., 2021; Pishdad & Onungwa, 2024).

For the third objective, multiple linear regression was employed to examine the effects of regulatory, environmental and socio-political challenges on cost-control effectiveness. Composite scores were generated for the predictor and dependent variables. The analysis assessed the explanatory power of the model using R^2 and adjusted R^2 , while the F-statistic was used to evaluate overall model significance. Individual regression coefficients were examined to determine the direction and statistical significance of each contextual factor. Multicollinearity was assessed using the Variance Inflation Factor (VIF).

For the fourth objective, one-way ANOVA was used to test whether cost-performance scores differed across procurement methods. Where a statistically significant overall difference was identified, the Tukey HSD post-hoc test was used to establish which procurement-method groups differed significantly. Statistical decisions for the inferential tests were based on $p < .05$.

Thus, the analysis combined RII, descriptive statistics, paired-samples t-test, multiple regression and one-way ANOVA with Tukey HSD to address the four objectives and provide both descriptive and inferential evidence on cost control in mass housing projects in the FCT.

4. RESULTS AND DISCUSSION

4.1 Factors Responsible for Cost Overruns

The Relative Importance Index (RII) analysis identified fluctuations in building-material prices as the most significant contributor to cost overruns in mass housing projects in FCT, Abuja (RII = 0.904; Mean = 4.52). This was followed by delays in project-fund disbursement (RII = 0.882; Mean = 4.42) and high inflation (RII = 0.870; Mean = 4.35). Poor cost estimation, currency devaluation, frequent design changes and supply-chain delays were also highly ranked.

Table 1. Leading Factors Responsible for Cost Overruns in Mass Housing Projects in FCT, Abuja.

Rank	Factor	Mean	RII
1	Fluctuation in prices of building materials	4.52	0.904
2	Delay in disbursement of project funds	4.42	0.882
3	High inflation rate	4.35	0.870
4	Poor cost estimation at planning stage	4.28	0.856
5	Foreign exchange/currency devaluation	4.19	0.838
6	Frequent design changes/variations	4.02	0.804
7	Scarcity of building materials/supply-chain delays	3.95	0.790
8	Poor procurement practices	3.87	0.774
9	Poor project supervision	3.74	0.748
10	High interest rates on construction loans	3.68	0.736
11	Delay in decision-making	3.61	0.722
12	Contractual disputes	3.55	0.710
13	Labour shortages	3.42	0.684
14	Poor project planning	3.38	0.676
15	Unavailability of construction equipment/plant	3.42	0.642
16	Poor risk management	3.40	0.631
17	Inadequate experience and competence	3.39	0.622
18	Poor communication among stakeholders	3.36	0.613

Source: Field Survey (2026).

The pattern demonstrates that the leading causes are predominantly macroeconomic and institutional, rather than deficiencies in professional competence. The finding is consistent with Alu et al. (2024), who identified financial constraints, inflationary pressure and macroeconomic instability as important cost drivers in Nigeria, and Durdyev (2021), who identified material-price fluctuations as a persistent global cause of construction cost overruns. Currency devaluation also reinforces the importance of the wider economic environment, consistent with Shaikh et al. (2025). Research_cost_control_final

However, the relatively low ranking of poor risk management, inadequate competence and poor communication contrasts with El-Ahwal et al. (2025), who identified these among important international cost-overrun factors. This divergence suggests that the relative importance of cost-overrun factors is highly context-dependent. It also indicates that cost-control interventions in Abuja should address macroeconomic and institutional exposure alongside conventional project-management improvements.

4.2 Cost-Control Strategies and Digital Technologies

Traditional cost-control strategies were widely utilised. Regular cost monitoring recorded the highest utilisation (RII = 0.896), followed by detailed project budgeting (RII = 0.872), procurement planning (RII = 0.842), cash-flow forecasting (RII = 0.810), material inventory control (RII = 0.778), and value engineering (RII = 0.724).

Table 2. Utilisation of Traditional and Digital Cost-Control Strategies.

Cost-control approach	Mean	RII
Traditional/conventional strategies	4.10	—
Regular cost monitoring	4.48	0.896
Detailed project budgeting	4.36	0.872
Procurement planning	4.21	0.842
Cash-flow forecasting	4.05	0.810
Material inventory control	3.89	0.778
Value engineering	3.62	0.724
Digital/modern technologies	3.23	—
Cost-management software	3.31	0.662
Digital project-management tools	3.12	0.624
Building Information Modelling (BIM)	2.74	0.548
Cloud-based collaboration platforms	2.58	0.516
Earned Value Management (EVM)	2.41	0.482

Source: Field Survey (2026).

The paired-samples test confirmed a statistically significant difference between the two approaches. Traditional strategies recorded a mean of **4.10**, compared with **3.23** for digital technologies, $t(403) = 19.17$, $p < .001$. Thus, conventional cost-control practices remain significantly more prevalent than digital approaches in FCT mass housing.

