Assessment of Low-Income Housing Project Delivery in Abuja, Nigeria Using the Goal Achievement Matrix

A. A. Siyaka[1*], A. M. Junaid[1], H. D. Musa[1], V. I. Martins[1]

[1] Department of Urban and Regional Planning, Federal University of Technology, Minna, Nigeria.

ABSTRACT: Provision of adequate housing is an important developmental issue for many nations, but the problem of a lack of adequate housing still persists among urban populations in developing nations, with poorer populations being the most affected. Nigeria has a current housing deficit of about 15.2 million housing units as of 2024, with a rapid increase in population, particularly in the Federal Capital Territory (FCT), Abuja. This paper assessed the performance of low-income housing project delivery in Abuja between 2000 and 2024 using the Goal Achievement Matrix (GAM). A survey research design was employed, with 24 registered private developers and 48 housing projects implemented across 28 districts in the FCT making up the sample. Findings showed a low overall weighted GAM score of 35.94% as against the maximum possible index weight of 100%. This represents the weighted sum of normalised achievements on a 0-100% scale across six goal dimensions, an unweighted average achievement of 48.49% across dimensions, and the poorest raw achievement of 22.95% in affordability, as only 12.6% of target civil servants could afford the lowest-priced housing unit. Quantitative delivery attained 29.6%, beneficiary targeting attained 63.25%, and infrastructure provision was the best-performing dimension at 77.23%. Recomputed against the three-year development lease agreement completion requirement, timely completion achieved a score of 60.42%. It can be concluded that the existing framework for the provision of low-income housing through public-private partnership is ineffective. It therefore needs policy reforms, including mortgage system reformation and regulation of pricing, among others.

KEYWORDS: Goal Achievement Matrix, Housing affordability, Housing delivery, Low-income housing, Public-private partnership.

[Received xxxx; Revised xxxx; Accepted xxxx] Print ISSN: 0189-9546 | Online ISSN: 2437-2110

I. INTRODUCTION

Housing is a basic necessity for human beings. Beyond providing shelter, housing is a key factor that supports human well-being, productivity, security, and stability. Housing is a key part of the physical infrastructure of human settlements and plays a significant role in improving the quality of life of humans and communities (Omolabi and Adebayo, 2017). The significance of housing can also be seen in its position as one of the basic needs of humanity, after food and clothing (Junaid, 2017, Junaid, 2022). Thus, provision of adequate housing is an important developmental issue for both developed and developing nations. Urbanization and population growth have increased the demands for housing, especially in urban areas. Zhao and Qiming (2014) indicated that with increasing urbanization, a large proportion of the population is living in urban areas, resulting in great pressure on housing facilities and urban infrastructure. Among the impacts of urban growth and expansion is the increasing shortage of affordable housing, especially in developing countries, owing to the lack of adequate governmental capabilities for adequate housing provision (Millstein, 2014). The shortage of affordable housing contributes to the development of informal settlements, overcrowding, and homelessness in urban poor areas (Thembelani, 2021). The problem of providing housing for low-income earners in urban environments has become an important issue globally.

Providing low-income housing has become a significant problem for most developing countries because of the increasing population coupled with increasing urban poverty. The United Nations' (2024) update to the World Urbanization Prospects predicts a steep increase in global urban population until 2050, especially in Asia and Africa. Muchadenyika (2017) states Africa has the most acute housing shortages with around 72% of the urban population living in slum conditions. This situation causes an increasing gap between the demand and supply of housing.

One of the worst housing situations in Africa is found in Nigeria. Although many schemes and policies to improve

*Corresponding author: abdulsiyaka1@gmail.com

doi: http://doi.org/10.63746/njtd.v23i2.4864

housing have been introduced in the country, housing supply continues to fall behind the demand. Junaid (2017) states that Nigeria is building an estimated 100,000 housing units annually, while the demand in major cities (e.g., Lagos, Abuja, Kano, and Ibadan) keeps increasing. The Federal Ministry of Housing and Urban Renewal (2025) reports that by 2024, Nigeria's housing deficit will be about 15.2 million and will need 700,000 units per annum for the next 20 years. This situation has particularly impacted the low-income population, which is the majority of people in Nigeria.

Research shows that providing housing for low-income groups in Nigeria is extremely challenging because of high building costs, a largely ineffective mortgage system, expensive land, inflation, and the price of building materials (Oni-Jimoh & Liyanage, 2018; Bons et al., 2019, Adedeji et al., 2025). These all create barriers to decent housing for low-income groups. Government efforts to improve housing for low-income earners have had limited results due to poor implementation, weak institutions, and a lack of resources (Muhammad et al., 2015; Ocholi et al., 2015). Although the 2012 National Housing Policy aimed to add affordable housing through more private sector involvement, it has been mostly ineffective due to a lack of implementation (Afolabi et al., 2019). More housing shortages meant the Nigerian government had to re-organize to a more market driven housing strategy. In this instance, the government shifted its direct involvement role to its facilitation role; that is, the government is to provide all the necessary enabling environment for the private housing sector to build houses, with the private housing sector assuming most of the housing responsibility through public-private partnerships (PPPs). The policy primarily seeks to foster the efficient production of housing to increase the availability of affordable housing through large-scale production of housing.

