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Condition, Deterioration, and Adaptive Retrofit Practices in Residential Buildings: Evidence from Ibadan, Nigeria

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Abstract

Ageing housing stock in Nigerian cities continues to deteriorate faster than it is maintained, yet resident-level evidence on building condition and retrofit uptake remains scarce. This study assessed the condition of residential buildings and the extent of adaptive retrofit and upgrading practices among occupants in Ibadan, Nigeria. A quantitative cross-sectional survey was administered to 152 residents across high-, medium-, and low-density neighbourhoods, recruited online through purposive, convenience-based sampling; the achieved sample exceeded the minimum of 150 respondents computed using Cochran's formula at a 95% confidence level and an 8% margin of error. Data were analysed using descriptive statistics, the Relative Importance Index (RII), one-way analysis of variance (ANOVA) with Tukey post-hoc comparison, and Chi-square tests of association, and the instrument demonstrated excellent internal consistency (Cronbach's alpha = 0.921–0.954 across constructs). Results showed that structural condition (mean = 3.70) and overall habitability (mean = 3.66) were rated highest among ten condition indicators, while indoor air quality (mean = 3.50) and thermal comfort were rated lowest. Poor maintenance culture and poor ventilation were the highest-rated deterioration problems (mean = 2.71 each), although all ten problems were rated below the scale midpoint. Building condition varied significantly with the age of the building ($F(3,148) = 3.51$, $p = 0.017$), and overall building performance varied significantly with residential density ($\chi^2(4) = 14.21$, $p = 0.007$). Respondents reported low-cost, incremental retrofit practices such as renovation, preventive maintenance, and neighbourhood participation more frequently than structural strengthening and climate-responsive retrofitting, and the frequency of preventive maintenance was significantly associated with tenure status ($\chi^2(6) = 16.99$, $p = 0.009$). The findings suggest that Ibadan's residential building stock is not yet critically degraded but is being sustained through minor, reactive interventions rather than

the comprehensive retrofit measures required for genuine lifecycle extension, pointing to building age, residential density, and tenure arrangement as practical entry points for targeted intervention.

Keywords: Adaptive Retrofit, Building Condition, Building Maintenance, Residential Buildings, Ibadan, Nigeria.

Introduction

Nigeria's housing deficit has grown steadily over the past three decades, driven by rapid urbanisation, population growth, and constrained access to housing finance (Emmanuel, 2019). Yet the deficit is not solely a problem of insufficient new supply; a substantial part of the existing residential stock is also ageing and underperforming. Studies estimate that a large proportion of urban housing in Nigeria is substandard, with widespread structural, servicing, and finishing defects (Olotuah & Taiwo, 2015; CAHF, 2019). Under such conditions, extending the useful life of existing buildings through adaptive retrofit and planned upgrading offers a more resource-efficient alternative to demolition and reconstruction, while also supporting the aims of Sustainable Development Goal (SDG) 11 on sustainable cities and SDG 13 on climate action (United Nations, 2015; Oyebamiji et al., 2025).

Despite the recognised benefits of adaptive retrofit, its adoption within Nigeria's residential sector remains limited. Buildings continue to deteriorate under the combined pressure of poor maintenance culture, inadequate funding, and weak technical capacity (Waziri & Vanduhe, 2013; Obarisiagbon et al., 2026). Much of the existing Nigerian literature on this subject is technical or policy-oriented, and resident-level empirical evidence on how occupants actually perceive building condition and engage in retrofit and upgrading practices remains limited (Adegoke et al., 2026). This gap constrains the development of realistic, context-specific retrofit frameworks for Nigerian cities.

This study addresses that gap by examining residential buildings in Ibadan, Nigeria, with three specific objectives:

i. To assess the current condition of residential buildings in the study area.
ii. To identify the major deterioration challenges affecting residential buildings.
iii. To evaluate the extent and frequency of adaptive retrofit and upgrading practices adopted by residents.

The study contributes resident-based empirical evidence that can inform practical retrofit strategies for architects, housing managers, and policymakers.