The finding is consistent with Pishdad and Onungwa (2024), who observed that even where 5D BIM is adopted, its application may remain concentrated on preconstruction estimating rather than active construction-stage cost control. The particularly low utilisation of EVM also reflects the importance of management commitment, staff competence and organisational integration identified by Aramali et al. (2021, 2024).

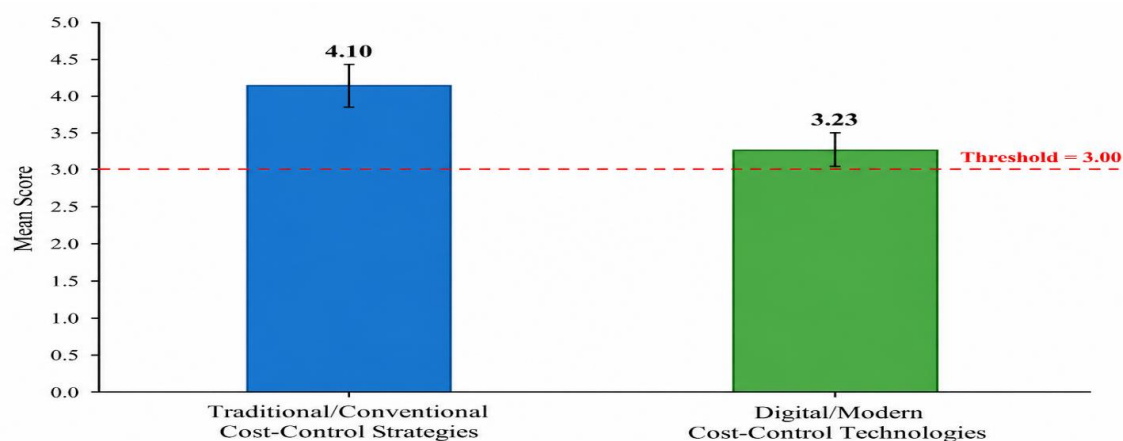


Figure 1. Relative Utilisation of Traditional and Digital Cost-Control Approaches.

Source: Field Survey, 2026

Figure 1 shows a clear difference in the utilisation of conventional and digital cost-control approaches. Traditional/conventional strategies recorded a higher composite mean score of 4.10, compared with 3.23 for digital/modern technologies. Although both approaches exceeded the 3.00 benchmark, the paired-samples t-test confirmed that traditional approaches were significantly more utilised than digital approaches ($t = 19.17, p < .001$). This indicates that practices such as regular cost monitoring, detailed budgeting, procurement planning and cash-flow forecasting remain more firmly embedded in mass housing project management than technology-driven approaches such as BIM, cloud collaboration and EVM.

The lower level of digital adoption was mainly associated with the high cost of digital tools (Mean = 4.29; RII = 0.858) and inadequate staff competency and training (Mean = 4.11; RII = 0.822), followed by organisational resistance (Mean = 3.77; RII = 0.754) and lack of management support (Mean = 3.58; RII = 0.716). These findings suggest that the digitalisation gap is driven largely by financial, skills and organisational constraints, rather than the non-availability of technology. The finding is consistent with Aramali et al. (2021, 2024), who emphasised the importance of management commitment and employee proficiency in effective digital cost management, and Pishdad and Onungwa (2024), who noted the limited application of digital cost technologies beyond preconstruction activities. Thus, improving digital cost control requires not only investment in appropriate technologies but also staff capacity development, management support and gradual organisational adoption.

4.3 Contextual Challenges and Cost-Control Effectiveness

Multiple regression was used to examine the influence of regulatory, environmental and socio-political challenges on cost-control effectiveness. The model was statistically significant, $F(3,400) = 80.00$, $p < .001$, and explained 37.5% of the variance in cost-control effectiveness ($R^2 = .375$; adjusted $R^2 = .370$).

Table 3. Regression Results for Contextual Challenges and Cost-Control Effectiveness.

Predictor	β	t	p-value	Interpretation
Regulatory challenges	-0.421	-7.09	<.001	Significant negative effect
Socio-political challenges	-0.248	-3.96	<.001	Significant negative effect
Environmental challenges	-0.109	-1.85	.065	Not significant

Model: $R^2 = .375$; Adjusted $R^2 = .370$; $F(3,400) = 80.00$, $p < .001$.

Source: Field Survey (2026).

The regression results show that regulatory challenges were the strongest negative predictor of cost-control effectiveness ($\beta = -0.421$, $p < .001$), followed by socio-political challenges ($\beta = -0.248$, $p < .001$). Although environmental challenges also had a negative coefficient, their effect was not statistically significant ($\beta = -0.109$, $p = .065$). The VIF values were all below 5, indicating that multicollinearity did not pose a significant problem in the regression model. The findings suggest that regulatory approval delays, bureaucratic procurement procedures, land-allocation complexities and socio-political instability have a more pronounced effect on cost-control effectiveness than environmental conditions when the factors are considered simultaneously. This implies that cost pressures in Abuja mass housing projects are not generated solely by weaknesses in project-level cost management but are also shaped by the institutional environment within which projects are planned and implemented.