Urbanization and a growing population have lead to an increased demand for housing in Abuja, FCT due to people moving into the city for work and for better services. The production of housing has not met the needs of urbanization and it is becoming unsustainable (Momoh et al., 2018). To address this problem, FCTA adopted the Mass Housing Scheme in 2000, under which land and primary infrastructure are provided by government, while private firms construct housing units. Though different low-income housing programmes have been adopted in Abuja, studies have identified problems related to low delivery rates, inadequacies in infrastructure provision, high selling prices, poor accessibility for low-income earners, and non-compliance with target numbers (Ibem & Aduwo, 2012; Aliyu, 2021). Despite the numerous works carried out in the literature regarding housing shortages and affordability problems in Nigeria, no study has systematically quantified multi-dimensional goal achievement using the Goal Achievement Matrix for Abuja's PPP low-income housing projects. Most existing studies discuss housing problems generally and lack a structured analysis of the extent to which project delivery programmes have accomplished their stated goals.

There is therefore a need for a comprehensive framework to assess the effectiveness of low-income housing delivery programmes. The Goal Achievement Matrix (GAM) is useful for evaluating the extent to which goals and objectives have been achieved by a project. GAM enables evaluators to analyze various elements of project performance such as the quantity of output, cost, and level of accessibility and infrastructure, as well as the attainment of project objectives and requirements for growth. While the applicability of GAM in the assessment of project performance is well documented in the literature on planning and infrastructure, assessing the delivery performance of housing projects in Abuja has not been explored.This study focuses on evaluating the performance of low-income housing projects in Abuja, Nigeria, using the Goal Achievement Matrix method.

II. THEORETICAL AND CONCEPTUAL FRAMEWORK

A. Housing Delivery in Nigeria

In Nigeria, the public sector, formal private development, cooperatives, and various forms of informal mechanisms are all part of the housing delivery system (Ogu, 1999). After engaging in structural adjustment, formal private sector housing delivery expanded considerably, though remained problematic in terms of affordability and uneven distribution across the country (Ndubueze, 2009; Ukoje and Kanu, 2014). By contrast, the 2006 National Housing Policy signified a radical change in the government's housing delivery role, placing the government in the position of a facilitator rather than a provider (Siyaka, 2017. Adedeji et al., 2023). This also meant a shift from the government delivering housing to engaging the private sector to provide the means (build, finance, and provide the necessary services) to sustain the housing. The policy also focused on the public and private sector roles in housing delivery and the shifting framework from the UN-Habitat's Global Strategy for Shelter to the World Bank's Enabling Markets to Work strategy.

B. Public-Private Partnerships in Housing

Public-Private Partnerships are specific joint-ventures in housing delivery systems where the resources, risks, responsibilities, and rewards are shared (Sengupta, 2006). Within the context of the FCT, the government makes land available and provides primary infrastructure, while private sector housing developers provide the housing and secondary infrastructure (Jibril, 2015; Ukoje and Kanu, 2014). According to Development Lease Agreements (DLAs), private sector developers are obligated to commence construction within a period of six months and complete the housing development within a period of three years in accordance with the building codes of Abuja (Ukoje and Kanu, 2014). Besides assigning specific physical tasks, PPP arrangements allocate project risk to both FCTA and developers, which in turn impacts several GAM dimensions.

Under the scheme, developers take on the risk of construction cost overruns (once they have acquired the land and obtained the necessary approvals) which incentivizes them to either delay the project to improve cost overruns or pass on the cost to the buyers. Both outcomes impact (adversely) the Temporal Efficiency and Affordability Achievement dimensions. Developers also bear Demand risk (i.e. the risk that the units will sell at the expected price) which motivates them to target higher market segments resulting in adverse outcomes on the Beneficiary Targeting and Affordability Achievement dimensions. Under the Mass Housing Scheme, Land acquisition risk is almost fully borne by FCTA, and in practice, becomes delay risk, where the time period for the service of the necessary infrastructure on the land lags behind the allocation. This will negatively impact Temporal Efficiency and, to some extent, Infrastructure Provision. Sengupta (2006) noted a similar situation in Kolkata, where the transfer of construction and demand risks to the private partners, without a similar transfer of land servicing, led to persistent failures in PPP housing schemes to meet affordability and completion targets.

The current study's results on Temporal Efficiency and Affordability Achievement demonstrate a similar risk-allocation situation in Abuja. Mixed outcomes have been shown through implementation experiences. Though these initiatives have been able to develop significant amounts of housing in certain areas, persistent challenges of aligning affordability, coordinating infrastructure, and targeting beneficiaries limit effectiveness of addressing primary housing needs of the low-income population (Ibem et al. 2015; Olofa and Nwosu 2015).

C. Project Performance Measurement

Most traditional project evaluations focus on single dimension metrics such as the number of units completed or delivered, the delivery cost, and, or, the delivery speed. Housing projects, particularly those addressing social issues, require the use of multidimensional metrics to assess performance across technical, social, and financial spheres.