LITERATURE REVIEW

Residential Building Condition in Nigeria

Building condition is typically assessed through structural integrity, roofing, wall finishes, plumbing and electrical installations, and indoor environmental quality (Ibem et al., 2013; Waziri, 2016). Research consistently reports that a significant share of Nigeria's residential stock falls short of these standards, with cracks in walls and foundations, leaking roofs, deteriorated finishes, and poor indoor air quality especially common in high-density and informal settlements (Onyenokporo & Ochedi, 2018; Alegbe et al., 2025). Housing quality is generally worse among tenants than owner-occupiers, suggesting that tenure status shapes both the condition of a dwelling and residents' willingness to invest in its upkeep (Ibem et al., 2013; Adegoke et al., 2025). Okpala et al. (2017) similarly report that only a

minority of urban dwelling units in Nigeria are considered fully sound, with the majority requiring either minor or major repair. Taken together, this body of work establishes that condition varies systematically with building age, tenure, and neighbourhood density, relationships this study tests directly.

Building Deterioration and Maintenance Challenges

Maintenance is defined as the range of work needed to preserve, restore, or improve a building's fabric and services to a satisfactory standard over its life (Plāviņa & Geipele, 2013). Alner and Fellows (1990) identify occupant safety, operational fitness, legal compliance, asset preservation, and quality control as its core purposes. In the Nigerian context, however, maintenance is frequently reactive rather than planned: it is triggered only once defects become severe, rather than being scheduled preventively (Odediran et al., 2012; Olajide & Afolarin, 2012). Zulkarnain et al. (2011) attribute this pattern to weak maintenance culture, inadequate funding, and limited technical oversight, while Waziri (2016) links much of Nigeria's residential deterioration directly to design and construction defects that surface only after occupation. More recent Nigerian evidence continues to identify poor maintenance practices and inadequate funding as the leading drivers of residential decay (Ichendu & Irimiagha, 2024), reinforcing the view that behavioural and financial factors, rather than structural failure alone, are central to the erosion of building performance.

Adaptive Retrofit and Upgrading Practices

Adaptive retrofit is defined as the modification of an existing building to improve its performance, energy efficiency, comfort, and adaptability to changing needs (Shahi et al., 2020), while upgrading emphasises improvements to habitability, services, and overall quality. Both practices depart from simple repair by deliberately extending a building's operational phase rather than treating demolition as the default endpoint once a structure begins to decline (Miran & Husein, 2023). Nigerian evidence shows that structural retrofit techniques such as steel bracing and reinforced concrete jacketing can meaningfully improve load-carrying capacity and reduce failure risk in existing buildings (Afolabi et al., 2025), while low-cost interventions targeting ventilation and thermal comfort can improve occupant satisfaction without the capital intensity of full structural strengthening (Akande & Olagunju, 2016). Elsewhere, integrated seismic and energy retrofit strategies illustrate the technical ceiling of what adaptive retrofit can achieve when resources allow (Bournas et al., 2022; Passoni et al., 2024), and circular-economy framings position such retrofit as inherently more resource-efficient than demolition and rebuilding (Aigwi et al., 2023; Oyebamiji et al., 2025). Yet uptake of the more technically demanding measures remains low in practice, with residents and stakeholders in Nigeria gravitating toward smaller-scale, incremental interventions (Adegoke et al., 2025), a pattern this study examines empirically.

Theoretical Framework

The study draws on two complementary perspectives. Building performance evaluation views a building as a system whose technical, functional, and behavioural performance is assessed in relation to occupants' needs. From this perspective, occupant feedback is a valid and informative indicator of building condition (Preiser et al., 1988), supporting this study's use of residents' assessments of condition, deterioration, and retrofit practices. Housing adjustment theory (Morris & Winter, 1975) explains how households respond to deficiencies in their dwellings. They compare their homes with

family and cultural standards of adequacy and, when they perceive a shortfall, may modify the dwelling, move, or adapt their standards, depending on the resources and constraints they face.

Together, these perspectives help explain why residents may favour incremental maintenance over structural or energy-efficiency retrofits. When incomes are limited and tenure is insecure, households are more likely to choose the least costly adjustment that restores acceptable functioning: typically, a small, reactive repair. By contrast, capital-intensive interventions with long payback periods may exceed household budgets or, for tenants, fall outside their rights over the property. Accordingly, this paper interprets variations in condition and maintenance across building age, density, and tenure as reflecting the adjustments households can afford and are permitted to make, rather than awareness alone.

MATERIALS AND METHODS

Study Area

The study was conducted in Ibadan, the capital of Oyo State and the third most populous city in Nigeria, with an estimated population exceeding two million residents (World Population Review, 2026). The city comprises both long-established traditional neighbourhoods and newer peri-urban developments, spanning high-, medium-, and low-density residential areas with housing types ranging from traditional courtyard compounds to modern flats and duplexes. A substantial share of Ibadan's residential stock is ageing and shows visible signs of deterioration, including corroded roofing, cracked walls, and deferred maintenance, making it a suitable context for examining building condition and retrofit uptake. Figure 1 shows the spatial distribution of the local government areas and neighbourhoods within Ibadan considered in the study. Figures 2 and 3 show the aerial view and ageing residential building environment respectively in the study area.