This finding is particularly significant in the FCT context because it highlights cost control as partly an institutional governance issue. Consequently, improvements in cost estimation, budgeting and monitoring may have limited effect where projects continue to experience administrative delays, complex approval processes and political or institutional uncertainty. Effective cost control therefore requires both strong project-level management and improvements in the regulatory and institutional environment.

4.4 Procurement Methods and Project Cost Objectives

The analysis further established a statistically significant difference in cost-performance scores across procurement methods, $F(4,399) = 15.51$, $p < .001$. Traditional Design-Bid-Build recorded the highest mean cost-performance score (3.85), followed by Design and Build (3.62), while PPP recorded a lower score of 3.21. Direct Labour recorded the weakest performance.

Table 4. Cost Performance by Procurement Method.

Procurement Method	N	Mean	SD
Traditional (Design-Bid-Build)	117	3.85	0.58
Design and Build	89	3.62	0.63
Public-Private Partnership (PPP)	71	3.21	0.71
Management Contracting	50	3.40	0.65
Direct Labour/Direct Contract	77	2.95	0.68
Total	404	3.47	0.68

Source: Field Survey (2026).

Post-hoc analysis showed that Traditional procurement significantly outperformed Direct Labour (mean difference = 0.90, $p < .001$) and PPP (mean difference = 0.64, $p < .001$). Design and Build also significantly outperformed Direct Labour (mean difference = 0.67, $p < .001$), whereas the difference between Traditional and Design and Build was not significant ($p = .302$).

The findings indicate that procurement arrangements involving competitive pricing, clearer contractual responsibilities and stronger cost-control mechanisms are associated with better cost performance than Direct Labour arrangements. They therefore support the use of Traditional and Design and Build procurement where cost performance is a major objective.

4.5 Integrated Discussion

The findings across the four objectives reveal a consistent pattern. External economic pressures constitute the immediate drivers of cost overruns; institutional and regulatory conditions constrain the effectiveness of cost-control measures; digital technologies remain underutilised; and procurement choice is associated with differences in project cost performance.

This integrated pattern extends existing evidence into the specific context of mass housing in FCT Abuja, where institutional, regulatory and macroeconomic conditions appear to exert

greater influence on cost-control performance than purely technical deficiencies. This supports the need for cost-control interventions that combine economic risk management, institutional reform, digital capability development and appropriate procurement selection, rather than relying solely on conventional project-level monitoring.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The study concludes that cost overrun in mass housing projects in FCT, Abuja is driven predominantly by macroeconomic volatility and institutional constraints rather than by deficiencies in professional competence alone. Material price fluctuations, delayed project-fund disbursement and inflation emerged as the most significant cost-overrun factors, demonstrating the strong influence of external economic conditions on project cost performance.

Although conventional cost-control practices are widely utilised, digital cost-control technologies remain comparatively underutilised, with high acquisition costs and inadequate staff competency identified as major barriers. The significant difference between traditional and digital approaches indicates that the sector has yet to fully exploit technology-enabled cost monitoring and forecasting.

The study further establishes that regulatory and socio-political challenges significantly reduce cost-control effectiveness, while environmental challenges do not have a statistically significant effect. This highlights the importance of the institutional environment, including approval processes, procurement procedures, land allocation and political conditions, in determining project cost outcomes.

Finally, procurement method significantly influences project cost performance. Traditional Design-Bid-Build and Design and Build recorded stronger cost performance than Direct Labour, while PPP performed below the level expected of a potentially cost-efficient procurement arrangement. Overall, effective cost control in Abuja's mass housing sector therefore requires an integrated approach addressing economic volatility, institutional efficiency, digital capability and procurement strategy.

5.2 Recommendations

Based on the findings of the study, four major recommendations are proposed:

1. Strengthen financial and macroeconomic risk management: Contractors and developers should incorporate appropriate contingency allowances, price-adjustment or

index-linked provisions, and realistic cost forecasts into project budgets to mitigate the effects of material-price fluctuations, inflation and currency volatility. Timely disbursement of project funds should also be prioritised to minimise cost escalation arising from funding delays.

2. Streamline regulatory and institutional processes: Relevant government agencies should simplify and accelerate regulatory approvals, procurement procedures and land-allocation processes. This is particularly important because regulatory challenges were identified as the strongest negative predictor of cost-control effectiveness.

3. Accelerate phased adoption of digital cost-control technologies: Construction firms should progressively integrate cost-management software, Earned Value Management and other appropriate digital tools into project cost monitoring. Adoption should be supported by structured staff training and stronger management commitment to address the identified barriers of high technology costs and inadequate technical competency.

4. Improve procurement strategy and risk allocation: Mass housing developers and public agencies should give greater consideration to Traditional Design-Bid-Build and Design and Build procurement where appropriate, given their stronger cost-performance results compared with Direct Labour. Where PPP is adopted, clearer risk allocation and stronger institutional support should be established to improve its cost-control performance.

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