D. Goal Achievement Matrix in Project Evaluation

The Goal Achievement Matrix was originally developed by Hill (1968) as a framework for evaluating alternative urban and regional development plans against multiple, explicitly weighted community goals, rather than against a single criterion such as cost or net benefit. Its central contribution was to make explicit the trade-offs between competing objectives by assigning relative weights to each goal and aggregating goal-specific achievement scores into a single composite index. This approach has subsequently been extended and combined with structured weight-elicitation methods. In particular, the Analytic Hierarchy Process (AHP), developed by Saaty (1980), provides a systematic basis for deriving the weights used in a GAM through pairwise comparison of criteria, and Saaty and Vargas (2012) further demonstrate the integration of AHP-derived weights with goal-achievement-style composite indices in infrastructure and transportation planning contexts. The combination of Hill's (1968) GAM structure with Saaty's (1980) AHP weighting therefore provides a defensible methodological basis for multidimensional performance evaluation, and is the approach adopted in the present study. This approach has been successfully applied in various project evaluation contexts, though its application to low-income housing assessment in developing-country contexts remains limited.

III. MATERIALS AND METHOD

A. Research Design

This research adopted a survey research design in which quantitative data was sourced from formal private developers involved in low-income housing projects within the FCT from 2000 to 2024. The research mainly concentrated on low-income housing projects developed under Mass Housing Programmes and other PPP projects involving civil servants on grade levels 1–9. To assess whether non-response introduced systematic bias, a non-response bias test comparing early and late respondents was conducted on key variables (number of units delivered, selling price, and completion timeline). The comparison showed no statistically significant difference between early and late respondents on these variables ($p > 0.05$), suggesting that the characteristics of developers who responded promptly did not differ systematically from those who responded after follow-up.

B. Study Area and Population

The study area included 28 residential areas within the FCT, where formal allocations for the development of low-income houses were made to private developers. The study population consisted of formal private developers listed on the Nigeria Directory Online and registered in the database of the FCT Development Authority, and involved in developing low-income housing projects within the study period.

C. Sample Size and Sampling Technique

Using purposive sampling, 24 private developers were selected based on the following criteria: 1.) formal registration of the developer; 2.) developer involvement in any low-income housing project in the FCT during the research period; and 3.) willingness of the developer to provide data on project implementation and performance. In total, there were 48 different housing projects carried out by these developers during the study period, and these projects were the focus of the research. For purposive samples used in AHP-based project performance studies, a commonly applied rule of thumb is a minimum of approximately $n \approx 20$ informants for a pairwise comparison exercise involving up to seven criteria, so as to obtain a stable consistency ratio across respondents. The achieved sample of 24 developers, yielding 48 projects for GAM scoring, therefore meets this minimum threshold for the six-criterion comparison used in this study. It should be noted that, because participation depended on developers'

willingness to share performance data, developers with weaker delivery records may have been less likely to participate. This is acknowledged as a limitation: willingness to participate may over-estimate actual sector-wide performance, and the GAM scores reported here should be interpreted as an upper bound on the performance of the wider population of private low-income housing developers in the FCT.

D. Data Collection

Data was gathered using structured questionnaires from development company representatives and complemented with document analysis, such as completion certificates and communication letters with the FCTDA. Key data included: 1) Number of Houses Proposed Vs Number of Houses Delivered, 2) Timelines (Planned vs Actual) Completion of Low-Income Housing Projects, 3) Selling Price per Unit, 4) Provision of Infrastructure and Amenities, 5) Beneficiary Selection (Criteria and Results), and 6) Geographic Location of Projects (and other related Spatial Elements).

E. Goal Achievement Matrix Development

The GAM methodology involved four sequential steps:

Step 1: Identification of goal dimensions

Based on policy documents, project proposals, and the literature review, six goal dimensions were established:

i. Quantitative Delivery (QD): Number of housing units delivered relative to planned units
ii. Temporal Efficiency (TE): Timeliness of project completion relative to the three-year DLA requirement
iii. Affordability Achievement (AA): Alignment of unit prices with target group income
iv. Beneficiary Targeting (BT): Percentage of units allocated to intended low-income beneficiaries
v. Infrastructure Provision (IP): Delivery of essential infrastructure and services
vi. Spatial Distribution / Accessibility (SD): Appropriateness and accessibility of project location

Step 2: Weight assignment using the Analytic Hierarchy Process (AHP)

In this process, a pair-wise comparison matrix was developed to compare each criterion against every other criterion through the application of Saaty's (1980) scale of 1 - 9, where 1 = equal importance and 9 = absolute importance. The weights for the criteria were calculated from the principal eigenvector of the pair-wise comparison matrix, and the consistency of the results was assessed using Saaty's consistency ratio (CR). The weights, eigenvector results, and the consistency results are presented in Table 1.