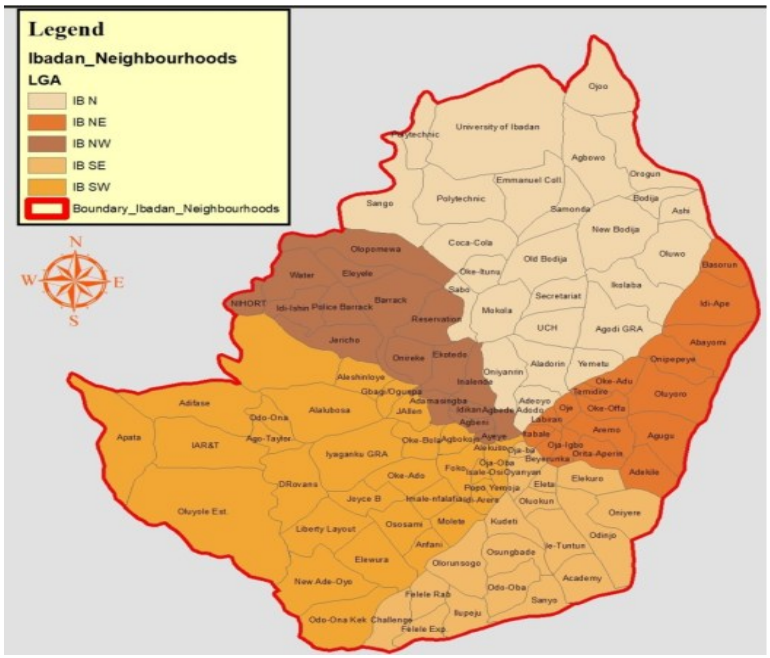


Figure 1: Map of Ibadan showing the local government areas and residential neighbourhoods within the study area.

Source: Oyo State Ministry of Lands, Housing and Urban Development.



Figure 2: Aerial view of Ibadan depicting the dense residential building fabric and the potential for adaptive retrofit (**Source**: Dar Group, 2019)



Figure 3: Ageing residential building environment in Ibadan showing visible signs of physical deterioration and inadequate maintenance

Research Design

The study adopted a quantitative, cross-sectional survey design within a positivist research philosophy, using a structured questionnaire to collect data from residents at a single point in time (Saunders et al., 2019; Bryman, 2016). This design was considered appropriate for objectively measuring building condition, deterioration frequency, and retrofit practices across a relatively large sample, and for enabling statistical comparison of these outcomes across socio-demographic and housing sub-groups.

Population and Sampling

The target population comprised residents of Ibadan occupying residential buildings as owner-occupiers, tenants, occupants of family houses, or residents of official quarters. Because a formal sampling frame of residential occupants is not maintained for the city, the minimum required sample

size was estimated using Cochran's (1977) formula for survey research with an unknown population size:

$$n_0 = Z^2pq / e^2$$

where Z is the standard score for the desired confidence level, p and q are the estimated proportions of the population with and without the attribute of interest, and e is the acceptable margin of error. Adopting a 95% confidence level (Z = 1.96), maximum variability (p = q = 0.5), and an 8% margin of error, the minimum required sample was approximately 150 respondents (150.06). An 8% margin was chosen instead of the more conventional 5%, which would have required about 385 respondents. This choice was made because the study is exploratory, no fixed sampling frame was available, and time, cost, and access constraints made a sample of that size impractical.

A purposive, convenience-based approach was adopted. Purposive sampling first identified residential neighbourhoods representing high-, medium-, and low-density categories with buildings of varying ages. Because data were collected online, the questionnaire was then shared with adult residents of these areas through WhatsApp groups, social media platforms, and community and personal networks. Respondents indicated their residential density category by selecting from the options provided in the questionnaire. The resulting sample is non-probabilistic and self-selected (Taherdoost, 2016).