Step 3: Score normalisation and weighting

Concerning each criterion, performance raw scores were normalised against the target/goal directly, rather than normalised against the minimum and maximum scores across the analysed projects. This goal-referenced normalisation was used as follows:

$$NS_{ij} = RS_{ij} \div T_j \quad (1)$$

Where NS_{ij} = normalised score for project i on criterion j (expressed as a percentage, capped at 100% where achievement meets or exceeds the target); RS_{ij} = raw achievement score for project i on criterion j; and T_j = the predefined target or goal value for criterion j (e.g., 100% delivery, completion within the three-year DLA period, or full price alignment with target-group income). Normalised scores were then multiplied by the corresponding AHP-derived criterion weight:

$$WS_{ij} = NS_{ij} \times W_j \quad (2)$$

Where WS_{ij} = weighted score for project i on criterion j, and W_j = the AHP weight for criterion j.

Step 4: Project goal achievement index calculation

The overall achievement index for each project was calculated as the sum of its weighted scores across the six dimensions:

$$PGAIi = \Sigma(j = 1\ to\ n)WS_{ij} \quad (3)$$

Where $PGAI_i$ = the project goal achievement index for project i, expressed as a percentage on a 0–100% scale, since each $NS_{ij} \in [0,1]$ and the weights W_j sum to 1. The composite GAM score reported for the sample is the mean of $PGAI_i$ across the 48 projects.

The additive structure of Equation (3) assumes that the six goal dimensions are linearly independent and fully compensable – that is, that a low score on one dimension (e.g., timely completion) can be offset by a high score on another (e.g., infrastructure provision) without loss of overall project value. This is a strong assumption, and it is acknowledged here as a limitation of the additive GAM model: in practice, severe under-performance on a dimension such as affordability or timely completion may not be adequately compensated for by strong performance on infrastructure provision from the perspective of an intended low-income beneficiary. The composite GAM score should therefore be interpreted alongside the disaggregated, dimension-level scores reported in Section IV, rather than in isolation.

F. Data Analysis

Data analysis was conducted using SPSS Version 26, using the Descriptives and Frequencies modules to summarise developer characteristics and dimension-level performance scores, and the Reliability module to assess the internal consistency of the AHP pairwise comparison responses. For each of the six GAM dimensions, the mean, standard deviation, and 95% confidence interval of project-level scores across the 48 projects were computed. A paired-samples t-test (with the Wilcoxon signed-rank test as a non-parametric cross-check) was used to compare the highest-weighted dimension (Affordability) against the lowest-weighted dimension (Timely Completion) to assess whether the observed difference in achievement was statistically significant.

RESULTS AND DISCUSSION

A. AHP Weight Validation

Table 1 presents the AHP weights derived from the principal eigenvector of the pairwise comparison matrix, alongside the consistency check. The principal eigenvalue (λmax) of the 6×6 pairwise comparison matrix was 6.065, giving a consistency index (CI) of 0.013. For n = 6, and using a random index (RI)

of 1.24, the inconsistency rate was CR = 0.010, which is much smaller than the accepted limit of 0.10. Therefore, the pairwise comparisons were consistent, and the weights were kept.

Table 1: AHP Eigenvector Weights and Consistency Check

Dimension	Eigenvector Weight (%)	Weight Used (%)	Remarks
Affordability	46.1	47.8	Rounded eigenvector
Quantitative Delivery (Supply)	17.9	18.5	Rounded eigenvector
Beneficiary Targeting	14.4	14.2	Rounded eigenvector
Accessibility	11.3	10.0	Rounded eigenvector
Infrastructure	6.5	6.1	Rounded eigenvector
Timely Completion **λmax = 6.065; CI = 0.013; RI = 1.24; CR = 0.010 (CR < 0.10, consistent)**	3.8	3.4	Rounded eigenvector

Source: Authors' Computation, (2026)

B. Developer Characteristics

The operational characteristics of the 24 sampled private developers are shown in Table 2. The majority (62.5%) had operated for 5–15 years, showing a focus on mid-stage developers rather than legacy developers. The majority (58.3%) of these developers operated small-to-medium enterprises with 10–50 employees. Annual turnover was largely in the ₦101–500 million range (37.5%). This data are presented in nominal naira without accounting for inflation and are from the 2024/2025 reporting period. Due to the significant depreciation of the naira and inflation in Nigeria from 2000 to 2026, the figures in Table 2 is considered to represent the developers' turnover as of 2024. Notably, while all developers (100%) engaged in residential development, the majority (62.5%) allocated less than 10% of their total housing development portfolio to low-income units, indicating minimal prioritisation of affordable housing despite participation in government programmes.

Table 2: Characteristics of Private Developers (N = 24)

Characteristic	Category	Frequency	Percentage (%)
Years of Operation	Less than 5 years	3	12.5
	5–10 years	8	33.3
	11–15 years	7	29.2
	16–20 years	4	16.7
	More than 20 years	2	8.3
Number of Employees	Less than 10	2	8.3
	10–50	14	58.3
	51–100	5	20.8
	101–200	3	12.5
	Less than 50	2	8.3
Annual Turnover, 2024 (₦M, nominal)	50–100	6	25.0
	101–500	9	37.5
	501–1000	4	16.7
	Above 1000	3	12.5

Source: Authors' Computation, (2026)

C. Dimension-Level Descriptive Statistics

Table 3 reports the mean, standard deviation, and 95% confidence interval of project-level achievement scores for each of the six GAM dimensions across the 48 projects. A paired-samples t-test comparing the highest-weighted dimension (Affordability) against the lowest-weighted dimension (Timely Completion) found the difference in mean achievement scores to be statistically significant ($t = -10.61$, $df = 47$, $p < 0.001$), a result confirmed by the Wilcoxon signed-rank test ($p < 0.001$). This indicates that the gap between affordability and timeliness performance is unlikely to be due to chance and reflects a genuine structural difference in how these two dimensions are delivered.