The survey targeted residential areas across the five LGAs shown in Figure 1, including Bodija, Agodi GRA, Sango, Yemetu and Mokola (Ibadan North); Basorun, Idi Ape, Aremo and Agugu (Ibadan North-East); Jericho, Eleyele and Ekotedo (Ibadan North-West); Felele, Kudeti and Elekuro (Ibadan South-East); and Iyaganku GRA, Challenge, Molete and Apata (Ibadan South-West). Neighbourhood of residence was not recorded for individual respondents, so these are the areas targeted rather than a verified distribution of respondents. Data collection continued across the density categories until the computed minimum was met and exceeded; a total of 152 valid, fully completed questionnaires were retrieved and used for analysis. A precise response rate could not be computed because no fixed sampling frame existed and the number of people who saw the online questionnaire is unknown (see Limitations).

Research Instrument

Data were collected using a structured questionnaire comprising four sections relevant to this paper. Section A captured respondents' socio-demographic and housing characteristics. Section B assessed the condition of residential buildings across ten indicators using a five-point rating scale (1 = Very Poor to 5 = Excellent). Section C measured the frequency of building deterioration and maintenance challenges across ten items using a five-point frequency scale (1 = Never to 5 = Very Frequently). Section D assessed the frequency of ten adaptive retrofit and upgrading practices using the same five-point frequency scale. Structured, closed-ended items were used throughout to ensure uniformity of response and facilitate statistical analysis (Saunders et al., 2019).

Validity and Reliability

Face and content validity were established through review by the research supervisor and academic experts in architecture and the built environment, whose comments were incorporated before final administration. Internal consistency was assessed using Cronbach's alpha, with values of 0.70 or above considered acceptable (Cronbach, 1951; Hair et al., 2019). As shown in Table 1, all three scales relevant to this paper returned alpha values well above this threshold, indicating excellent internal consistency.

Table 1: Reliability (Cronbach's Alpha) of the Research Instrument

Construct	No. of Items	Cronbach's Alpha
Section B: Building Condition Indicators	10	0.953
Section C: Deterioration & Maintenance Issues	10	0.954
Section D: Retrofit & Upgrading Practices	10	0.921

Note. Values above 0.70 are considered acceptable (Cronbach, 1951; Hair et al., 2019).

Method of Data Analysis

Data were coded from the five-point ordinal scales and analysed using Python-based statistical computing (pandas, SciPy, and scikit-learn), with results cross-checked against manual computation. Descriptive statistics (means and standard deviations) summarised responses, and the Relative Importance Index (RII) was computed to rank condition indicators, deterioration issues, and retrofit practices, following the standard formula used in construction and built-environment research (Akadiri, 2011):

$$RII = \Sigma W / (A \times N)$$

where W is the sum of weightings assigned by respondents to an item, A is the highest weight on the scale (5), and N is the total number of respondents. One-way analysis of variance (ANOVA), followed by Tukey's Honestly Significant Difference (HSD) post-hoc test where applicable, was used to test for differences in building condition across building-age groups. Chi-square tests of independence, with Cramér's V reported as a measure of effect size, were used to test associations between selected socio-demographic characteristics and building performance or maintenance frequency. Ordinal responses were banded into three categories (Low/Moderate/High or Poor/Fair/Good) for the Chi-square analyses to improve expected cell counts. All tests were evaluated at the conventional 5% significance level. Three hypotheses, stated in the null form, were tested:

1. H1: There is no statistically significant difference in perceived building condition across building-age groups.
2. H2: There is no statistically significant association between residential density and overall building performance.
3. H3: There is no statistically significant association between tenure status and the frequency of preventive maintenance practices.

RESULTS

Socio-Demographic and Housing Characteristics

Table 2 summarises the demographic and housing characteristics of the 152 respondents. The sample was predominantly male (59.9%), most commonly aged 26–35 or 46 and above (28.9% each); the largest group held a Higher National Diploma or Bachelor's degree (41.4%). Tenants formed the largest tenure group (47.4%), and flats were the most common housing type (34.2%). Buildings aged 11–20 years and above 20 years together accounted for 70.4% of the sample, indicating that the survey substantially captured Ibadan's ageing housing stock, which is central to this study's focus on deterioration and retrofit uptake.

Table 2: Socio-Demographic and Housing Characteristics of Respondents (N = 152)

Variable	Category	Frequency	Percent (%)
Gender	Male	91	59.9
	Female	60	39.5

Variable	Category	Frequency	Percent (%)
Age Group	18–25	36	23.7
	26–35	44	28.9
	36–45	28	18.4
	46 and above	44	28.9
Educational Qualification	Secondary	19	12.5
	ND/NCE	26	17.1
	HND/BSc	63	41.4
	MSc / PhD	44	29.0
Tenure Status	Owner Occupier	24	15.8
	Tenant	72	47.4
	Family House	43	28.3
	Official Quarters	13	8.6
Housing Type	Flat	52	34.2
	Tenement	33	21.7
	Duplex	26	17.1
	Detached	24	15.8
	Semi-detached	17	11.2
Age of Building	Less than 5 years	9	5.9
	5–10 years	36	23.7
	11–20 years	54	35.5
	Above 20 years	53	34.9
Residential Density	High-density	54	35.5
	Medium-density	63	41.4
	Low-density	34	22.4
	Informal Settlement	1	0.7

Note. Gender frequencies total 151 owing to one missing response. The single informal-settlement case was excluded from the density analysis (Table 6, n = 151).

Condition of Residential Buildings

As shown in Table 3 and Figure 4, structural condition of the building recorded the highest mean rating (mean = 3.70, SD = 0.89), followed by overall building performance and habitability (mean = 3.66) and the condition of roofing systems (mean = 3.64). Indoor air quality (mean = 3.50) and indoor ventilation and thermal comfort (mean = 3.53) were rated lowest. Corresponding RII values ranged from 0.700 to 0.739, and all ten indicators fell between the 'Fair' and 'Good' range on the five-point scale, suggesting that the surveyed building stock is not in an advanced state of decay, but that indoor environmental quality lags behind structural and fabric condition which is a pattern consistent with the hot-humid climate challenges to natural ventilation reported elsewhere in Nigeria (Onyenokporo & Ochedi, 2018).

Table 3: Condition of Residential Buildings (Ranked by Mean Score, N = 152)

Rank	Building Condition Indicator	Mean	SD
1	Structural condition of the building	3.70	0.89
2	Overall building performance and habitability	3.66	0.97
3	Condition of roofing systems	3.64	0.97
4	Drainage and sanitation systems	3.58	0.99
5	Condition of walls and finishes	3.57	0.95
5	Condition of plumbing systems	3.57	0.92
7	Accessibility and functionality of spaces	3.56	0.92

Rank	Building Condition Indicator	Mean	SD
7	Condition of electrical systems	3.56	0.92
9	Indoor ventilation and thermal comfort	3.53	0.88
10	Indoor air quality conditions	3.50	0.97

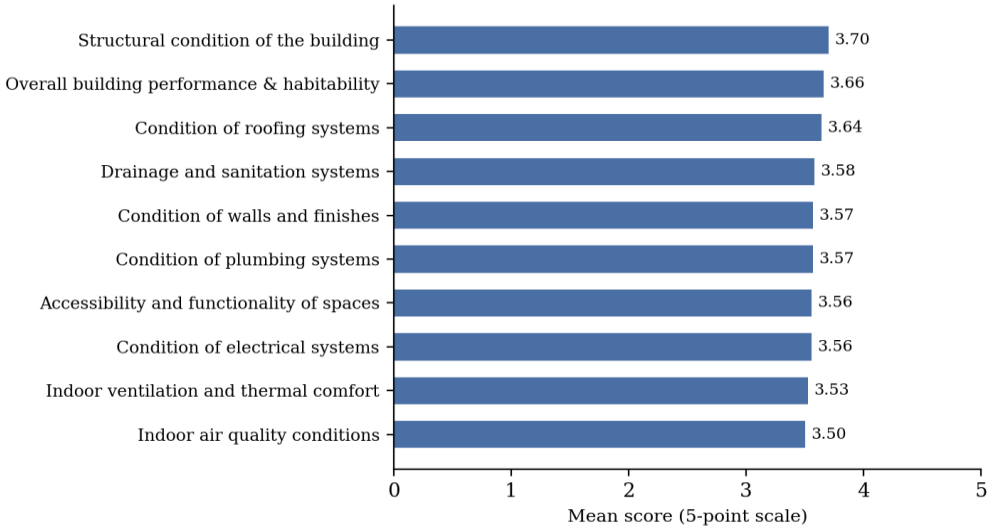


Figure 4: Mean Ratings of Residential Building Condition Indicators (N = 152)
Source: Author's work (2026)

Variation in Building Condition by Age of Building

A one-way ANOVA tested H1, that perceived building condition does not differ significantly across building-age groups. As shown in Table 4, the test returned a statistically significant result, F (3, 148) = 3.51, p = 0.017, leading to rejection of H1. Buildings aged 5–10 years recorded the highest mean condition score (mean = 3.84), while buildings above 20 years and those under 5 years recorded the lowest (mean = 3.36 each); the under-5-year group comprised only nine respondents. Tukey HSD post-hoc comparison identified a significant pairwise difference specifically between the 5–10-year and above-20-year groups (mean difference = 0.49, q = 4.18, p = 0.019), while other pairwise comparisons were not significant. This suggests that condition does not decline in a simple linear way with age: the only statistically significant difference was between the 5–10-year and above-20-year groups, and the equally low mean for the small under-5-year group (n = 9) should be interpreted cautiously.