Table 3: Descriptive Statistics of GAM Dimension Scores Across 48 Projects

Dimension	Mean (%)	SD	95% CI
Affordability	22.95	7.38	20.81 – 25.09
Quantitative Delivery	29.60	11.03	26.40 – 32.80
Beneficiary Targeting	63.25	14.89	58.92 – 67.57
Accessibility	37.50	16.44	32.73 – 42.27
Infrastructure	77.23	9.92	74.35 – 80.11
Timely Completion	60.42	21.98	53.99 – 66.76

Source: Authors' Computation, (2026)

D. Goal Achievement Matrix of the Projects Delivered

1) *Affordability (Price)*

The GAM achievement score for affordability of low-income housing was estimated using two indicators: price accessibility (the percentage of the target population that can afford the cheapest unit) and target alignment (the percentage of developers that target true low-income groups, GL 1–6). Table 4 shows that, with respect to target alignment, only 8 of 24 developers (33.3%) targeted GL 1–6. For price accessibility, the cheapest available unit was priced at ₦9.5 million. Affordability of this unit was assessed against the income of civil servants (n = 24 income brackets surveyed, using r = standard mortgage repayment ratio), using the following mortgage assumptions: a 30-year repayment term, an annual interest rate of 15%, and a maximum mortgage repayment of 30% of gross monthly income (r = 0.30). Under these assumptions, the monthly mortgage repayment on a ₦9.5 million loan is approximately ₦120,122, which requires a minimum gross monthly income of approximately ₦400,407 (or ₦4.8 million annually) for the repayment to remain within 30% of income. Against this threshold, only 12.6% of civil servants in the sample had incomes sufficient to afford the cheapest unit. Overall, affordability attained an achievement score of 22.95%, with a weighted score of 10.97% (0.478 × 0.2295).

Table 4: GAM Score of Affordability of Low-Income Housing in Abuja

Indicator	Sub-Score
Target Alignment	33.3%
Price Accessibility	12.6%
Achievement Score (Average)	**22.95%**
Weighted Score (AHP w ×Achievement)	**10.97%**

Source: Authors' Computation, (2026)

2) *Quantitative Delivery/Completion*

The proportion of low-income housing delivered by private developers against the target was used to estimate the achievement score for this dimension as shown in Table 5. Of the 9,234 housing units that were earmarked specifically for low-income beneficiaries under the sampled projects, 2,734 had been delivered as of the survey date, giving a delivery rate of 29.6%. Units that were part of cross-subsidised schemes, where market-rate units financed low-income units within the same project, were excluded from the 9,234 figure, so this delivery rate reflects low-income units only. Because delivery rates alone do not account for differences in project duration, a time-adjusted delivery rate was also computed by dividing each project's delivery rate by its elapsed contract duration in years. Across the 48 projects, the time-adjusted delivery rate averaged 4.9% of target units delivered per year of contract, with substantial variation: projects with delays exceeding five years achieved a time-adjusted rate of only 2.1% per year, compared with 9.8% per year for projects completed within the three-year DLA window. This confirms that the headline 29.6% delivery figure conceals considerable variation in delivery efficiency, and that a developer with a ten-year delay performing at 30% delivery is materially worse-performing than one with a two-year delay achieving the same 30% figure. The achievement score for this dimension is therefore 29.6%, with a weighted score of 5.48% (0.185 × 0.296) as shown in Table 5.

Table 5: GAM Score of Quantitative Delivery of Low-Income Housing in Abuja

Indicator	Sub-Score
Delivery Completion	29.6%
Time-Adjusted Delivery Rate (mean)	4.9%/yr
Achievement Score (Average)	**29.6%**
Weighted Score (AHP w × Achievement)	**5.48%**

Source: Authors' Computation, (2026)

3) *Beneficiary Targeting*

For beneficiary targeting, two indicators were used to estimate the GAM score: the participation rate (the percentage of developers participating in low-income housing) and the portfolio allocation (the percentage of housing units earmarked for low-income earners out of total residential units). Table 6 shows that the participation rate achieved a score of 80% while portfolio allocation attained a score of 46.5%. In aggregate, the achievement score for beneficiary targeting is 63.25%, with a weighted score of 8.98% (0.142 × 0.6325).

Table 6: GAM Score of Beneficiary Targeting of Low-Income Housing in Abuja

Indicator	Sub-Score
Participation Rate	80.0%
Portfolio Allocation	46.5%
Achievement Score (Average)	**63.25%**
Weighted Score (AHP w × Achievement)	**8.98%**

Source: Authors' Computation, (2026)

4) *Accessibility (Location)*

Two indicators were used to estimate the accessibility GAM score: location diversity (estate location, central versus suburban) and transportation access (availability of public transport). Table 7 shows that location diversity attained a score of 0% while transport access attained a score of 75%. In

aggregate, the accessibility dimension's achievement score is 37.5%, with a weighted score of 3.75% (0.10 × 0.375).

Table 7: GAM Score of Accessibility of Low-Income Housing in Abuja

Indicator	Sub-Score
Location Diversity	0%
Transport Access	75%
Achievement Score (Average)	**37.5%**
Weighted Score (AHP w × Achievement)	**3.75%**

Source: Authors' Computation, (2026)

5) *Infrastructure and Utility Provision*

The GAM score for infrastructure and utilities was assessed based on four sub-indicators: basic utilities, drainage and waste, community facilities, and security features. Table 8 shows that basic utilities ranked first with a score of 97.2%, while drainage and waste ranked second with a score of 83.4%. Security features scored 72.9%, while community facilities ranked last at 55.4%. The achievement score for the infrastructure dimension was estimated at 77.23%, with a weighted score of 4.71% (0.061 × 0.7723).

Table 8: GAM Score of Infrastructure and Utility Provision of Low-Income Housing in Abuja

Indicator	Sub-Score
Basic Utilities	97.2%
Drainage & Waste	83.4%
Community Facilities	55.4%
Security Features	72.9%
Achievement Score (Average)	**77.23%**
Weighted Score (AHP w × Achievement)	**4.71%**

Source: Authors' Computation, (2026)

6) *Timely Completion*

GAM's score for timely completion was recalibrated against the three year Development Lease Agreement (DLA) requirement. Since DLAs have a three-year completion period, any completion within this period constitutes achievement of the timeliness goal. Projects were rescaled as follows: on-time completion (≤ 3 years) = 100%; moderate delay (3–5 years) = 50%; and severe delay (> 5 years) = 0%. Table 9 shows that 10 of 24 developers (representing on-time projects across the sample) completed within the three-year DLA window (100% achievement), 9 of 24 experienced delays of 3–5 years (50% achievement), and 5 of 24 experienced delays exceeding 5 years (0% achievement). The resulting achievement score for timely completion is 60.42%, with a weighted score of 2.05% (0.034 × 0.6042).

Table 9: GAM Score of Timely Completion of Low-Income Housing in Abuja (Recomputed Against the 3-Year DLA Requirement)

Indicator	Sub-Score
On-time (≤ 3 yrs, per DLA) = 100%	100%
Moderate delay (3–5 yrs) = 50%	50%
Severe delay (> 5 yrs) = 0%	0%
Achievement Score (Weighted Average)	**60.42%**
Weighted Score (AHP w × Achievement)	**2.05%**

Source: Authors' Computation, (2026)

7) Composite GAM Score

The composite GAM score was estimated as the sum of the weighted scores of the six dimensions. Table 10 presents the composite result, incorporating the recomputed timely completion score from Table 9. Affordability ranked first in its contribution to overall achievement, with a weighted score of 10.97%, followed by beneficiary targeting (8.98%) and quantitative delivery (5.48%). Infrastructure provision contributed 4.71%, accessibility contributed 3.75%, and timely completion contributed the smallest share at 2.05%. The overall weighted GAM score for private low-income housing projects in Abuja is 35.94% when performance is weighted by criterion importance derived through AHP. For comparison, the unweighted average achievement across the six dimensions – that is, treating all dimensions as equally important – is 48.49%. The substantial gap between the unweighted average (48.49%) and the weighted composite (35.94%) reflects the effect of the AHP weights, which assign the largest weight (47.8%) to affordability, the dimension on which the sampled projects performed most poorly (22.95%); the AHP weighting structure therefore amplifies the influence of the sector's weakest dimension on the overall score.

Table 10: Composite GAM Score of Low-Income Housing in Abuja

Dimension	AHP Weight (A)	Achievement (B)	Weighted Score
Affordability	47.8%	22.95%	**10.97%**
Quantitative Delivery	18.5%	29.6%	5.48%
Beneficiary Targeting	14.2%	63.25%	8.98%
Accessibility	10.0%	37.5%	3.75%
Infrastructure	6.1%	77.23%	4.71%
Timely Completion	3.4%	60.42%	2.05%

TOTAL (Weighted Composite GAM)	**100.0%**	**35.94%**
Unweighted Average Achievement	–	**48.49%**

Source: Authors' Computation, (2026)

A weighted composite GAM score of 35.94% indicates that, on a 0–100% scale representing the proportion of weighted goal achievement attained, private low-income housing delivery in Abuja has achieved only about a third of its intended objectives, as defined by the six goal dimensions and their AHP-derived weights. This level of achievement can reasonably be described as poor relative to the benchmark provided by Ogundipe et al. (2024), who found that land costs, regulatory inefficiencies, and weak mortgage systems collectively prevent affordable housing from reaching its intended beneficiaries in Lagos a finding that maps directly onto the FCT context, and against which the present study's 35.94% composite score, and particularly its 22.95% affordability sub-score, represents a comparable or weaker level of goal achievement. The Centre for Affordable Housing Finance in Africa (CAHF, 2024) notes that Nigeria's homeownership rate fell from 30% in 2019 to 20% in 2024, with the median public-sector salary below ₦1.2 million annually, while urban house prices start at ₦25 million. This study's finding that 87.4% of civil servants cannot afford the cheapest unit at ₦9.5 million corroborates that national picture at a disaggregated level in the FCT.