Table 4: One-Way ANOVA — Building Condition by Age of Building

Age of Building	N	Mean	SD
Less than 5 years	9	3.36	0.98
5–10 years	36	3.84	0.84
11–20 years	54	3.68	0.83
Above 20 years	53	3.36	0.60

Note. F (3, 148) = 3.51, p = 0.017. Tukey HSD post-hoc: significant difference between 5–10 years and above 20 years (mean difference = 0.49, q = 4.18, p = 0.019); no other pairwise comparison was significant.

Building Deterioration and Maintenance Challenges

Table 5 presents the frequency of deterioration and maintenance issues. Poor maintenance culture among residents and poor ventilation/overheating were jointly the highest-rated problems (mean = 2.71 each), closely followed by inadequate funding for maintenance, cracks in walls and structural elements, and electrical faults (mean = 2.70 each). Roof leakage and water penetration was the least frequently reported issue (mean = 2.56). All ten means fell below the scale midpoint of 3 ('occasionally'), indicating that these problems were reported as occurring less than occasionally rather than frequently. Corresponding RII values ranged from 0.512 to 0.542. These findings corroborate previous Nigerian studies identifying poor maintenance practices and inadequate funding as leading drivers of residential decay (Waziri, 2016; Ichendu & Irimiagha, 2024), and support the view that maintenance behaviour, rather than structural failure alone, is central to the erosion of building performance in the study area.

Table 5: Building Deterioration and Maintenance Issues (Ranked by Mean Score, N = 152)

Rank	Deterioration / Maintenance Issue	Mean	SD
1	Poor maintenance culture among residents	2.71	1.11
1	Poor ventilation and overheating	2.71	1.08
3	Inadequate funding for building maintenance	2.70	1.11
3	Cracks in walls and structural elements	2.70	0.99
3	Electrical faults and power-related problems	2.70	1.06
6	Plumbing and water supply failures	2.68	1.03
7	General dissatisfaction with building condition	2.66	1.00
7	Dampness and mould growth	2.66	1.10
9	Deterioration due to ageing building materials	2.64	1.05
10	Roof leakage and water penetration	2.56	1.07

Association between Residential Density and Building Performance

A Chi-square test of independence tested H2, that overall building performance is not associated with residential density. As shown in Table 6, a statistically significant association was found, χ^2 (4) = 14.21, p = 0.007, Cramér's V = 0.217 (weak-to-moderate effect size), leading to rejection of H2. High-density areas recorded the weakest profile, with 16.7% of respondents rating overall performance 'Poor' and 42.6% 'Good', compared with 3.2% and 66.7% in medium-density areas. Low-density areas were more polarised than medium-density areas (14.7% 'Poor' and 70.6% 'Good'), although only 34 low-density respondents were included. The association is therefore driven mainly by the weaker performance of high-density buildings, consistent with the literature on high-density settlements (Onyenokporo & Ochedi, 2018; Alegbe et al., 2025). One respondent who classified their area as an informal settlement was excluded from this test (n = 151).

Table 6: Chi-Square Test — Residential Density and Overall Building Performance

Residential Density	Poor	Fair	Good
High-density	9	22	23
Medium-density	2	19	42
Low-density	5	5	24

Note. χ^2 *(4) = 14.21, p = 0.007, Cramér's V = 0.217.*

Extent and Frequency of Adaptive Retrofit and Upgrading Practices

Table 7 and Figure 5 present the frequency of adaptive retrofit and upgrading practices. Participation in neighbourhood housing improvement initiatives was the most frequently reported practice (mean = 3.33), followed by regular preventive maintenance (mean = 3.27) and renovation of deteriorated components (mean = 3.26). Structural strengthening and rehabilitation were the least frequently adopted practice (mean = 2.74), followed by the use of climate-responsive retrofit strategies (mean = 2.93). Corresponding RII values ranged from 0.547 to 0.666. This pattern indicates that respondents more often reported low-cost, incremental measures than technically demanding or capital-intensive interventions such as structural strengthening, renewable energy integration, and climate-responsive design which is consistent with the cost and technical-skills barriers to advanced retrofit reported elsewhere in the Nigerian literature (Akande & Olagunju, 2016; Adegoke et al., 2025), and suggesting that the more advanced retrofit strategies documented internationally (Bournas et al., 2022; Passoni et al., 2024) remain under-utilised among residential occupants in Ibadan. The differences between adjacent mean scores are modest and were not formally tested.