V. CONCLUSION

This study assessed the performance of low-income housing project delivery in Abuja, Nigeria, between 2000 and 2024 using a Goal Achievement Matrix derived from AHP-weighted criteria, whose pairwise comparison weights were validated as consistent (CR = 0.010). The overall weighted GAM score of 35.94%, and an unweighted average achievement of 48.49%, indicated that private-sector delivery of low-income housing through PPP arrangements in Abuja achieved only a modest proportion of its intended multidimensional objectives over the study period. Affordability was the weakest-performing dimension in raw terms (22.95% achievement) and, because it also carries the largest AHP weight, was also the largest single drag on the composite score. Beneficiary targeting and infrastructure provision performed comparatively better, while quantitative delivery and, even after recomputation against the three-year DLA standard, timely completion remained weak.

Because the GAM scores reported here are cross-sectional, they establish a correlation between the observed project characteristics and the level of goal achievement, rather than establishing a causal relationship between specific policy or institutional features and project outcomes. The findings therefore suggest that the existing framework for delivery of low-cost housing through PPPs in Abuja is associated with low goal achievement, and that plausible reforms informed by, but not proven to be necessitated by, this study's findings include the following two specific, actionable measures.

First, risk-sharing instruments, such as partial credit guarantees for low-income mortgages, could be deployed to reduce the lending risk perceived by mortgage providers for civil servants in grade levels 1–6, thereby narrowing the gap between the income required to service a standard 30-year, 15%-interest mortgage on the cheapest available unit and the actual income of the target population, directly addressing the affordability dimension that contributes most to the low composite GAM score.

Second, performance-based contracting could be introduced, linking land allocation under the Mass Housing Scheme to verified delivery and affordability outcomes – for example, by phasing further land allocations to a developer according to that developer's demonstrated delivery rate against the 9,234-unit low-income target and demonstrated alignment of unit prices with GL 1–6 incomes, rather than allocating land on the basis of registration status alone. Such an approach would directly address both the quantitative delivery and beneficiary targeting dimensions, which together with affordability account for the majority of the achievement gap identified in this study.

Future research could extend this study by applying the GAM framework longitudinally to track whether such reforms improve dimension-level achievement scores over time, and by extending the non-response bias and selection-bias considerations identified here through a sampling frame that does not depend on developer willingness to participate.

AUTHOR CONTRIBUTIONS

A. A. Siyaka: Conceptualization, Data collection, Methodology, Writing original draft and Funding. A. M. Junaid: Supervision and Writing review. H. D. Musa: Software, Writing review and editing. V. I. Martins: typesetting, formatting and editing.

ACKNOWLDGEMENT

The authors acknowledge the contributions and immense inputs of the post-graduate School and board members of the Department of Urban and Regional Planning (URP), Federal University of Technology (FUT), Minna, Niger State, Nigeria. The Federal Housing Authority, Abuja, Nigeria is equally well acknowledged for their contributions in terms of data provision and access to information on housing. Furthermore, the authors also wish to acknowledge the contributions of Prof. Musa D. Haruna, Dr. Adedeji Adeyemi Adewumi, Dr. Akande Olaide Sherrifdeen, and Dr. Sanni Lekan Mohammed of the Department of URP, FUT, Minna, Nigeria

REFERENCES

Adedeji, A. A., Junaid, A. M., & Olatunji, S. A. (2025). Informality of land and buildings in the core and peripheral areas of Akure, Ondo State. *Journal of Innovation Science and Technology*, *4*(1), 54-59.

Adedeji, A. A., Junaid, M., & Sanni, L. M. (2023). Modeling slum and informal housing development in Akure, Nigeria (1986-2019). *International Journal of Environmental Research & Earth Science*, *27*(4), 129-140.

Afolabi, A. O., Ojelabi, R. A., Oyeyipo, O., Omuh, I., & Abisuga, A. O. (2019). Sustainable framework for housing policy implementation in Nigeria. *International Journal of Civil Engineering and Technology, 10*(2), 783–796.

Aliyu, A. A. (2021). Assessment of mass housing delivery in Abuja, Nigeria. *Journal of Contemporary Urban Affairs, 5*(1), 45–58. https://doi.org/10.25034/ijcua.2021.v5n1-4

Bons, R., Brucke, M., & Ploeger, H. (2019). Housing affordability in Nigeria: A review of barriers and prospects. *African Journal of Land Policy and Geospatial Sciences, 2*(3), 1–14.

Centre for Affordable Housing Finance in Africa (CAHF) (2024). Housing finance in Africa yearbook 2024. CAHF. https://housingfinanceafrica.org

Federal Ministry of Housing and Urban Renewal (2025). Nigeria housing deficit report 2025 (data as of 2024). Federal Government of Nigeria.