Table 7: Adaptive Retrofit and Upgrading Practices (Ranked by Mean Score, N = 152)

Rank	Retrofit / Upgrading Practice	Mean	SD
1	Participation in neighbourhood housing improvement initiatives	3.33	0.98
2	Regular preventive maintenance activities	3.27	1.02
3	Renovation of deteriorated building components	3.26	1.03
4	Replacement of old materials with durable alternatives	3.24	1.07
5	Retrofitting for improved ventilation and thermal comfort	3.16	1.07
6	Upgrading of plumbing and sanitation systems	3.03	1.05
7	Integration of renewable energy technologies	3.02	1.18
8	Use of energy-efficient systems during renovation	2.96	1.12
9	Use of climate-responsive retrofit strategies	2.93	1.13
10	Structural strengthening and rehabilitation practices	2.74	1.15

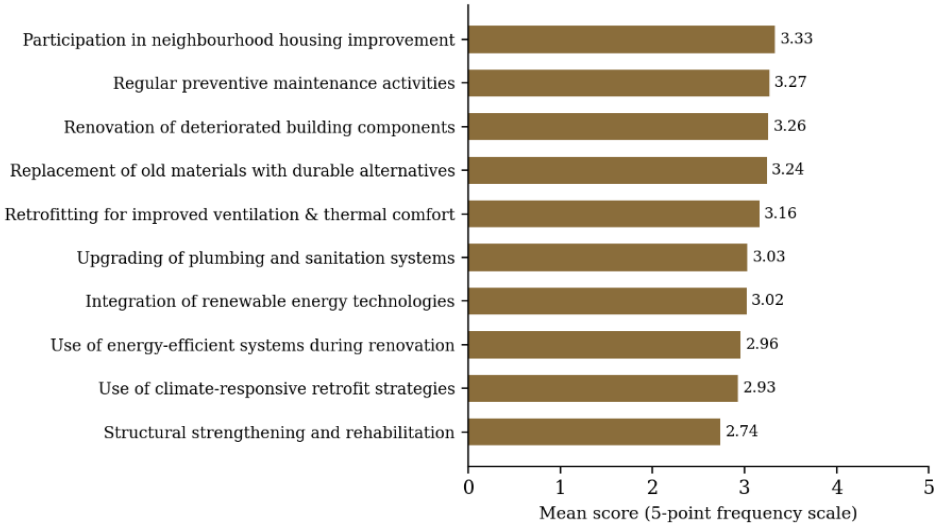


Figure 5: Mean Frequency of Adaptive Retrofit and Upgrading Practices (N = 152)
Source: Author's work (2026)

Association between Tenure Status and Maintenance Frequency

A further Chi-square test examined H3, that the frequency of preventive maintenance is not associated with tenure status. As shown in Table 8, a statistically significant association was found, χ^2 (6) = 16.99, p = 0.009, Cramér's V = 0.236, leading to rejection of H3. Owner-occupiers and residents of official quarters were more likely to report frequent preventive maintenance than tenants, consistent with prior Nigerian findings that owner-occupiers report better maintenance outcomes than tenants (Ibem et al., 2013; Adegoke et al., 2025), and suggesting that split incentives between landlords and tenants may partly explain the low uptake of preventive maintenance among the tenant sub-group.

Table 8: Chi-Square Test — Tenure Status and Frequency of Preventive Maintenance

Tenure Status	Low	Moderate	High
Owner Occupier	3	5	16
Tenant	19	29	24
Family House	7	14	22
Official Quarters	1	1	11

Note. χ^2 *(6) = 16.99, p = 0.009, Cramér's V = 0.236.*

DISCUSSION

The results address the three objectives of this study in a complementary way. Regarding building condition, residential buildings in Ibadan were rated between 'Fair' and 'Good' on structural and fabric indicators, but weaker on indoor environmental quality, with poor maintenance culture, poor ventilation, and inadequate funding emerging as the leading deterioration challenges. This confirms that maintenance behaviour, more than structural failure per se, is central to the erosion of building performance in the study area (Waziri, 2016; Obarisiagbon et al., 2026), and is reinforced by the finding that condition differs significantly by building age, with a statistically significant difference only between the 5–10-year and above-20-year groups, and by residential density, with high-density neighbourhoods showing the weakest overall performance and low-density neighbourhoods showing more polarised (both better and worse) outcomes than medium-density areas.