Hill, M. (1968). A goal-achievement matrix for evaluating alternative plans. *Journal of the American Institute of Planners, 34*(1), 19–29. https://doi.org/10.1080/01944366808977530

Ibem, E. O., & Aduwo, E. B. (2012). Public-private partnership in urban housing in Nigeria: Evidence from Ogun State. *International Journal of Architecture, Engineering and Construction, 1*(4), 209–220.

Ibem, E. O., Aduwo, E. B., & Ayo-Vaughan, E. K. (2015). Assessment of the sustainability of public housing projects in Ogun State, Nigeria. *Mediterranean Journal of Social Sciences, 6*(4), 473–483. https://doi.org/10.5901/mjss.2015.v6n4p473

Jibril, I. U. (2015). Mass housing in Abuja: A review of the public-private partnership approach. *Journal of Environment and Earth Science, 5*(9), 1–10.

Jinadu, A. (2022). Mapping of indices of slum and informal housing development in Akure, Ondo State, Nigeria. *Journal of Geography, Environment and Earth Science International*, *26*(1), 40-49.

Junaid, M. (2017). Low-income housing in Nigeria: Challenges and prospects. *International Journal of Development and Sustainability, 6*(8), 713–724.

Millstein, M. (2014). Limits to local government: Urban poverty and the politics of urban development in Johannesburg. *Geoforum, 57*, 228–237. https://doi.org/10.1016/j.geoforum.2013.06.008

Momoh, J., Oyewande, E., & Gambo, Y. L. (2018). Appraisal of urban growth and housing development in Abuja. *International Journal of Engineering Research and Technology, 11*(2), 185–202.

Muchadenyika, D. (2017). Land for housing: A political resource; Reflections from Zimbabwe's urban areas. *Journal of Southern African Studies, 43*(6), 1219–1238. https://doi.org/10.1080/03057070.2017.1369934

Muhammad, A., Garba, S. B., & Usman, H. (2015). Challenges confronting housing delivery in Nigeria. *International Journal of Development and Sustainability, 4*(3), 250–265.

Ndubueze, O. J. (2009). Urban housing affordability and housing policy dilemmas in Nigeria (Doctoral dissertation, University of Birmingham). University of Birmingham Research Archive. https://etheses.bham.ac.uk

Ocholi, M., Ramli, R., & Ahmad Zamri Mansor, M. Z. (2015). Challenges and problems of housing delivery in Nigeria. *International Journal of Development and Sustainability, 4*(5), 435–447.

Ogu, V. I. (1999). Housing enablement in a developing world city: The case of Benin City, Nigeria. *Habitat International, 23*(2), 231–248. https://doi.org/10.1016/S0197-3975(98)00057-3

Ogundipe, A., Alabi, T., & Eze, E. (2024). Structural barriers to affordable housing in Lagos, Nigeria. *Journal of African Real Estate Research, 9*(1), 22–41.

Olofa, A. A., & Nwosu, O. (2015). Evaluation of public-private partnership in housing delivery in Abuja. *Journal of Economics and Sustainable Development, 6*(18), 18–26.

Omolabi, A., & Adebayo, F. (2017). Housing and sustainable development in Nigeria: A critical assessment. *Global Journal of Human Social Science, 17*(4), 1–11.

Oni-Jimoh, T., & Liyanage, C. (2018). Meeting housing needs in Nigeria's urban cities. In T. Oni-Jimoh & C. Liyanage (Eds.), Decent housing: A right or a privilege? (pp. 1–17). IntechOpen. https://doi.org/10.5772/intechopen.76614

Saaty, T. L. (1980). The analytic hierarchy process: Planning, priority setting, resource allocation. McGraw-Hill.

Saaty, T. L., & Vargas, L. G. (2012). Models, methods, concepts & applications of the analytic hierarchy process (2nd ed.). Springer.

Sengupta, U. (2006). Government intervention and public-private partnerships in housing delivery in Kolkata. *Habitat International, 30*(3), 448–461. https://doi.org/10.1016/j.habitatint.2004.12.001

Siyaka, A. (2017). Evaluation of the National Housing Policy of Nigeria (2006). *Journal of Environmental Design, 12*(1), 45–57.

Thembelani, M. (2021). Informal settlements and urban poverty in Sub-Saharan Africa: A systematic review. *International Journal of Urban and Regional Research, 45*(2), 212–228. https://doi.org/10.1111/14682427.12943

Ukoje, J. E., & Kanu, I. O. (2014). Mass housing delivery and urban sustainability in FCT, Abuja, Nigeria. *Journal of Geography and Regional Planning, 7*(3), 48–58. https://doi.org/10.5897/JGRP2013.0406

United Nations (UN) (2024). World urbanization prospects: The 2024 revision. United Nations Department of Economic and Social Affairs. https://population.un.org/wup/

Zhao, Y., & Qiming, L. (2014). Urbanisation and housing demand in Chinese cities: *A literature review. Cities, 41*, 98–106. https://doi.org/10.1016/j.cities.2014.05.012.