Regarding retrofit and upgrading practices, respondents in Ibadan more often reported low-cost, incremental measures such as renovation, preventive maintenance, and neighbourhood-level participation than technically demanding interventions such as structural strengthening or climate-responsive retrofit design. This mirrors the technical-skills and cost barriers to advanced retrofit reported elsewhere in the Nigerian literature (Akande & Olagunju, 2016; Afolabi et al., 2025) and suggests that, absent external support, occupant-driven retrofit in Ibadan will continue to operate well below the technical ceiling demonstrated in more resourced contexts (Bournas et al., 2022; Passoni et al., 2024). The significant association between tenure status and maintenance frequency further indicates that ownership structure, not merely awareness or willingness, shapes whether preventive maintenance actually occurs, given that tenants, who make up the largest share of the sample, were markedly less likely to report frequent maintenance activity than owner-occupiers or residents of official quarters.

This preference for minor, piecemeal repair is consistent with the housing adjustment perspective outlined earlier and cannot be separated from the wider economic context of urban Nigeria. Sustained inflation, currency depreciation, and the construction sector's dependence on imported inputs have pushed up the prices of cement, steel, tiles, and other hardware in recent years, and building costs have remained high even as headline inflation has eased (Guardian Nigeria, 2025). Household income and

material prices were not measured directly in this study, but these pressures offer a plausible explanation for the findings. A planned retrofit demands a large lump sum that many households cannot raise, whereas small, immediate repairs such as patching a roof, replacing a fitting, or repainting can be funded from current income and staged or deferred as prices change. Escalating hardware costs therefore reinforce reactive maintenance: residents scale down or postpone interventions, tolerating gradual decline in indoor environmental quality rather than committing scarce funds to structural or energy measures with long payback periods. Landlords may face the same cost pressures and have limited incentive to invest in tenanted properties, which may further help to explain the tenure effect observed. This suggests that technical advice alone is unlikely to shift retrofit behaviour without financing support, affordable materials, or phased retrofit packages.

Together, these findings suggest that Ibadan's residential stock is currently being sustained rather than genuinely renewed: buildings remain serviceable through minor, reactive interventions, but the comprehensive retrofit measures needed for substantial lifecycle extension such as structural strengthening, climate-responsive design, and renewable energy integration remain marginal. Building age, residential density, and tenure status each offer a practical, measurable entry point for targeting future retrofit interventions and policy support, rather than treating the residential sector as a single undifferentiated population.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study assessed the condition of residential buildings and the extent of adaptive retrofit and upgrading practices among 152 residents of Ibadan, Nigeria. While the surveyed building stock remains broadly serviceable, its structural and fabric condition already outperforms its indoor environmental quality, and both are undermined by a maintenance culture that is reactive rather than planned. Building condition was significantly lower in buildings above 20 years than in those aged 5 –10 years, and it varies with residential density, while retrofit practice is dominated by low-cost, incremental measures rather than the structural and climate-responsive interventions with the greatest potential to extend building lifecycles. Tenure status further shapes whether preventive maintenance occurs at all, with tenants reporting less frequent preventive maintenance than owner-occupiers.

Recommendations

- Property owners and facility managers should shift from reactive repair toward scheduled preventive maintenance, particularly for buildings approaching or exceeding 20 years of age, where condition was significantly lower than in 5–10-year-old buildings.
- Local government and housing agencies should prioritise retrofit support such as technical advice, inspection schemes, or small grants in high-density neighbourhoods, where overall building performance was weakest, and in low-density neighbourhoods with older, more heterogeneous building stock, where outcomes were more polarised.
- Landlord–tenant maintenance responsibilities should be clarified through lease-level guidance or regulation, given the significant gap in preventive maintenance frequency between tenants and owner-occupiers.
- Professional bodies and tertiary institutions should expand training in structural strengthening and climate-responsive retrofit techniques, which remain the least-adopted practices despite their potential to extend building lifecycles more substantially than minor renovation alone.

Limitations of the Study

The paper reports resident-perceived, self-reported data rather than independent technical assessment of building condition, and its cross-sectional design captures a single point in time rather than change over time. Neighbourhood of residence was not recorded, and because data were collected online without a fixed sampling frame of residential occupants, a precise response rate could not be computed, and the findings should be interpreted with this in mind. The study also deliberately confines its scope to building condition, deterioration and retrofit practice.

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